Spis Godt

Semester assignment, INFO262

Spring 2019

Students: 156, 186, 183

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1 Introduction

We are making an application that helps people eat more varied and healthy food, while also decreasing food waste. The application - Spis Godt- will automatically generate recipes based on multiple factors - what ingredients you currently have in your home, ingredients you want to make food with, and new exciting recipes our system will recommend based on your previous likings.

According to Matvett (2017) we threw away 385.000 ton of food in Norway in 2017. Although most of this is caused by the food industry, grocery stores and hotels, “a very large proportion of food waste occurs in private households (Syversen et al, 2018).

To decrease food waste, our application lets you easily register expiration dates of products you buy, be it cold or dry stored, fruits and vegetables. After registering, the application will remind the user if a product is close to it’s expiration date and will recommend a recipe based on these products.

1.1 Problem Space

Everyday we have to figure out what to eat for breakfast, lunch and dinner. We have to figure out what we can make out of the ingredients we have, if we need to go to the store, what to buy, and at the same time wanting to eat healthy. Since there is so much to take in to consideration, we often end up buying a frozen pizza on our way home from work or school, order food or make something without consider what you already got. This causes us to throw food, eat unhealthy and waste money.

Our application - Spis Godt - will help people eat healthier, spend less money and reduce food waste. The user will have full control off what groceries they have at home, be reminded when food is about to expire, and get recipe recommendations. Since the user will be able to check what groceries they have at home at any time,

they will avoid buying duplicates, and because our system recommends a recipes which contains those ingredients the user has, they save time and money, and reduce food waste.

1.2 Intended Target Group

Our intended target group are norwegian students that want to eat healthier and reduce food waste. Most students have just moved out, and have little to no experience with meal planning. And most of them won't have a lot of money either. This means that they have to plan their meals and grocery shopping even more carefully. We want our application to help students, which in our opinion need our application - Spis Godt - the most.

We assume that people from older generations would not use the application. This assumption is based on the complexity of technology. Generations which are not digital natives (people who grow up with and rely on digital technology) will commonly avoid learning new technology as they find it redundant. We also assume young children to not use this application. Young children does not buy much of their own food because they are being provided for. But both young-adults and adults with families will be able to take part in a "family-group" where they can register what they have eaten and what they like. This way we include most age groups, though with a bigger focus on our target group.

1.3 User Stories

When we started evaluating what functionality the application should have, we first made a list of user stories. This list was written from the standpoint of a user, and this way we got an overall look of what our application should include.

The user stories:

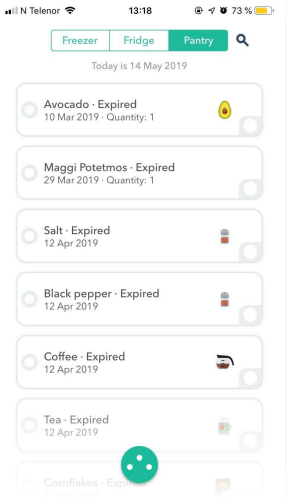
- As a user I want to have a list that lets you add and delete products.

- As a user I want to have an overview over when my products expires.
- As a user I want to have a way to get options for recipes.
- As a user I want to get notifications when a products is about to expire.
- As a user I want to be able to cross out for things I don't like or tolerate.
- As a user I want to have an option for family members to be able to update the list of what I have in the fridge.
- As a user I want to have all information in norwegian.
- As a user I want to get recipes based on how much time i have.

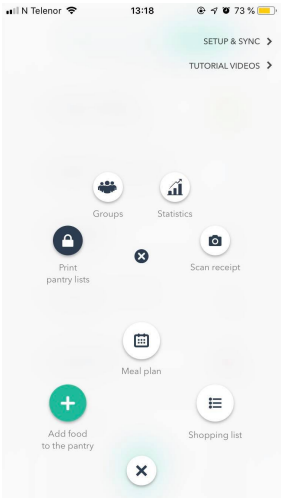
1.4 Similar Applications

There are multiple applications that are similar to our idea, but all differ from one another in both design and functionality. In addition the available applications restricts our intended target group - norwegian students - in terms of their targeted location. From the ones we tested we chose three of them to compare against our idea.

The application ‘NoWaste’ (NoWaste, 2019) has a good design, but it’s functionality is simple and doesn’t support recipe recommendation in the way our idea will provide. As shown in picture 1.1 and 1.2 ,this is a very simple application where the user have control of what they have in their fridge, freezer and pantry. We want want a simple design like this for our application - Spis Godt - as well, but we also want to focus more on recipe recommendations to make it even more personalized.



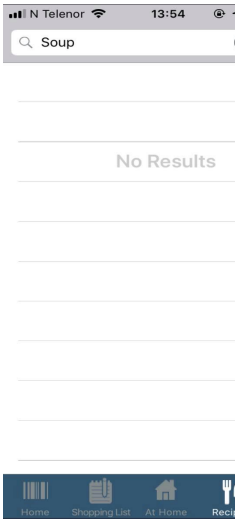
Picture 1.1



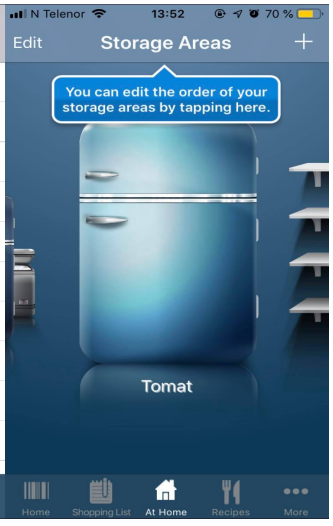
Picture 1.2

Picture 1.1 and 1.2: Screenshots of the application ‘NoWaste’ .

‘Fridge Pal’ (Fridge Pal, 2017) shares a lot of the functions we would like to implement, but lacks in design and is tedious to use. Picture 1.3 and 1.4 shows the design of the application ‘Fridge Pal’. When we tried to search for a recipe it said “No results” no matter what we wrote. When we tried to add a tomato as a grocery we had, it ended up being added as the name of a storage area. This shows how lacking this design is, and is something we saw as an advantage for the future design for our application.



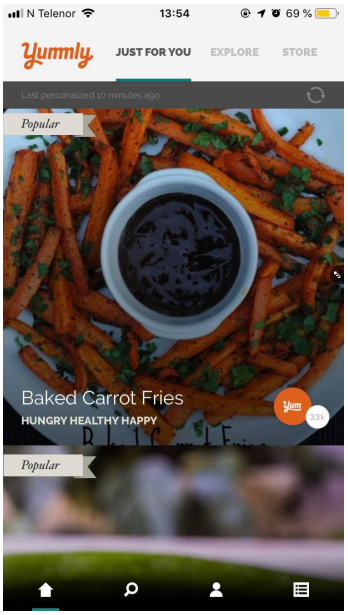
Picture 1.3

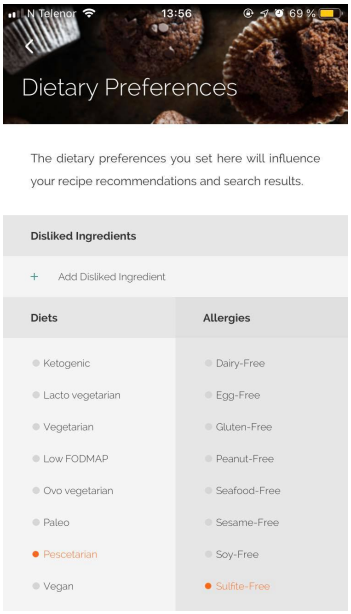


Picture 1.4

Picture 1.3 and 1.4: Screenshots of the application ‘Fridge Pal’.

From the applications we chose to focus on, ‘Yummly’ (Yummly, 2019) seems to be the current available application that is the most similar to our idea of an application. ‘Yummly’ have recipe recommendations which is based on dietary preferences as shown in picture 1.5 and 1.6. It does not have the ability to check with groceries you have at home, as the two other applications. The application have a lot of pictures, which makes it messy and difficult to know what each button does. Although the application have many of the same functions as we want, it is not optimal when it comes to design.





Picture 1.5 *Picture 1.6*

Picture 1.5 and 1.6: Screenshots of the application ‘Yummly’.

Our application - Spis Godt - will differ from these applications as we want to focus on making it even more personalized and simpler in design. All of these applications seem to be adapted to people who live in The United States. This makes the applications difficult to use for people that live in Norway as there are different groceries here. Since our target group is norwegian students, our application will be

adapted to people living in Norway. What we are creating is something similar to the available products, but one that focuses on both good interactive features with an attractive design and functionality.

2 Requirements

Requirements needed to be established for our application, and to help with this we created a google form with questions that potential users answered. The questions were based on the problem space we'd previously defined and the initial requirements we'd set from our user stories. From this data we could define and establish early requirements with confidence.

2.1 Gathering Data

The goal of our data gathering is to further establish requirements and goals for this application. We chose a questionnaire as our data gathering technique. According to Rogers, Sharp and Preece (2015, p. 295) questionnaires help us get a wider perspective on particular issues that have arisen elsewhere. An online questionnaire gives us the possibility to gather information from people located in other parts of the country, and therefore gather more data than we would from a location restricted questionnaire. Since our target group is students, we assume that they are familiar with Google forms or similar pages. And because we want to gather the broadest amount of data, we are going to use a quantitative approach with our questionnaire on Google forms.

When making the questionnaire we made sure to place the questions in a order that makes sense, as well as having unambiguous questions and simple instructions. We decided to divide the questions into related topics to make the questionnaire easier and more logical to complete (Rogers et al., 2015, p. 206). In the first part of the questionnaire the user finds an introduction that explains how the questionnaire should be carried out. These instructions are also specified for each question. The

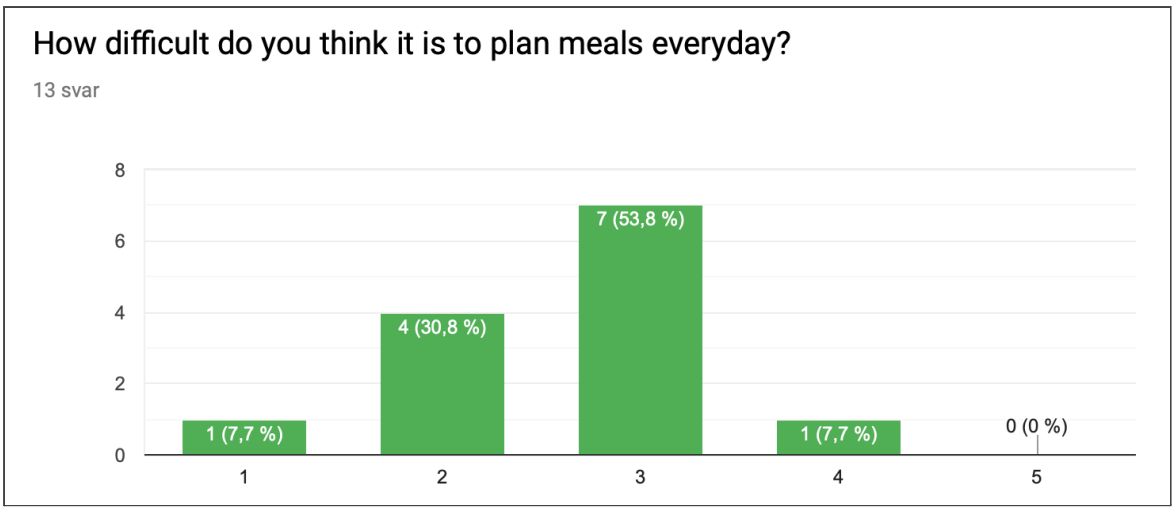
first part of the questionnaire consist of some basic demographic questions, such as age and gender. This background information is useful for putting the questionnaire responses into context." (Rogers et al., 2015, p. 206). We placed the "short answer" questions at the end, as the respondents then have gained more insight into what we are gathering data about. By doing this, as well as creating the questionnaire in a format that serves each question in the best way, it is easier for the respondents to answer clearly.

2.2 Analyzing the Data

From the 13 participants in our questionnaire extracted and analyzed the answers as data, and received helpful information from them. This helped us put together some requirements, and an idea of how to structure our design in a way that fulfills these requirements. The requirements are listed in section 2.4.

We asked norwegian students, our target group, to take our questionnaire. Most of the respondents were females, while only 35% of the respondents were males. And more than 85% of our responses came from peoples between the age of 18 to 29. 61% also said that they still lived with their parents. Which told us a function for "grouping" (several people could share a common grocery list) might be useful.

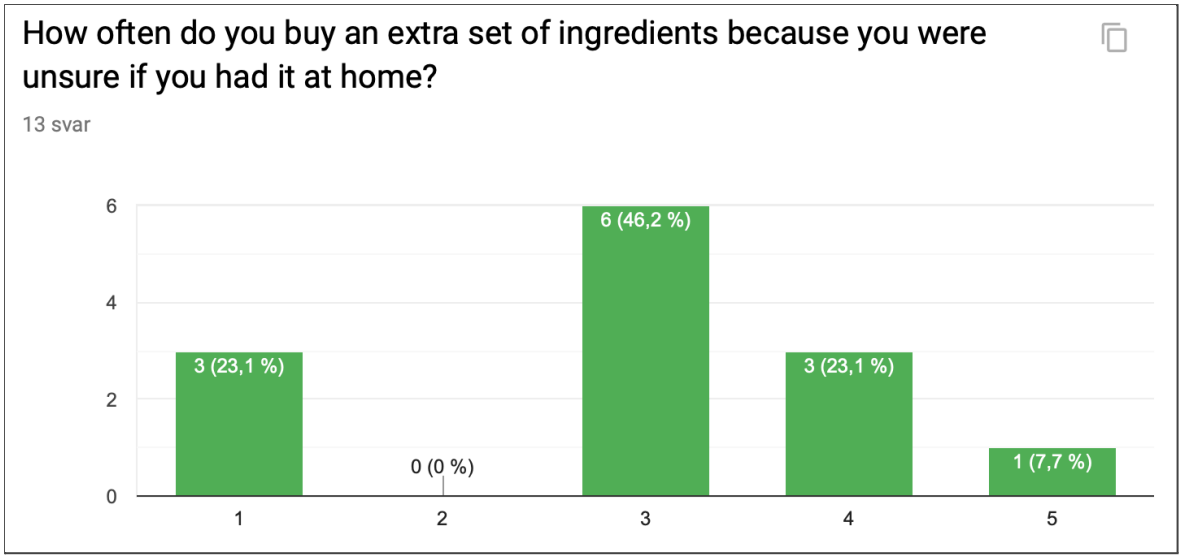
Both picture 2.1 and 2.2 show that only 7,7% think it is easy to plan meals, and that they never plan meals while they are in the store. More than half of the respondents have answered that they think it is ok to plan meals every day, and as many as 77% have answered that they sometimes or often plan meals at the store.



Picture 2.1: Representation of the answers for question 5 "How difficult do you think it is to plan meals every day?" where the scale goes from "1(Not difficult)" to "5(Very difficult)".

Picture 2.2: Representation of the answers for question 6 "Do you often plan your meals while you're at the store?" where the scale goes from "1(Never)" to "5(Always)".

Picture 2.3 shows that only 23,1% of the respondents never buy an extra set of ingredients because they were unsure if they had it at home. The rest of the respondents have answered sometimes or more often. This data indicates that a list of what the user have at home would be a fitting implementation.



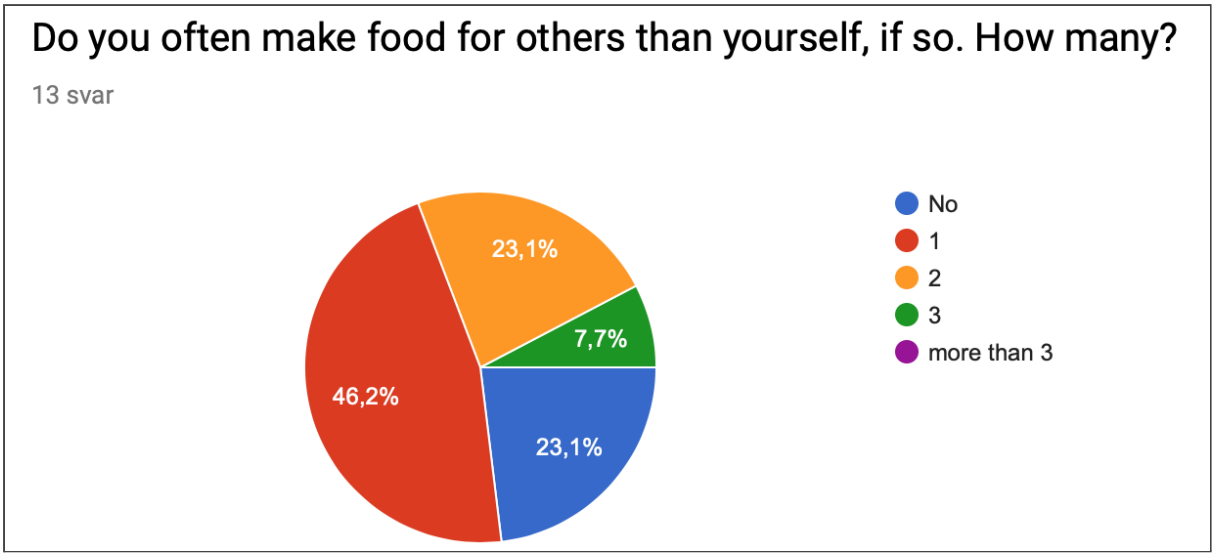
Picture 2.3: Representation of the answers for question 8 "How often do you buy an extra set of ingredients because you were unsure if you had it at home?" were the scale goes from "1(Never)" to "5(Always)".

Picture 2.4 shows that all of the respondents answered in a way that indicates that they care about eating healthy.

Picture 2.4: Representation of the answers for question 9 "How important is it for you to eat varied, and have a well balanced diet?" were the scale goes from "1(Not important)" to "5(Very important)".

Picture 2.5 shows that a surprising amount of the respondents make food for more than them self, while only 23,1% usually cook strictly for themselves. To make it

easier for families and collectives, we see that an option to create groups, where in these groups all of the members can see available ingredients as well as delete eaten or add newly bought would be neat.

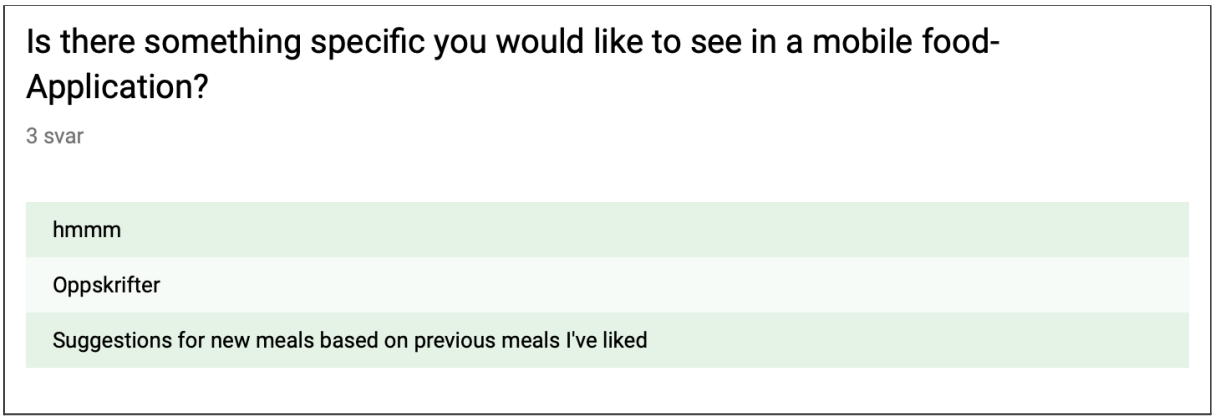


Picture 2.5: Representation of the answers for question 10 "How often do you buy an extra set of ingredients because you were unsure if you had it at home?" were the colors in the graph corresponds with the answer next to the same color to the right.

Picture 2.6 shows that the overall reason for food waste is expired food. To solve this, we deem that an overview of expiration dates would serve the user well.

Picture 2.6: Representation of the answers for question 13 "What is the main reason you throw food?" which is a "short answer" question.

Picture 2.7 shows that some of the respondent would like to have suggestions for recipes. One also answered that they want the suggestions for recipes to be based on the previous meals they have liked.



Picture 2.7: Representation of the answers for question 14 “Is there something specific you would like to see in a mobile food-Application?” which is a “short answer” question.

2.3 Persona and Scenario

KARI NORDMANN

Personal Information

Age: 22
Gender: Female
Address: Bergen, Norway
Occupation: Student at The University of Bergen

About Me

I am a student at The University of Bergen, in which I study literature at my fourth year. I live in a student apartment with three other friends which are all also students. We try to make dinner together sometimes, but with different schedules almost each day, it can become difficult to find time for this. Mostly I make dinner for myself. Besides being a student, I play lacrosse at the university team twice a week and have a part time job at a supermarket.

Meal Planning

- I usually spend 10-15 minutes planning my meals each day.
- Sometimes I find it difficult to decide what to eat because I want to eat healthy, but also varied meals. This can make it hard to plan my meals when I have a stressful week.
- When shopping for food, I decide my meals while shopping two or three times a week.
- I find it hard to constantly remember what foods I have at home, so I sometimes end up buying duplicates.
- This also ends up with me throwing away food sometimes, as a result of expired wares.

User Scenario

Monday morning Kari wakes up early to attend a class at the university. She makes herself some breakfast and a lunch pack. After school she has a two-hour break before she needs to attend lacrosse training, but before she can begin her practice, she needs to eat something. She decides that she wants to make some pasta, but she doesn't have all the ingredients she needs at home, so Kari needs to go grocery shopping. Kari doesn't bother making herself a list because she only needs to buy a couple of ingredients, but when she's leaves the store, she has ended up buying a

full bag of food. Kari didn't remember if she had enough pesto home, or if the tomatoes on the bench were getting old, neither did she remember if she had any ham left after the breakfast. When Kari comes home, she realizes that she's bought duplicates on almost everything she thought she didn't have, which she now won't be able to eat up before they expire.

After lacrosse training, Kari needs to make dinner but hasn't yet planned what to eat, so she searches for some recipes online. This time she thinks it's a good idea to write down a list of the ingredients she needs for her dinner, so she knows exactly what to buy for her meal. And as a result, she doesn't come home with foods she already has, and none of the ingredients goes to waste. Kari likes the idea of not throwing food, wasting money, while also getting fresh recipe ideas, but searching for recipes online can be tedious. Also, she doesn't want to always have to search for new recipes for her to plan a meal without her ending up throwing half of it, so she decides to download an application which can do all of this for her automatically – 'Spis Godt'.

Kari now gets all of her necessary groceries automatically added to her shopping list when choosing one of the many recipes suggested by the application. When Kari wakes up the following day, she inputs what she has left of ingredients at home and the application finds a recipe to recommend her, based on what she already has. Now when Kari has finished her day at the university, she simply follows the ingredients she needs for the recipe of her choosing, all of which can be easily accessed in the application. If she wants to shop for multiple recipes at a time, she simply chooses multiple recipes that she'd like to have for the week and follows the ingredients for the respective recipes. If Kari has some unused foods at home, she will get a notification if these foods are about to expire and gets a recommendation on a recipe that utilizes the foods in the best way. She now doesn't have to worry about searching for recipes if she doesn't want to, while still eating varied, and will be throwing away less food.

2.4 Requirement Specification

2.4.1 Functional Requirements

The application needs to satisfy the following requirements:

- Have a list that lets you add and delete products.
- Have an overview over when different products expires.
- Automatically give options to recipes, based on a recommender system.
- Automatic notifications if you haven't used the application in a while, and when products are about to expire.
- Be able to cross out for things you don't like or tolerate.
- family function that lets family-members be able to update the collective information.
- Information needs to be displayed in norwegian.
- Be able to easily give the user a new recipe with the click of a button if the suggested one wasn’t satisfying.
- Filter feature that lets the users decide how much time their willing to spend making food.

2.4.2 Non-Functional Requirements

The application must satisfy these requirements:

- User Friendly
- Logical and intuitive
- Support IOS
- As a Norwegian application it must follow GDPR
- Up to date recipes
- System scalability (must scale to different screens)
- Storage capacity (foresee and maintain enough data storage)

These non-functional requirements are measurable with usertesting.

3 Prototype Design

We have conducted an iterative process to design our prototype. This is to split the project in parts to evaluate our progress continually

3.1 First Iteration - Low-Fidelity Prototype

We want our users to feel like they have a certain control and overview on their diet and personal stock of food, and with our users being mainly students, which can be hard to appeal to when it comes to food and recipes, we must design our application with simplicity and well functioning, logical interactive features. Students tend to be a little more carefree than adults that have settled down when it comes to making food. And sometimes we find ourselves in a situation where we've gone a week without actually planning any meals beforehand, but instead just buys something that's quick and with little nutritional value. That's why we want to create the application for this target group, to help students with culinary lacking skills and efforts to eat better and throw less.

Based on our idea to help people eat healthier, we decided to go with a green theme, with a simple look and feel when navigating through the different pages. As little information as possible on each of the pages, but still enough information for the user to know what their next step would be is our goal. This is to keep the user interested, too much information packed in one place can be tedious. We want to make the user feel like it's a simple application to use, and so that the user can easily learn the application faster. Following the 'simple-feel' pattern we try to use features that most users are already familiar with (e.g. 'Hamburger Menu').

According to The Norwegian Directorate for Children, Youth and Family Affairs (2018) 15-20% of norwegians live with disability. We therefore considered the Web Content Accessibility Guidelines when designing our low-fidelity prototype. We have considered colorblind people by having a contrast ratio of at least 4.5:1 on visual presentation of text and images of text (Calwell et al., 2008, p. 10). As we have

green as the main color in our application, which does not get a high contrast ratio with black text on it, we have chosen to have light-green or white background for the places we wanted black text, as this has a contrast ratio of 14.81 (Verou, 2008). An alternative would be to have white text on green background, which have contrast ratio of 5.13 (Verou, 2008). We also annotated all the symbols with text to make the application more user-friendly for people with disabilities.

The evaluation part was mostly based on how our own thoughts and preferences affected our design decisions. We haven't yet conducted any user tests, and therefore it's hard to get any objective and constructive criticism regarding the state of our design. But to make sure our design followed some basic principles we did some design analysis, utilizing some of the heuristics from Nielson. Keeping Nielsen's heuristics in mind, we find that our design might be lacking some system status visibility. Though we highlight certain areas of the page we could implement more feedback for the user. Also we could implement more languages so that users from different nationalities might find the application easier to use.

To improve our evaluation and to get a broader view, we compared our design with three applications that looked similar. We found that some features in these applications we didn't like and one of the applications had an overall poor design, so we tried to learn from their mistakes, and implement some of the good features to our own, like user control and user freedom.

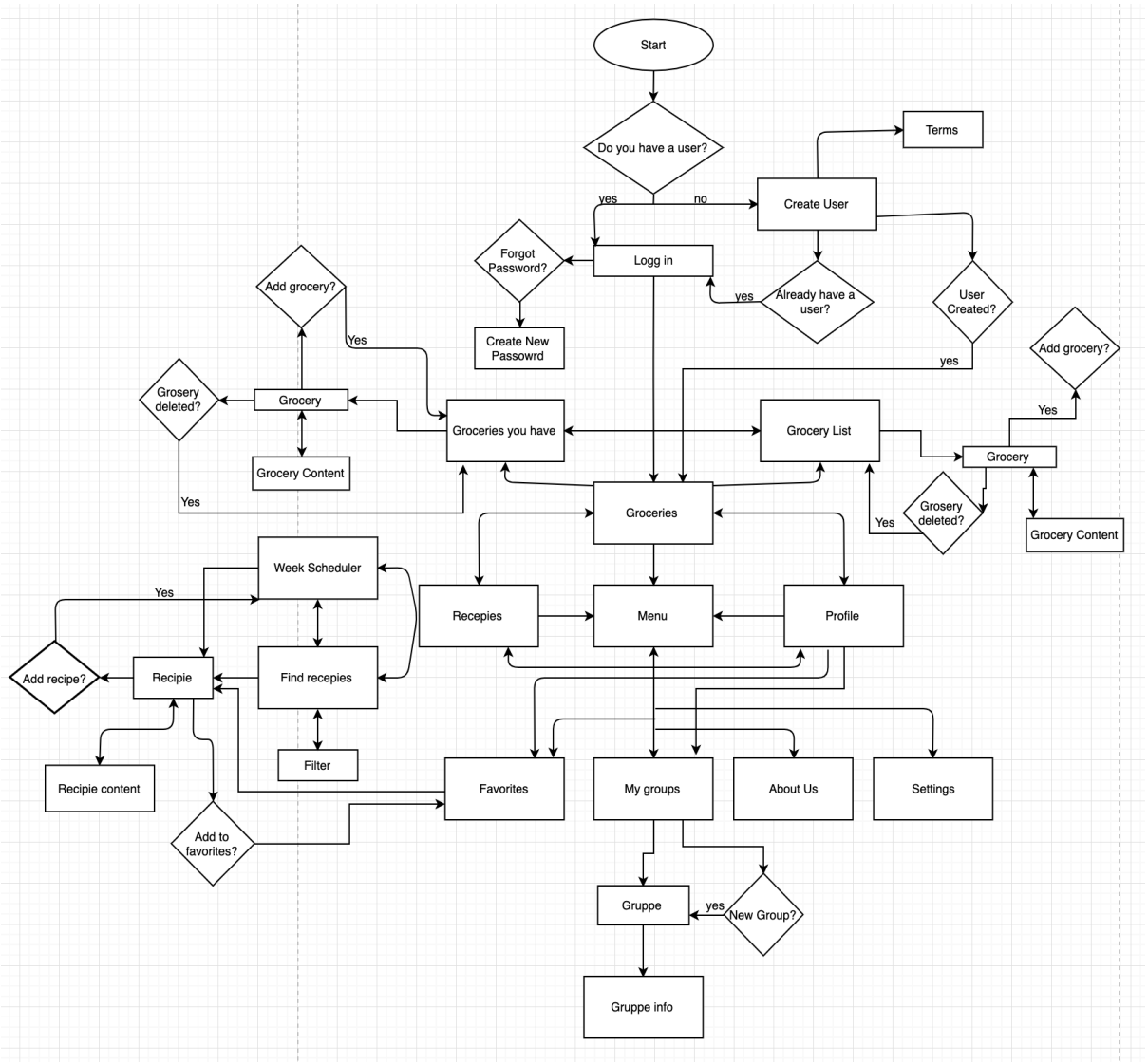
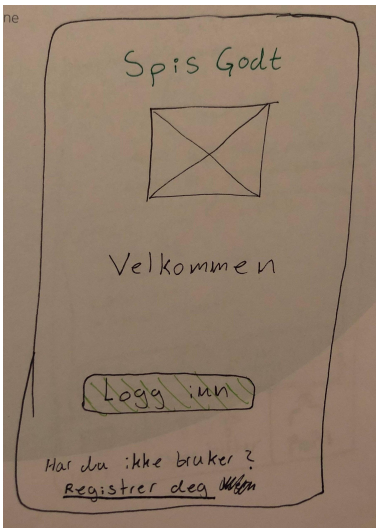
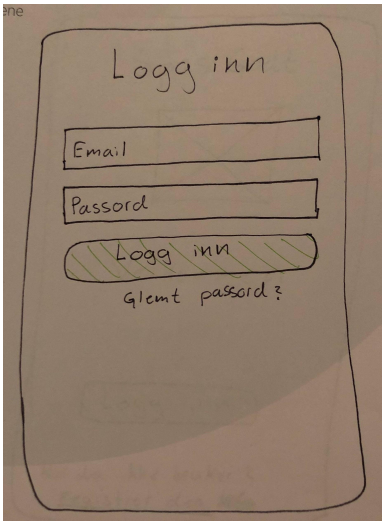


Figure 3.1.1: Flowchart representation of the user interface for the low-fidelity prototype.

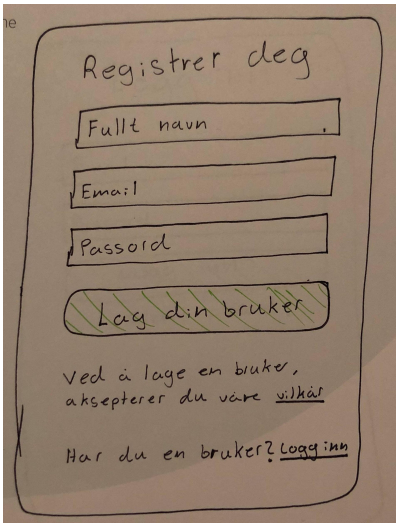
3.1.2 Low Fidelity Prototype Design



Picture 3.1.1

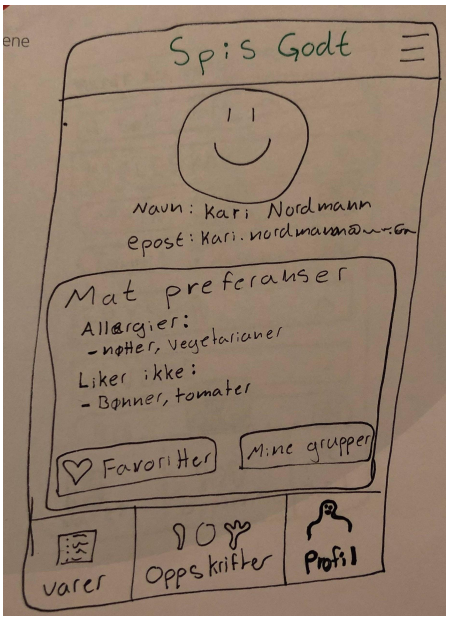


Picture 3.1.2

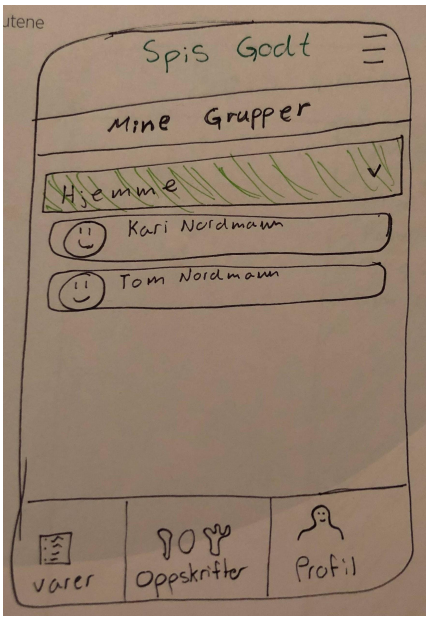


Picture 3.1.3

Picture 3.1.1, 3.1.2 and 3.1.3: Low-fidelity prototype of the “Welcome” page, “Sign in” page and “Register” page.

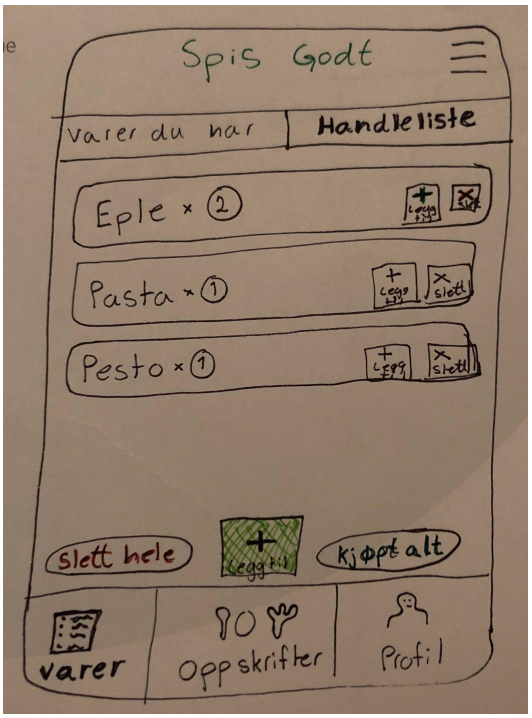


Picture 3.1.4



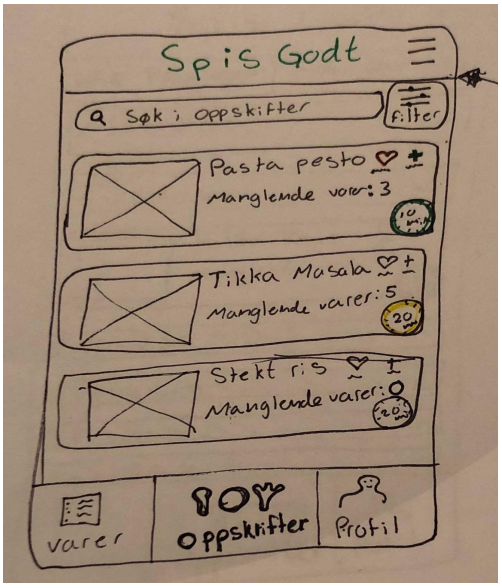
Picture 3.1.5

Picture 3.1.4 and 3.1.5: Low-fidelity prototype of the “profile” page and “My groups” page.



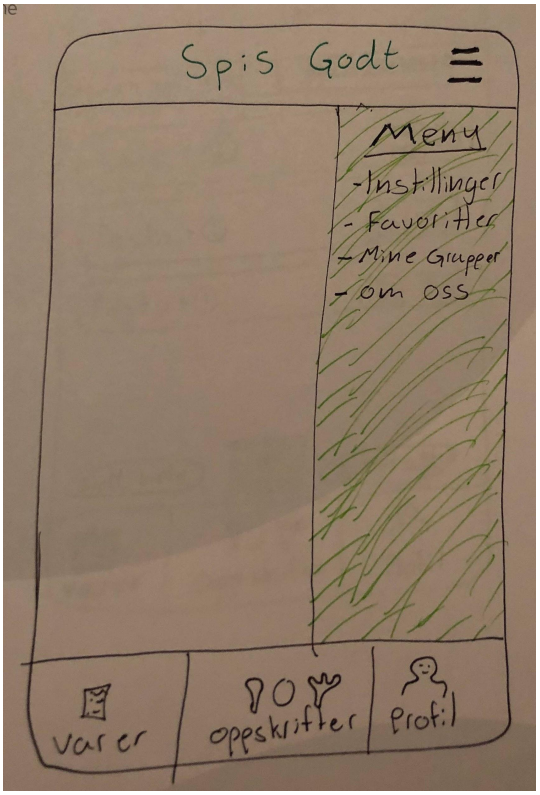
Picture 3.1.6 *Picture 3.1.7*

Picture 3.1.6 and 3.1.7: Low-fidelity prototype of the “Shopping List” page and “Groceries you have” page.



Picture 3.1.8 *Picture 3.1.9*

Picture 3.1.8 and 3.1.9: Low-fidelity prototype of the “Find recipes” page and “week planner” page. The “Find recipes” page is also supposed to have the menu where you can go to the “Find recipes” page.



Picture 3.1.10

Picture 3.1.10: Low-fidelity prototype of the menu that shows when you click the hamburger menu.

3.2 Second Iteration - First High Fidelity Prototype

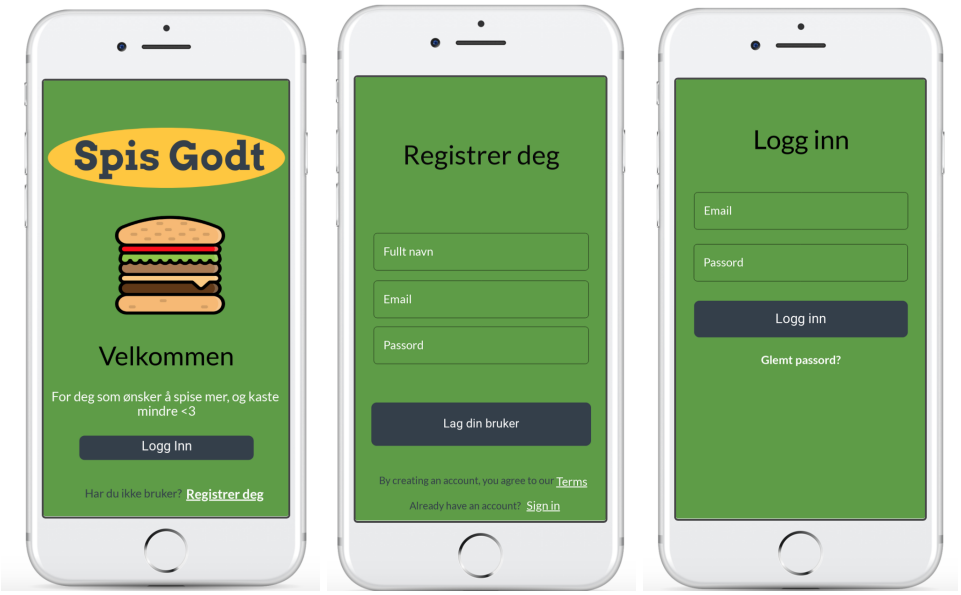
When making the first high-fidelity prototype, we agreed to change some parts of the low-fidelity prototype. We initially went with a green background, but figured out that this would prove difficult as green does not go well with other colors, such as red. Since we want a contrast ratio of at least 4.5:1, we decided to go for white and grey as our background colors and use green for other features, like highlighting and status feedback.

We want our application to ‘speak’ the users` language, with words, phrases and concepts familiar to the user (Nielsen, 1994). We therefore used more icons and different colors to make it clearer for the user what the buttons do. We have used green and red colors to highlight positive and negative actions. Delete buttons have red text, while buttons that add something are green. We have also used red when a grocery is about to expire. As red and green can’t be differentiated by colorblind people, we also added text and icons. We have used icons that is commonly used in other famous applications and websites, and therefore assume that these icons seem familiar for the users. For most of our icons we also have text so that the user don't have to wonder what the different icons are.

When a user want to delete an item from the favorite list, a pop-up window shows up (see, picture 3.2.5). And here the user can either confirm or cancel their action. This gives the user a confirmation option before commiting to the action, and prevents users from deleting or changing something by accident.

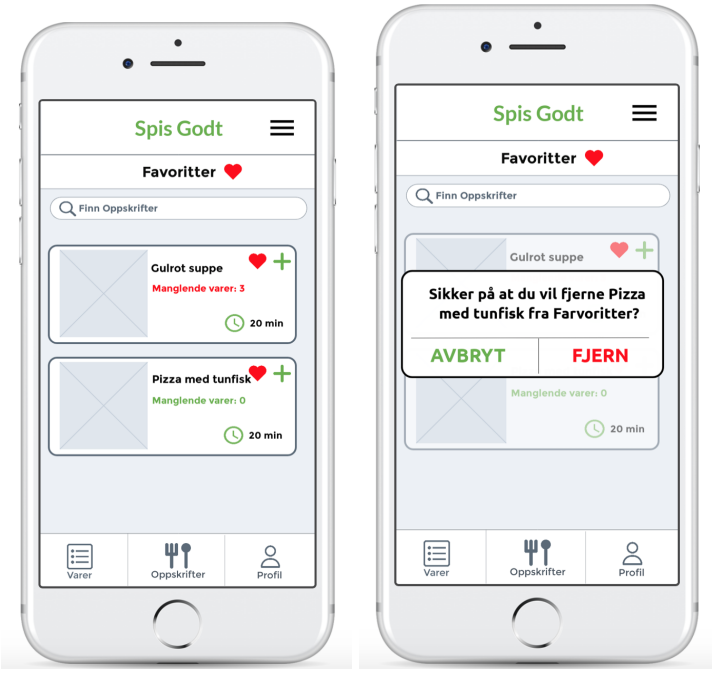
3.2.1 First High Fidelity Design

To build our high fidelity prototype we used a tool called Marvel App. We build a high fidelity prototype like this because it is an easy way to visualize the final product while also providing a great deal of functionality we can test.



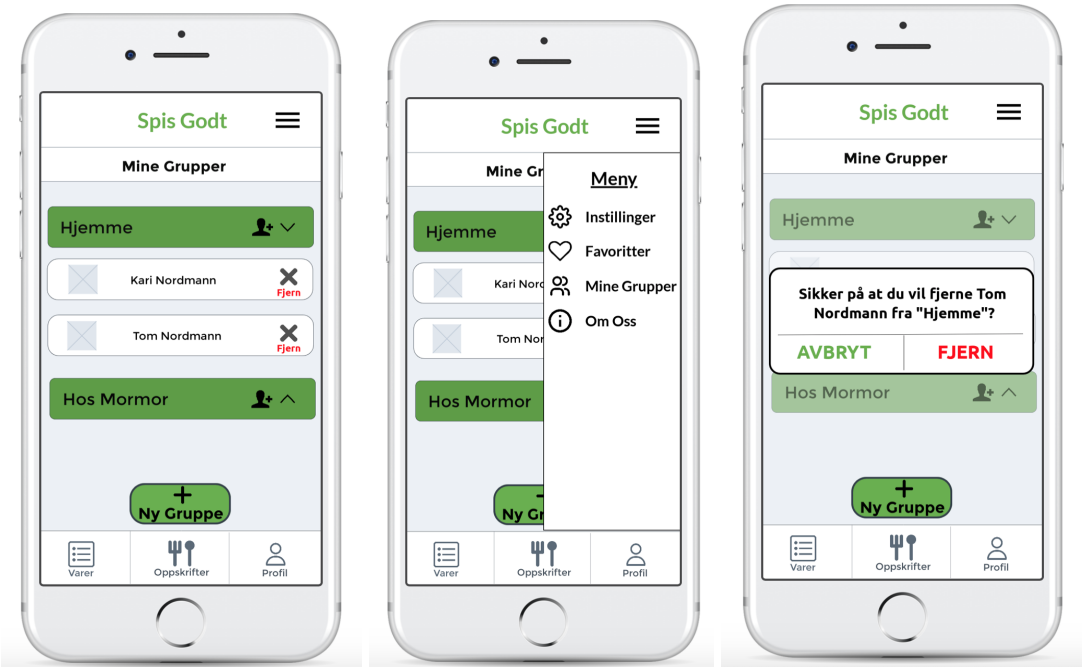
Picture 3.2.1 *Picture 3.2.2* *Picture 3.2.3*

Picture 3.2.1, 3.2.2 and 3.2.3: The three first pages of our application. The Welcome page, the register page and the login page.



Picture 3.2.4 *Picture 3.2.5*

Picture 3.2.4 and 3.2.5: The favorite page and the pop-up window, that asks the user to confirm the action. This window shows up when the user click the heart to remove the recipe from favorites.

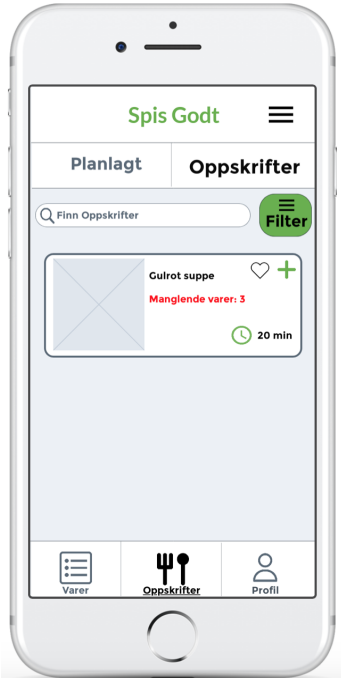


Picture 3.2.6 *Picture 3.2.7* *Picture 3.2.8*

Picture 3.2.6, 3.2.7 and 3.2.8: The “my groups” page and the drop-down menu that shows when the user click the hamburger menu. The last image show the pop-up window that shows if the user click the remove button.

Picture 3.2.9 *Picture 3.2.10*

Picture 3.2.9 and 3.2.10: The grocery section where the user can find both "groceries you have" and "shopping list".



Picture 3.2.11 *Picture 3.2.12* *Picture 3.2.13*

Picture 3.2.11, 3.2.12 and 3.2.12: The “recipe” section where the user can find both “meal planner” and “recipes”. When the user click on a recipe, information about the recipe, such as ingredients, potions and more. The red symbolises that the grocery is missing, while the black ones are groceries that the user has.

Picture 3.2.13

Picture 3.2.13: The profile page where the food preferences is shown.

3.2.2 First Design Evaluation

When evaluating our current prototype, we used the “any setting not involving users” method. This evaluation method involves that consultants and reachersers critique, predict, and model aspect of the interface in order to identify the most obvious problems (Rogers et al. 2015, p.369). As this was our first evaluation of the high-fidelity prototype, we felt that this method was appropriate.

We had three reachersers (fellow students) evaluate our prototype. We informed them of our purpose with the application and the target group. The reachersers then got to test the application.

The researchers continually informed us how they experienced the application, while we also observed how they interacted with the with it. We took notes of what we observed and what they said. They then got a form with nielsen's heuristics where they could evaluate the application.

Nielsens Heuristics	Severity Rate				
	Cosmetic	**Minor**	**Major**	**Catastrophe**	**Explanation**
Visibility of system status	3.2	2.1, 3.1, 3.3			2.1: It was difficult to find the logout option 3.1: I feel that you get “thrown into” the grocery section when you login for the first time, without even knowing which tab your on. 3.2:Always have a title for where you're at (profile does not have this) 3.3:the green plus icon dont give any explanation for what it is for. Maybe have a matching symbol for the “planned recipe” so you know where it's going.
Match between system and the real world		3.1			3.1: planned, is not so intuitive, here there could be allot of different stuff.
User control and freedom		3.1	1.1		1.1: No way to undo mistakes, like for example removing the wrong recipe 3.1: if something is deleted, make it possible to revert that action.
Consistency and standards	1.1, 3.1	1.2	2.1		1.1: Clicking on the heart, both for removing and adding recipe to favorites doesn’t make total sense. 1.2: You should stick to one design for remove buttons, now you're using a trash can icon and an x for deleting items from different lists.

					2.1: sometimes you remove/delete stuff with a trash can symbol, and other times you press on the red heart in favorites to delete it from there. (maybe stick to one universal delete button)? 3.1: Filter uses the same symbole (hamburger menu) as the settings/menu.
Error prevention		3.1	1.1		1.1: Can't see error messages for anything. 3.1: Should give the popup "are you sure you want to logout when you press on logout.
Recognition rather than recall					
Flexibility and efficiency of use			1.1		1.1: Can't see any way to search for items other than using text. (not categories)
Aesthetic and minimalist design	1.1	3.1			1.1: The about us page contains 3 separate pages with a lot of extra information. 3.1:The radius on the different items should be the same, not have a bunch of different corner radiuses.
Help users recognize, diagnose, and recover from errors	2.1				2.1:Maybe have a regret button if people delete an item and then want it back?
Help and documentation		3.1	1.1		1.1: Can't see any "helper function" that describes how the application works. (guide) 3.1: No form of documentation available, maybe create a first time

					logging guide to help the user understand the app
Other usability problem(s)	2.1, 3.1		1.1		1.1: Doesn't make sense that "my groups" is in the settings (menu) but maybe in the bottom navigation bar instead. 2.1:Not a usability problem, but a change that could be made: Under allergies in the Profile it is displayed Vegetarian as an option. I would advise to have a different "section" for vegetarians, and be able to select this to receive vegetarian recipes 3.1: The navbas should be highlighted better, maybe create some chaddow or change the icons or symbolic.

Figure 3.2.1: Nielsens heuristics. The numbers in the columns represent experts 1-3, where 1.1 would represent expert one, comment 1. 2.1 would represent expert two comment 1. And 2.2 would represent expert two comment 2.

3.2.3 Analyzing Data from Design Evaluation

When designing an application, it can be difficult to see its flaws from the creators perspective. This is why it is important to evaluate continually. By evaluating the prototype, we got a lot of useful feedback from the reachersers. Some of the main issues were with the recipe page, the profile page and some minimalistic design errors.

All the reachersers agreed that it was unnatural that the application jumped to the "favorites" when they added a recipe as a favorite. They instead suggested that when you click the heart, it would fill to visualize that the recipe was added. Also, the "plus" icon that adds the recipe to meal planner, was not informative enough. To fix this we got three different suggestions. One of the reachersers suggested that we use an icon that can match the "meal planner". Another suggestion was to have text that informes what the button does. One of the researcher also suggested that if the

user clicks and holds down on a recipe options such as “favorite” and “add to meal planner” would appear.

For the profile page the researchers thought that it, as all the other pages, should have a title to accentuate the location in the application. The part on the profile page where information about the user’s food preferences is stored should have another division for special considerations, such as if the user is vegetarian. “My groups” and “favorites” should be located another place than in the section for food preferences. One researcher suggested that “my groups” should be an own button in the navigation bar to make it more available.

We should make the application design even more aesthetic and minimalist. The researchers told us that we should stick to one border radius, as both straight and round edges are not pretty together. Also the theme should be more consistent as all the pages don't have the same theme. The first time a user uses the application, there should be a guide.

We proceeded our design work by going through the feedback we received during this iteration and fixed it accordingly. Our last design version before our theoretical release is based on user testing in controlled environments which will be explained in the following iteration. The user testing iteration is our final form of feedback. From there we are taking all feedback in to consideration and using it as a collective critique to form the final design for our prototype.

3.3 Third Iteration - Second High Fidelity Prototype

For the third iteration we discussed the feedback we got from the reachearcers in the previous iteration, and then did some changes for the application. After the changes were done, we tested the application on users within our target group, norwegian students.

3.3.1 High Fidelity Design Changes

The researchers told us that we should stick to one delete button and one border radius. Most of the squares now have the same border radius. When deciding which delete/remove button we wanted, we choose to have check-boxes instead (see picture 3.3.2, 3.3.5 and 3.3.11). This way the user can choose as many items or people they want in “My groceries”, “Shopping list” and “My groups”, and then remove them.

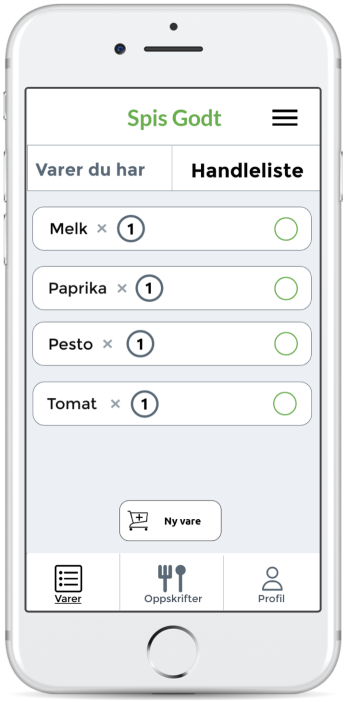
Picture 3.3.1

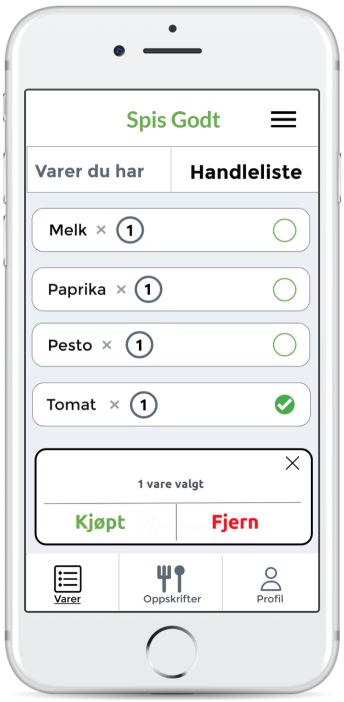
Picture 3.3.2

Picture 3.3.3

Picture 3.3.1, 3.3.2 and 3.3.3: Screenshots of “groceries you have”.

The button that add groceries to the “Shopping list”, the button that creates new groups in “My groups” and the “Filter” button were not very aesthetic. All of these buttons were big and green. We decided to make them more aesthetic, by making them white and have a thinner border (see picture 3.3.4, 3.3.7 and 3.3.10).

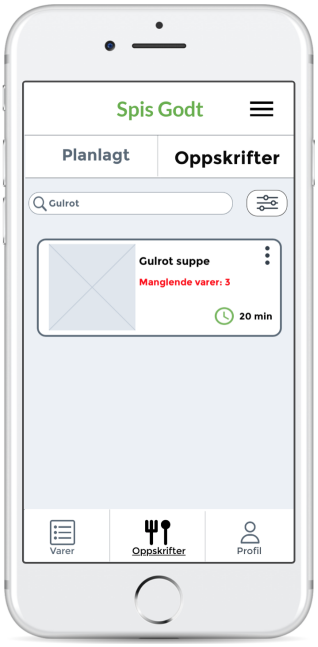




Picture 3.3.4 *Picture 3.3.5* *Picture 3.3.6*

Picture 3.3.4, 3.3.5 and 3.3.6: Screenshots of “Shopping list”.

As the researchers did not find the heart and the plus symbol very intuitive, we changed them. As picture 3.3.7 shows, we decided to have three dots as a button where the user can add the recipe to “favorites” and/or “meal planner”. On this page we also changed the “filter” button to a symbol that is known to most people as a filter.

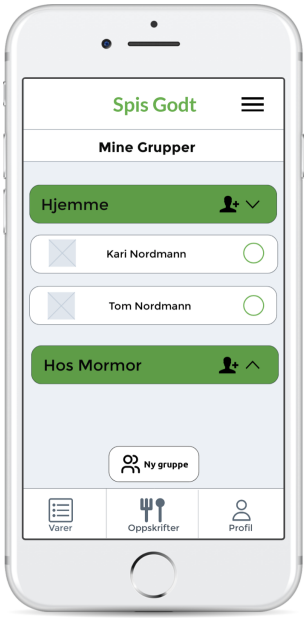


Picture 3.3.7

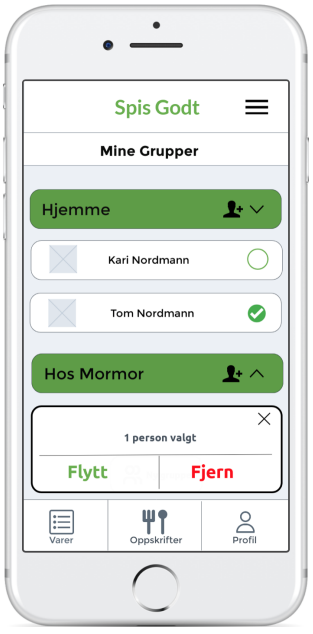
Picture 3.3.8

Picture 3.3.9

Picture 3.3.7, 3.3.8 and 3.3.9: Screenshots of “Recipes” and the options that pop up when the user click the “more” button (the three dots).



Picture 3.3.10



Picture 3.3.11

Picture 3.3.10 and 3.3.11: Screenshots of “My groups”.

The researchers told us that we should not have the “favorites” button and the “my groups” button in the same section as “food preferences”. Picture 3.3.12 shows that we now have these buttons outside this section.

We also discovered that all of the researchers struggled with logging out. The “logout” button is now also available when the user clicks the hamburger menu (see picture 3.3.13).

Picture 3.3.12 *Picture 3.3.13*

Picture 3.3.12 and 3.3.13: Screenshots of “My Profile” and the menu that shows when the user click on the hamburger menu.

3.3.2 Second Design Evaluation

For our third iteration we used the “Controlled setting involving users” method for our user test. By using this method we can determine whether our interface is usable by our target group - Norwegian students - to carry out the tasks for which it was designed and the things that it is designed for them to be able to do (Rogers et al., 2015, p. 369). By having a controlled setting we had the ability to control what the users did, when they did it, and for how long. This also gave us the ability to “reduce outside influencers and distractions, such as friends and colleagues talking.” (Rogers

et al., 2015, p. 369). We choose this method instead of the “Natural setting involving users” as this is our first time testing the application on users, and the application still is in an early stage. We want all functionalities to work when testing the application in an natural setting as that method does not involve specific tasks.

We booked a seminar room at the University of Bergen and asked five students to come in and take our user test one by one. We decided not to ask the students that evaluated our previous prototype, as they already were familiar with the application. This way we gained new perspective off how users that never have interacted with the application before used it. We first informed them what the purpose with the application is, and then gave them tasks to perform:

3.3.3 User Testing

1. log in.
2. find “shopping list”
3. delete tomato from the “shopping list”.
4. find “meal planner”
5. add “carrot soup” as a favorite.
6. find “my favorites”
7. remove “pizza with tuna” from favorites.
8. find settings.
9. find “my groups” .
10. remove Tom Nordmann from the group “home”.
11. find groceries you have
12. find the ingredients and instructions to “carrot soup”.
13. find “your food preferences”.
14. read about us.
15. find “Your groceries”.
16. remove milk from “groceries you have”.
17. find “recipes”.
18. add carrot soup to “meal planner”.
19. find “meal planner”.

20. remove carrot soup from “meal planner”.
21. log out.

While the students performed the tasks, we observed and took notes of how they performed the tasks and their feedback. We then interviewed them to get their opinion on how they experienced the application:

1. Besides what you have said during the tasks, is there anything you found difficult or weird?
2. Is there anything we should change?
3. On a scale of one to ten, where one is “very bad” and ten is “perfect”, how intuitive and easy do you think the application is?
4. Would you use the application?

3.3.4 Analyzing User Testing

As the users performed the tasks, we discovered several things we should change. Although we performed the user test on the students separately, without influence by others, we discovered that they commented on many of the same things.

When performing task 3.”delete tomato from the shopping list. ” (see picture 3.3.4), four out of five users failed at first try. One user clicked– the “tomato” text, while three users clicked on the “x” symbol that is supposed to symbolise the quantity of the food. This shows that the “x” symbol is misleading and not very intuitive, and needs to be changed.

When the users navigated through the navigation bar, they struggled with knowing where they where. All of the users though it was weird that both the navigation bar and the top bar had the name “recipe” (see picture 3.3.7), and many struggled with finding both “Recipes” and “Groceries”. One suggested that we could change the name in the top bar to “find recipes” instead of “recipes”. In general it needs to be more highlighted where the users is located in the application.

For the tasks where the users was supposed to remove/add a recipe to “meal planner” and/or “favorites”, some of the users found it difficult to know if the recipe was added or not (see picture 3.3.7, 3.3.8 and 3.3.9). One user wanted to have a symbol that symbolises that the recipe have been added to “meal planner” and/or “favorites”. The user suggested that we could have a heart on the recipes that have been added to “favorites”, and a spoon on the recipes that have been added to “meal planner”. This makes it easier to see that you have added a recipe.

When the users were asked to find “your food preferences”, some found it hard to find. One user clicked the hamburger menu when trying to find “your food preferences”, and suggested that could be in the menu as well as on the profile page (see picture 3.3.12).

For task 12. “find the ingredients and instructions to “carrot soup”.” three of the users clicked on the “more” button (the three dots) instead of the picture. As seen on picture 3.3.7, 3.3.8 and 3.3.9, the menu where you can add the recipe to “favorite” and/or “meal planner” pop up when the user click that button. To fix this we can add a button for showing the ingredient in this menu as well.

The users also had some features that they would like to see on the “shopping list” (see picture 3.3.4). One user wanted to have the possibility to comment on each grocery in the “shopping list”. This user also suggested that we could add a feature that lets the user see related recipes to each grocery. Another user said that it would be practical if you could see were the groceries in the “shopping list” are cheapest to buy. We will consider if these features are necessary and/or possible.

When asking the users if they would use the application, and what they would rate the application on a scale from one to ten, where one is “very bad” and ten is “perfect”, we got positive feedback. All of the users answered that they would use the application. They said it was practical, simple, and help you with planning the meals through the week, and keeps you from buying something you already have at home.

They also said that the application was easy to use, and three users gave the rating seven, while two users gave the rating eight.

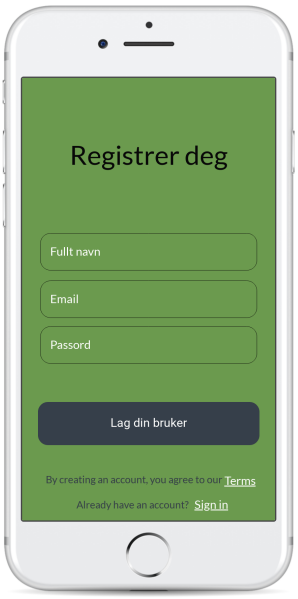
3.4 Fourth Iteration - Finished High Fidelity Prototype

For out fourth and final iteration, we made several smaller changes to our prototype. The changes we made were based on feedback from the previous user test and discussion around this feedback. The changelog following iteration 3 is as follows:

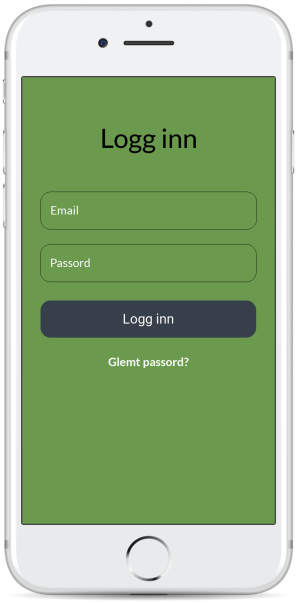
- We removed the “x” from “shopping list” (see, picture 3.4.12, 3.4.13, 3.4.14 and 3.4.15.).
- Changed the static text in “Om oss” to “Hvordan kan vi hjelpe” instead of “Hvordan skal vi hjelpe” (see, picture 3.4.34 and 3.4.37).
- Added a heart symbol to recipes that are added to favorites (see, picture 3.4.29 and 3.4.19).
- Added a calendar symbol to recipes that are added to “planlagt” (see, picture 3.4.19 and 3.4.20).
- Changed the header title from “oppskrifter” to “finn nye” (see, picture 3.5.1.16 and 3.4.20).
- Changed the colour from green to gray, and removed the “dropdown” on days that does not have any recipes in it (see, picture 3.4.24).
- Users can now navigate to recipe information screen by pressing on the “more symbol” (see, picture 3.4.10, 3.4.16 and 3.4.17).
- Added a popup screen for users that pressed the logout button, for error prevention (see, picture 3.4.9)
- Added green colours to the toggle button when toggled on (see, picture 3.4.38 and 3.4.39).
- Changed the text in “Varer”, to “Dine varer” from “Varer du har” (see, picture 3.4.4).

3.4.1 Finished High Fidelity Design and Changes

Picture 3.4.1



Picture 3.4.2



Picture 3.4.3

Picture 3.4.1, 3.4.2 and 3.4.3: Screenshots of the Welcome, register and login pages.

Picture 3.4.4

Picture 3.4.5

Picture 3.4.6

Picture 3.4.7

Picture 3.4.4, 3.4.5, 3.4.6 and 3.4.7: Screenshots of “Your groceries”, showing a grocery being deleted.

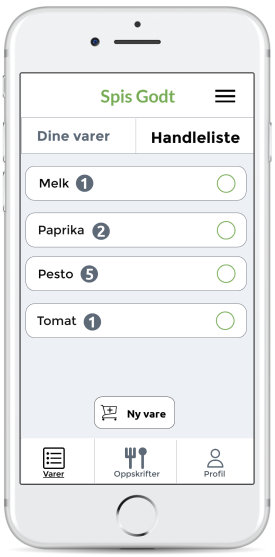
Picture 3.4.8

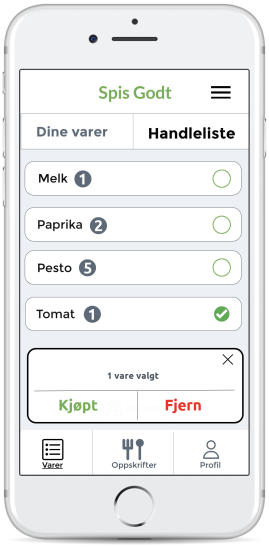
Picture 3.4.9

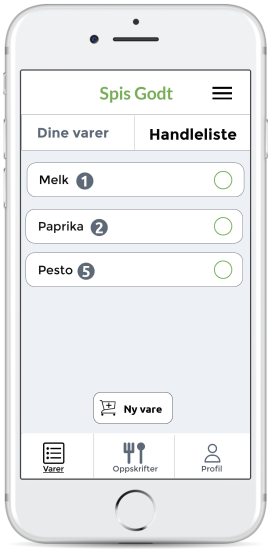
Picture 3.4.10

Picture 3.4.11

Picture 3.4.8, 3.4.9, 3.4.10 and 3.4.11: Screenshots of the menu bar (accessible from all the different pages by pressing the hamburger menu). The popup page, visible when selecting “log out”. The recipe information screen and the profile page.

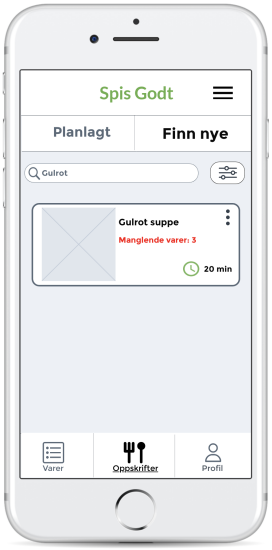






Picture 3.4.12 *Picture 3.4.13* *Picture 3.4.14* *Picture 3.4.15*

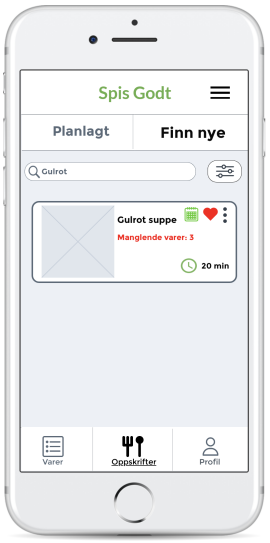
Picture 3.4.12, 3.4.13, 3.4.14 and 3.4.15: Screenshots of “grocery list”, showing a grocery being deleted.



Picture 3.4.16

Picture 3.4.17

Picture 3.4.18



Picture 3.4.19

Picture 3.4.16, 3.4.17, 3.4.18 and 3.4.19: Screenshots of “groceries you have”, Showing a recipe being added to both “favorite” and “planned recipes”.

Picture 3.4.20

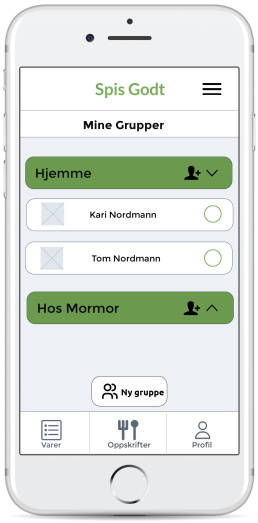
Picture 3.4.21

Picture 3.4.22

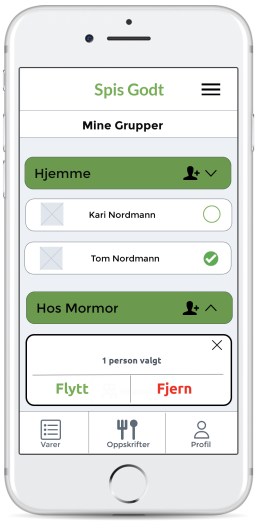
Picture 3.4.23

Picture 3.4.24

Picture 3.4.20, 3.4.21, 3.4.22, 3.4.23 and 3.4.24: Screenshots of “Planned recipes”, showing a recipe being deleted.

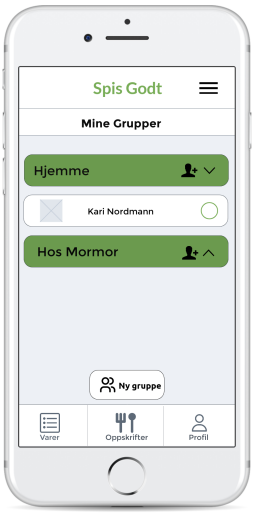


Picture 3.4.25



Picture 3.4.26

Picture 3.4.27



Picture 3.4.28

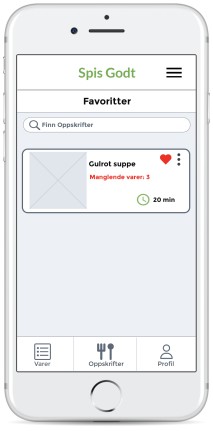
Picture 3.4.25, 3.4.25, 3.4.27 and 3.4.28: Screenshots of “My groups”, showing a person being deleted from the group “Home”.

Picture 3.4.29

Picture 3.4.30

Picture 3.4.31

Picture 3.4.32

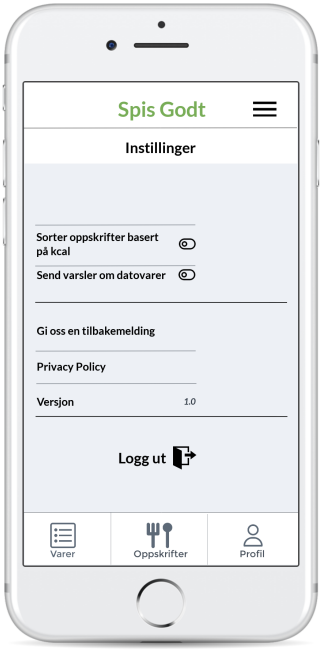


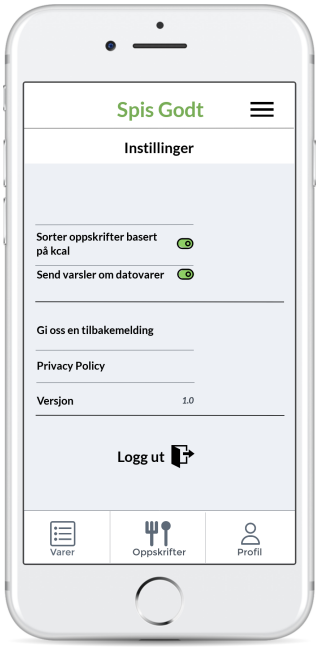
Picture 3.4.33

Picture 3.4.29, 3.4.30, 3.4.31, 3.4.32 and 3.4.33: Screenshots of “Favorites”, showing a recipe being deleted.

Picture 3.4.34 *Picture 3.4.35* *Picture 3.4.36* *Picture 3.4.37*

Picture 3.4.34, 3.4.35, 3.4.36, 3.4.37: Screenshots of “About us”, and the different pages accessible from this page.





Picture 3.4.38 *Picture 3.4.39*

Picture 3.4.38 and 3.4.39: Screenshots of “Settings” showing some possible options for customization the application .

3.4.2 Finished Design Evaluation

For the last iteration we used the “Controlled setting involving users” method. We decided to run the same tasks and questions as we did in our previous user test. This way we could see if new users would do the same tasks in a different way with the changes we made.

We booked a seminar room at the University of Bergen, as we did last time, and asked five new students to come in one by one and take our user test. By asking new students, we avoided that they already knew of how the application worked. We informed them of the purpose with the application, and gave them the tasks. After finishing the test we interviewed the user.

3.4.3 Analyzing User Testing

Despite the changes we made from the previous iteration, we still found some things we could change. Some of the users performed the same mistakes as the users in the previous user test.

Although we removed the “x” symbol (see picture 3.3.4 and 3.4.12) in the shopping list, some users still failed at deleting “tomato”. In the previous user test, four out of five users clicked the “x” symbol, which was supposed to symbolise the quantity. After removing it, two people tried to click and hold on the “tomato” text. Less users failed this time, but it still required some changes.

Two user commented on the inventory feature on the “Your groceries” page (see picture 3.4.4), saying that it was hard to understand the quantity of each item. They both suggested that we should use the same symbols for quantity in the “Your groceries” section as the one in “shopping list”.

One user tapped on the “see more information” text, instead of the select circle beside it (see picture 3.4.30). This could mean that our grouping of the text and circle was not informative enough. The same user also opened the menu bar to find “Food

Preferences” (see picture 3.4.8 and 3.4.11). This might be a good place to store this information too, seeing that it is one of our more central “features” for customisation.

When the users had tried the prototype once, they showed great signs of learning. They no longer struggled with finding their way when traversing the application. This was also confirmed by every participant when we asked them if the application was easy to learn. All the users also said yes, when asked if they would use the application if it was in production. The average rating our users gave, when asked to give a number between ten and one, was 7.8. While only one user gave us a rating of seven, the other four gave us all eights.

4 Discussion and conclusion

The final product from this project is promising and we find the application we have prototyped to be useful and well-functioning. Though our final thoughts are positive and we are satisfied with our prototype, there are some minor changes to be made and future implementations we would like to see if this were to be developed as a complete and functioning application.

To improve the application we would like to change some of the non-functional features as well as some of the functional features. This varies from minor aesthetic visual features to click-responses and status feedback like highlight improvement so that the user always has a good sense of where they are in the application at all times. Also we would like to implement new features that would help the user feel like the have full control when planning their meals. These implementations would be price estimates for shopping list, and price comparison between different stores when discovering new recipes.

Our project development life cycle had four main iterations. Within these iterations we had an evaluation of our own work and an evaluation featuring either users or experts. From these we gained a lot of useful experiences for us to work from, but the one thing we didn’t get the chance to accomplish was an evaluation in natural

settings involving users. We feel like such an evaluation would provide a useful set of data from which we could improve our prototype in a better way than from only controlled or any settings evaluations. Also we have realized that if we had followed a standard SDLC (e.g.., Kanban) during this project, it might would have helped structure the iterations in a better way.

To conclude our project we would like to think that we succeeded in making a useful and well functioning prototype for a potential application. The team has worked well together with the management of this project, and we have gained a lot of useful experience from this project for us to build upon. The feedback we received from user testing were generally positive towards our prototype being available as an application today, and we as a team are satisfied with what we have accomplished during this project.

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