

Design Dialogues Coursework2

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1.Introduction

1.1Description of system

The Food Forest is an interactive app that allows users to experience healthy and sustainable fruits and vegetables when visiting the Lions Gate garden.

The Lions Gate garden consists of different vegetable and fruit sections depending on the season. Some fruits and vegetables are placed in a greenhouse. Each section is highlighted with a marker. While visiting the garden the user can point his smartphone towards a marker.

The app recognises the marker via augmented reality and displays information about why the chosen food is healthy and how it supports the well-being of the user. In addition, the app tells the user if the food is ripe and ready to eat.

1.2 motivations behind the project choice

Many students do not prepare healthy meals because of busy timetables that reduce the amount of time. Instead of eating well-balanced and healthy meals they eat junk food or they snack sweets during break time. However, snacking and eating junk food has negative impacts on the health and on the well-being because they consist of fat and sugar (Cleobury et al, 2014). Over time, convenience will become a habit without realising it.

On the one hand, I decided to work on my app, The Food Forest, because I want to help the user to gain an understanding about the importance of healthy eating and well-being with the help of the Lions Gate garden. Through the app the user shall learn about the advantages of fruits and vegetables and the user shall be inspired to live in a more conscious way.

On the other hand, I decided to work on my app, because well-being and health are important principles for permaculture. I wanted to use these principles as the core of the app.

1.3 objectives you aim to achieve through the design

One objective to achieve through the design is to encourage the user to explore the garden. The design of the app shall arouse user's interest so that they have a look at the entire garden. Bright colours, short texts and augmented reality were chosen to ensure a positive experience.

At the same time, another objective to achieve through the design is to create a new space by connecting User Experience with permaculture. This shall ensure that the user deals with permaculture components like sustainable fruits and vegetables.

At the first glance, User Experience (UX) and permaculture are not related. However, UX and permaculture have similarities, because both are concerned with creating and both deal "with materials, competences and meanings" (Egan et al., 2017, p.2). In short, UX is a concept that investigates and evaluates human feelings, emotions, habits etc. while using a system. Permaculture is associated with topics like sustainability, nature, gardening and agriculture. (Egan et al., 2017).

2.Design approach

For this coursework the iterative design approach was chosen. The iterative design approach can be defined as a cyclic process in which a system or a product is checked and evaluated regularly at various stages. Usually, the process consists of prototyping, testing and analysing (Nielsen, 1993).

The iterative design approach was chosen as a concept for many reasons. Firstly, it provides early user feedback which was utilised to improve usability, design and the user experience before putting the app into use. Secondly, issues and problems were identified in the early stages so that time-consuming work was avoided. In other words, the iterative design process addresses issues and problems before they can get out of control. Thirdly, the iterative design approach is efficient, because it allows fixing problems at the beginning of the design process (Engness, 2018).

At the start of the project, research is conducted and ideas are generated with the help of brainstorming sessions. Then, a prototype was developed. The prototype is tested through interviews with Napier students. The outcomes of the interviews helped me to learn about problems and requirements and helped me to improve the app. The learning outcomes from the test phase are then transferred to the design and a new prototype is created after analyzing. The new prototype is tested through a second round of interviews with other Napier students as well. The outcomes helped me to improve the app.

3.Understanding

Understanding methods are very helpful for designers in order to understand the requirements for the new design and to understand problems that people have with existing systems. To gain valuable insights a designer has to use several techniques such as observation, questionnaires, interviews, card sorting and much more (Benyon, 2017).

This part of the coursework focuses on two understanding methods: brainstorming and interviews.

3.1 Brainstorming

Brainstorming can be described as a group activity where participants can discuss and generate ideas. It is necessary to start “with an ‘anything goes’ approach”(Benyon, S. 171, 2017). Ideas and thoughts should be documented, e.g. on paper or white boards. Each member of the brainstorming session has a role, e.g. one person is responsible for documenting the brainstorming session and another person is responsible for being critical to proposed ideas. After the first session it is helpful to filter and to analyse the outcomes of the brainstorming session. (Benyon, S. 171, 2017).

Two brainstorming sessions were held over two weeks. The first brainstorming session took place with a group of 4 Design Dialogues students. After the first session, the second brainstorming session was held with 10 Design Dialogues students and the professor.

Brainstorming session 1:

The aim of the first brainstorming workshop was to receive an overview of the Lions Gate garden, to get a general understanding, to gain information about the garden and to clarify the aim of the garden.

Results brainstorming session 1:

The aim of the garden is to give visitors an understanding of permaculture. The garden should follow certain principles, like sustainability and well-being. Moreover, the garden should improve the health of the visitors. Visitors should have the ability to explore nature in a digital way. Elements included in the garden can be: fruit trees, composters, renewable energy, food forests and much more.

The results of the session helped to develop a vague idea about the content of the app. I focused on the topics well-being, health and food because these topics are important permaculture principles.

Brainstorming session 2:

The second brainstorming session focused on potential and general ideas about an interactive system for the garden. Moreover, the second session concentrated on what an interactive system would look like.

Results brainstorming session 2:

The results shown in figure 1 were created during class.

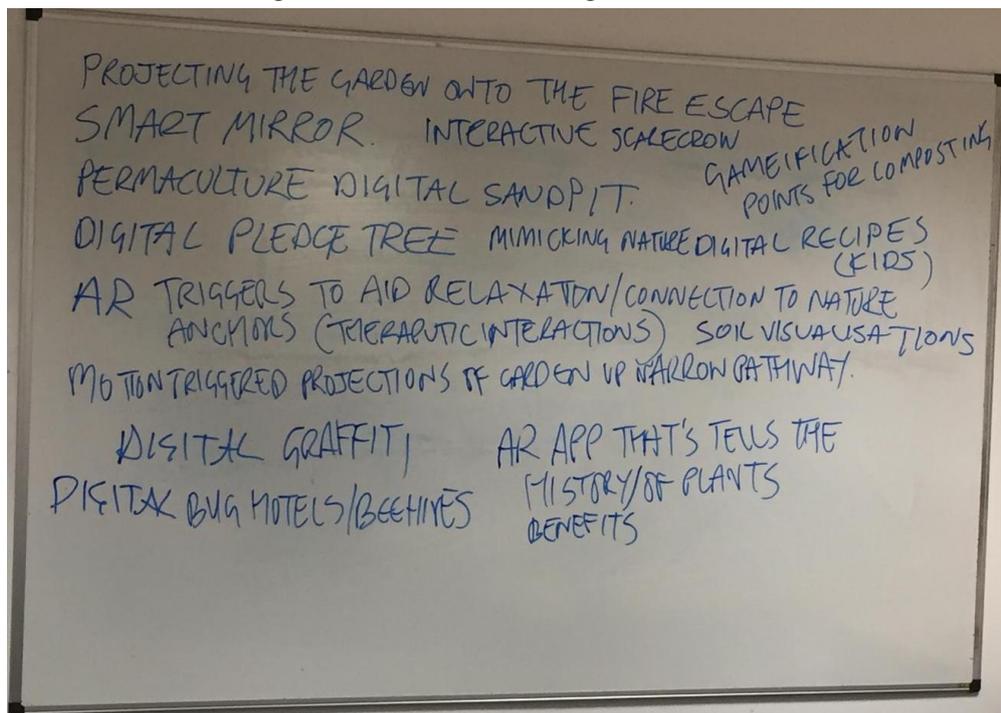


Figure 1: brainstorming results

Brainstorming was chosen as an understanding method because it encourages creative thinking in an early stage. Moreover, it provides an easy starting point to build upon. In addition, it is an appropriate method for gathering different ideas and viewpoints and to think out of the box.

3.2 Interviews

Doing interviews is one method that helps designers to find out about people needs and about problems people often have. Interviews can be described as a conversation with people where a number of questions are asked.

Three types of interviews are often used: structured interviews, non structured interviews and semi-structured interviews. The structured interview uses prepared questions. In contrast to that, the questions in a non structured interview are not defined in advance. The semi structured interview is more open, and new ideas can be brought up while asking questions (Lucas, 2005).

In order to receive an understanding of problems and requirements semi-structured interviews were conducted with four Napier students who have different courses of study and different backgrounds. Before asking questions, the concept of the app was described roughly. In addition, the students received an early storyboard and an early prototype to get a better understanding of the app and the UX.

This extract shows the most important parts of the interviews that generated requirements and problems.

In general, what do you think about my concept?

"When I am stressed I eat a lot of unhealthy stuff. The app could help me to eat healthy and it could remind me to take more care of myself. I like the idea."

"I love fruits. Especially apples! I know that apples have a lot of vitamins. But I cannot tell you which kind of vitamins. Therefore, I like the idea of getting information about minerals, vitamins and much more. However, too much information would scare me off. You should reduce the text."

"The garden should have a variety of food. I would like to taste different types."

"My smartphone is very old and very slow. I would like to use a web app instead of a native app. A web app is easier to use and I could access it online without downloading an app. Downloading would take a while. Maybe you can add this idea to your concept so that a lot of people can use it."

Would students use the app?

"A lot of students would use the app. This could be a problem. The food is limited."

"I think students would use the app when they need a break. The garden provides an awesome possibility to snack on healthy stuff."

What do you think about the interaction?

"I don't like the interaction. I think it is cumbersome. I don't want to type in the number of each section."

"The interaction takes too long. The entire process should be easier. In addition, the interaction is not clear. Which section can provide information?"

Question 4: In general, what do you think about the prototype?

"At first I was confused, because there were too many buttons. I would reduce them."

"I like the prototype. However, I cannot see pictures. You should include some."

List of requirements and problems

- The concept about getting information about fruits and vegetables was well accepted. However, information should be more visual than textual to avoid reading long texts. A Long text can be boring and some students won't be interested.
- The app should provide short information about vitamins, minerals and ingredients.
- Some users would like to eat different types of fruits and vegetables. However, the garden is limited in space, and therefore the types of fruits and vegetables will also be limited.
- The interaction was not accepted. The interaction seems to be cumbersome. More work is required. Moreover, the interaction process takes too much time.
- The use of buttons should be limited. Too many buttons confuse students.
- Users need markers so that they know which section to type in. The section must be numbered.
- The app must be a native app and a web app. This will help to increase the number of potential users.
- Using pictures would help the app to appear user-friendly.

The first interview helped to refine the app. The identified requirements were implemented to improve the app. Some identified problems were solved.

At this point, the app was only an early prototype. It was appropriate to use semi structured interviews as an understanding method, because new identified requirements and problems were easy to implement at this stage. Semi structured interviews helped to collect important information concerning the understanding phase. Moreover, they provided a flexible way of gathering statements and information from the participants. Participants could express views and opinions.

I started a second round of interviews. The focus was on the interaction because the first round of the interviews had shown that more work was required. This extract shows the most important parts of the interview that generated requirements and problems.

What do you think about the interaction?

"The interaction seems easy. I like the fact that the app automatically recognises the markers when you scan the sections. This encourages people to look around and to explore the garden."

I like that the app tells you if a fruit is ripe or not. However, I would like to get a confirmation message."

"Using augmented reality is very good. It is a better option. I didn't like to type in the numbers of each section. Now I can scan them! That is better!

In general, what do you think about the prototype?

"The prototype is now better. I see more pictures. However, the font-sizes are too small and there are a lot of icons. They confuse me. You should think about the colours. In my opinion they are dark and not friendly."

List of requirements and problems

- The interaction was well accepted. However, after scanning a section the user should get a message that tells him that the scanning was successful or not (Feedback).
- The numbered sections provide orientation. The Users would know which section to scan.
- The number of icons should be reduced.
- The colours of the app should be brighter. More work is required to find out about the symbolism and meaning of colours.
- The font size is too small.

After the second round of interviews I improved the prototype and the interaction.

4. Envisionment

Envisionment focuses on realising ideas and making them visible. There are a lot of techniques and methods for envisionment that help the designer to explore and create ideas. In this part of the coursework I focus on mood boards, storyboards, wireframes and prototypes.

4.1 Mood board

A mood board can be described as a collage of words, texture, colours, photos etc. to capture certain emotions and feelings that a system or products shall evoke. It is important to realize that a mood board helps the designer to focus on ideas and thoughts. (522 Production, 2018).

At first, a mood board was created to gather ideas and inspirations. A mood board was chosen as an envisionment method because it was a very helpful tool for organizing many thoughts, different ideas and to capture the feeling of the design. Moreover, the mood board helped me to focus on emotions that users shall get when interacting with the app.

The mood board shown in figure 2 was created with the help of pinterest and indesign.



Figure 2: mood board

With the help of the mood board I decided to choose four main colours for the app. This decision is based on fruits colours: R:123 G:213 B:221, 186 G:216 B:104, R:8 G:165 B:196, R:255 G:211 B:80

The chosen colours are bright and affect the user in a positive way. Blue is associated with calmness and serenity and it is often represented in the nature. Yellow is often described as a cheery and warm colour that makes people delighted. Wine red evokes warm emotions and it is a very strong, powerful and intensive colour. Green is associated with nature and freshness. It symbolises health as well as happiness (Cherry, 2018).

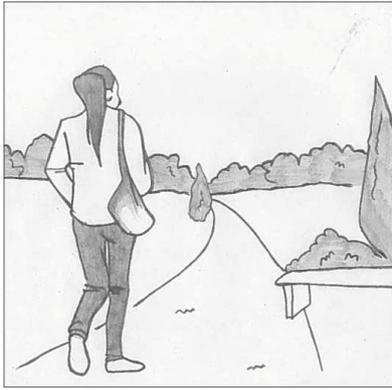
To summarize, the symbolism of the colours are important for the app because they evoke feelings that the app shall transfer.

4.2 Storyboard

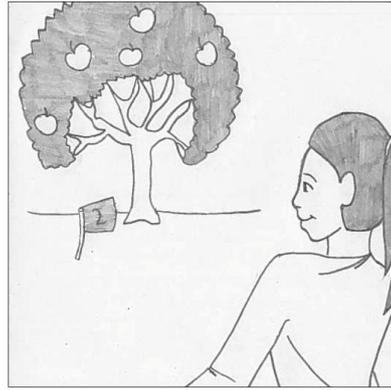
A storyboard can be describes as a visual, cartoon-like representation of how a certain product is utilised. It consists of numbered squares that illustrate the context, and how the product is used in that context. Usually, one square is made of graphics about a scene that can contain notes about the action (Benyon, 2017).

The storyboard shown in figure 3 was used to illustrate the scenario in which case the app would be utilised. Moreover, it was chosen because it visualises the whole User Experiences. The storyboard makes it much easier for potential user to understand the UX. Furthermore, it was chosen because it visualises other necessary elements in the garden, e.g. markers and sections .

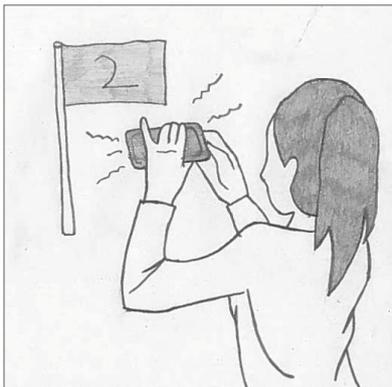
The storyboard shown in figure 3 was created with paper and pencil. It is the final storyboard. I created an early storyboard for the interviews then I reworked the storyboard after the second round of interviews.



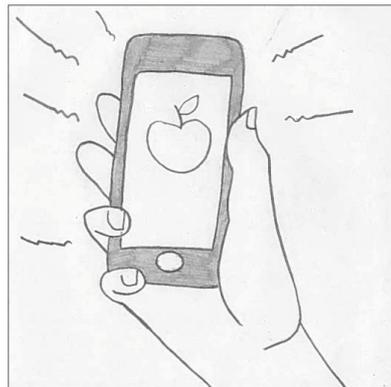
1. user goes to garden



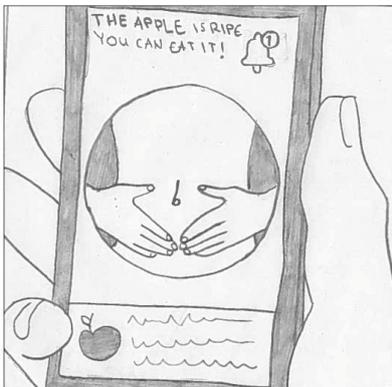
2. user sees a tree with marker



1. user points his smartphone towards marker



2. app recognizes marker



2. app displays information



2. user eats ripe apple

Figure 3: storyboard

4.3 Wireframe

After creating the final storyboard a wireframe was visualized. A wireframe can be described as a simple layout that represents the structure of an application. Usually, wireframes are devoid of design elements, like colours or typography choices. The main purpose of wireframe is to visualise the structural placement of elements (Hamm, 2014).

A wireframe was chosen as an envisionment method because it encourages determining the basic structure of the app. Furthermore, it was an important and useful method to establish elements of the app before designing a detailed prototype.

The shown wireframe in figure 4 was created with Indesign.

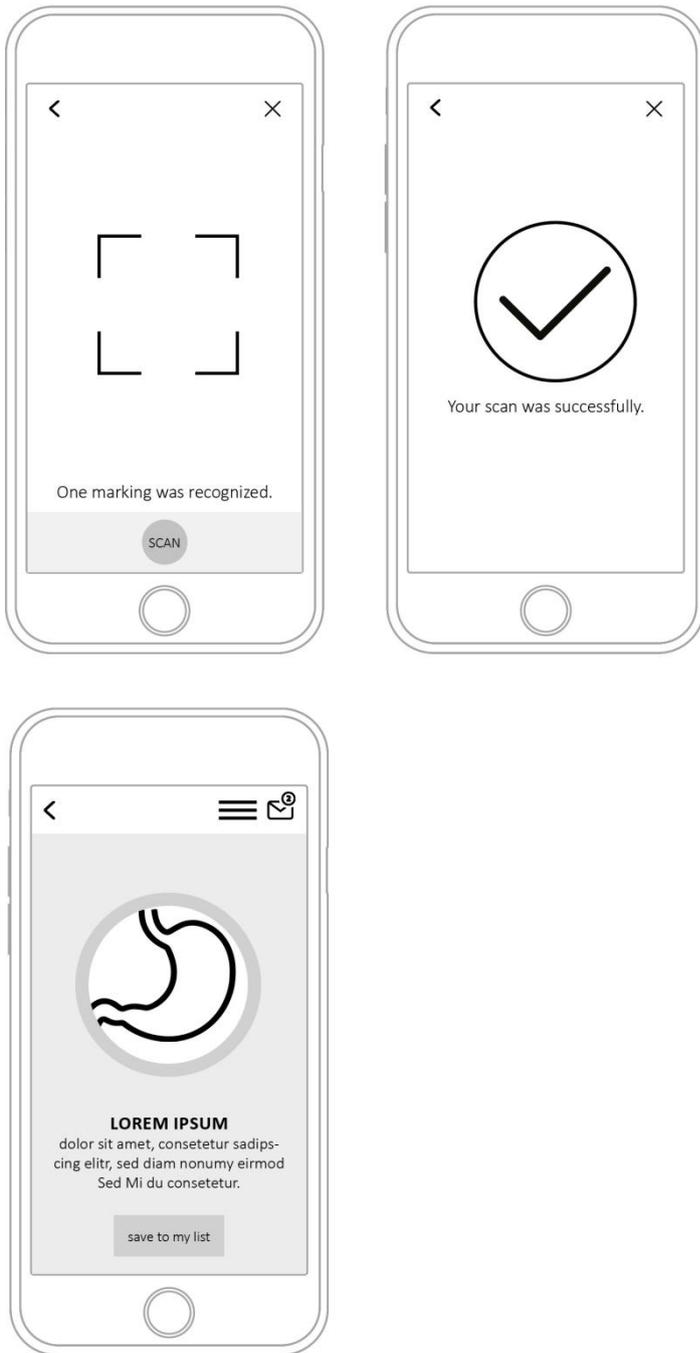


Figure 4: wireframe

4.4 Prototype

A prototype can be described as an early representation of a product or a system to test the concept. It is possible to build the prototype with only paper and pen or to develop a part of the code (Greenberg, 2018).

A prototype was developed with HTML5 and CSS. The prototype was for the first round of the interviews important because some the questions related to the use of the prototype. After analysing the answers of the first round requirements and problems were identified and helped to improve the app. The improved prototype was used in the second round of the interviews as well. New identified requirements and problems helped to improve the prototype further on.

The shown prototype in figure 5 was created with Visual Studio Code.

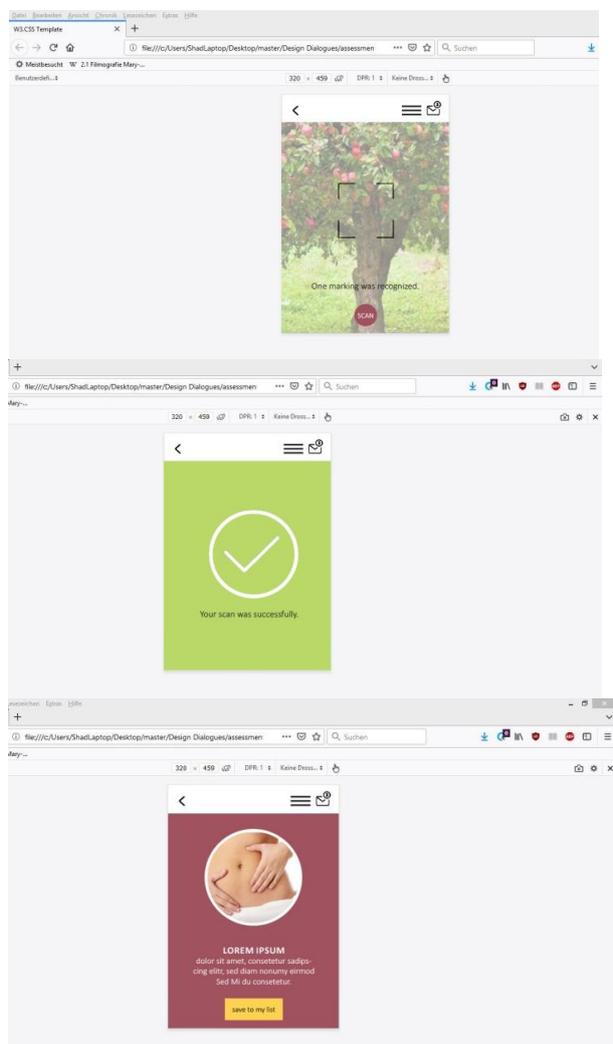


Figure 5: prototype

The prototype was developed because it brought one part of the design to life. Moreover, the prototype was very important for the evaluation and testing process. It helped the participants to understand the design and to identify easily problems and issues. In addition, the prototype helped to demonstrate quickly the main idea of the app. Another reason why I decided to develop a prototype is that it helped me to think about design principles, like feedback, visibility, accessibility or consistency.

5. Testing

Doing test during a design process is very important to improve a system and to increase the quality. Several methods of testing help the designer to find out about issues and problems. While the evaluation is implemented in the end of a design process, the testing is implemented earlier at different stages of the entire design process (Benyon, 2017).

This part of the coursework focuses on two testing methods: accessibility testing method and the system usability scale method.

5.1 Accessibility Testing

Accessibility testing can be described as a part of usability testing. It is a method that checks if a system is applicable by different kind of peoples who might have certain disabilities like visual impairment (W3C, 2014). Tools like the W3C web accessibility initiative help developer and designer to check their systems in regard of accessibility (Benyon, 2017).

Nowadays, accessibility is not only an important topic for websites but also for web apps. Accessible systems offer access to different types of information for users who have certain disabilities like visual impairment. Firstly, accessibility avoids social exclusion. Secondly, it supports equal opportunities and thirdly it helps users who are disabled to participate in our society (Oyetoke, 2018).

Although I know that my prototype is not finished yet, I decided to test it in regard of accessibility because the prototype was shown during an interview to a student who has poor eyesight. Moreover, it was important for me to test my prototype concerning accessibility because the prototype is the first approach for a developed web app to build upon and to learn from.

First of all, the prototype is been tested with different Browsers. The content of the app should appear correctly at Chrome, Safari, Edge, Firefox and Internet Explorer. While testing the prototype, some problems emerged. Not every browser supports the CSS object-fit property that is utilized to determine the size behaviours of an img-tag (w3schools, 2018). For instance, the Internet Explorer does not support the property therefore I decided to use the background-size property "contain".

It is necessary to ensure that the prototype of the app The Food Forest is compatible across multiple browsers because the app should be not only a native app but also a web app to make sure that a number of people will use the app.

In the next step, the code of the prototype is been tested through the markup validation service w3org by direct input. Some warnings and errors appeared. Alternate text is added to the img-tag because they were missing. The Alternate text is utilised to describe an img-tag. It is very important for screen readers to use alternate text in order to help users who have a visual impairment. Instead of a button-tag a div-tag was used. This is also been fixed to ensure that the screen reader can interpret the tags correctly.

5.2 Usability questionnaires

The system usability scale (SUS) can be described as a tool that consists of 10 questions and 5 response choices. These choices start from strongly agree to strongly disagree. The purpose of the scale is to give a view of assessments of usability and to measure the usability (Bhat, 2018).

I decided to use SUS because it helps to gain reliable results in within a short period of time and it was easy to conduct. Furthermore, I used SUS because received answers were easy to asses.

1 Computing student and 1 Business student were asked to undertake the system usability scale questionnaire. At first, the students got a short description of the app then the prototype is shown and it is been used. The questions were copied from the course book: Designing Interactive Systems. Before evaluation the answers I checked all answers to ensure that all participants had responded to all questions.

After checking the answers a calculation was done. For each of the questions 1,3,5,7 and 9, I subtracted one from the score. For each of the questions 2, 4, 6, 8 and 10, I subtracted their value from 5. Finally, the new values were added up and then multiplied by 2.5 (Thomas, 2015).

Figure 6 shows the answers of the students.

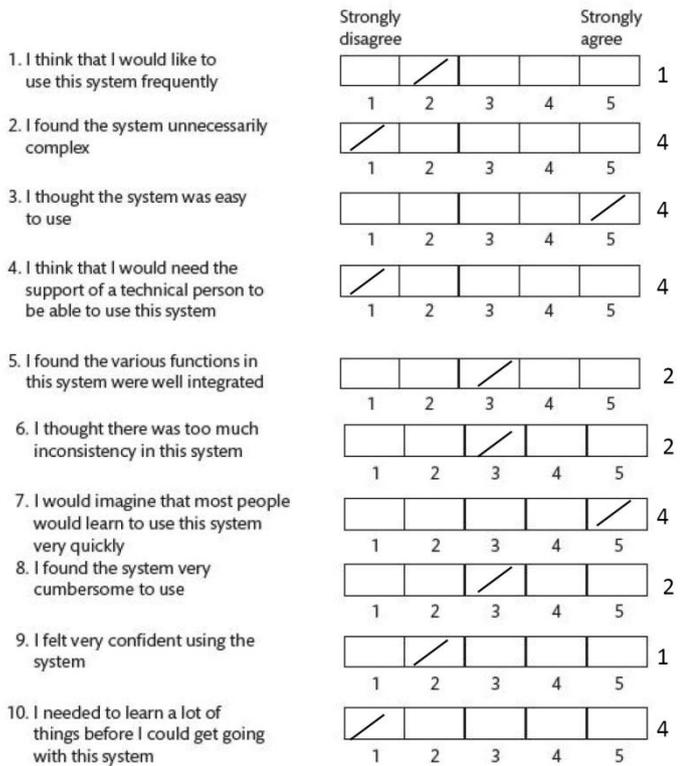
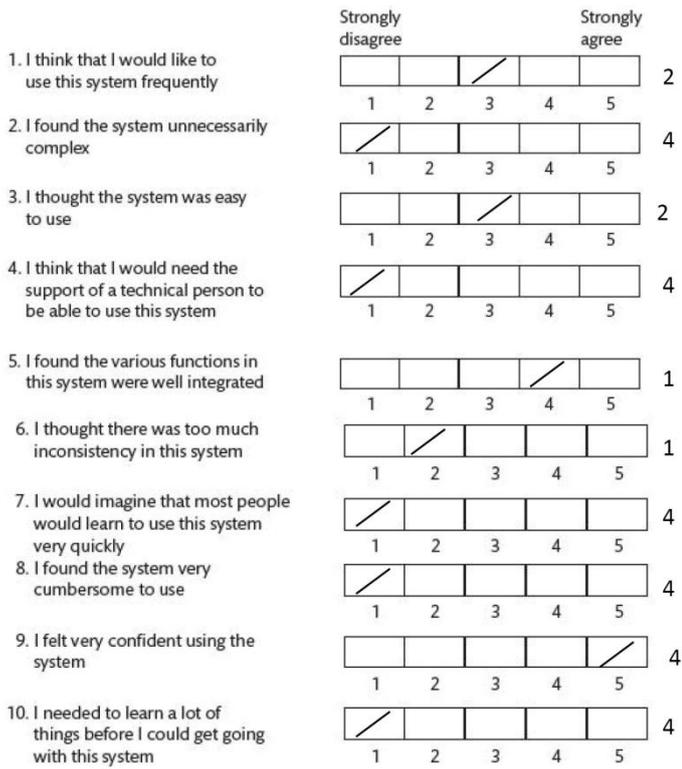


Figure 6: SUS

The total score of the first questionnaire is: 30 and the total score of the second questionnaire is: 28. The two numbers were multiplied by 2.5. The result for the first number is: 75 and the result for the second number is: 70. Now it is important to understand the score. The shown wireframe in figure 6 shows an interpretation about the score

SUS Score	Grade	Adjective Rating
> 80.3	A	Excellent
68 – 80.3	B	Good
68	C	Okay
51 – 68	D	Poor
< 51	F	Awful

Figure 7: interpretation of SUS score

Retrieved from <https://uiuxtrend.com/measuring-system-usability-scale-sus/>

The results of 75 and 70 can be interpreted as good results. The participants were convinced. The usability performance can be interpreted as sufficient.

6.Evaluation

6.1 Expert Evaluation

An expert evaluation can be described as process of examining critically a system or product through a specialist in a field, e.g. User Experience or Usability (Experienceux, 2018).

An expert evaluation was carried out with one student. The student was chosen as an expert because he is well versed in UX and Usability. He took the design dialogue course.

At first, a short description about the idea and concept was given. Moreover, the storyboard and the wireframe were also shown. Then, the student received the prototype of the app. The prototype was intended to visualise the given information after scanning a highlighted marking.

Style

The design of the app was well accepted. The colours fit to the concept. The appearance of the app was described as modern, attractive and consistent.

Feedback

The feedback of the app was well accepted. However, more feedback functions could make the app appear more reliable. To include more feedback it is necessary to develop the app in detail. Further work is required.

Visibility

The student criticised the visibility of the core function. For instance, the scan button was too small and indiscreet. Regarding to the feedback, I changed the colour of the icon and the font-size. Further work is required to include steps to guide users to the next step.

Navigation

In addition, he criticised the navigation concept. The navigation of the prototype had a lot of items. It was not very clear and good structured. Too many items can confuse users therefore I reduced the number of items. The burger icon was placed at the left side of the prototype. The position was not user-friendly because most of the people are right-handers. I changed the placed to ensure usability.

Expert evaluation was chosen to ensure that the development of the app is moving in a right and required direction. Moreover, the expert evaluation was chosen because it helps to identify problems early in the entire designing process so that time was not wasted.

6.2 Participant-based Evaluation

Two Computing students who could be potential users of the app were asked to take part in a participant-based evaluation. They were given a short description about the concept and they been asked to have a look at the prototype to identify possible issues and problems.

Some used icons were not clear and produced irritations. Regarding to this feedback the icons were replaced and a research about icons was done to ensure to use icons that are easy to understand and to interpret.

The main idea of the app was criticized because the app is not useful in any time of the year. During winter, students were not able to scan and to get information about fruits and vegetables because most of them do not grow in winter time. At this point it was necessary to rethink the idea and to provide options and alternatives during winter, e.g. the Lions Gate garden should contain a greenhouse to ensure interaction during winter time.

7. Conclusion

The brainstorming sessions encouraged to gather first ideas and thoughts from different perspectives. Developing ideas in groups was an important step to think outside the box. The interviews helped to gain an understanding of the requirements, problems and issues that user may have. Two rounds of interviews and brainstorming sessions helped to increase the outcomes.

Creating a mood board was very useful to obtain an idea about the look and feeling of the app. The outcomes were used to develop the prototype. The storyboard was chosen because it visualises the whole User Experience and it helped the interviewee to understand the UX. The wireframe encouraged to think about elements and the structure of the app. Moreover, the prototype was developed easier because of the wireframe. The prototype was important in order to get good results while the evaluating and testing phase.

The expert evaluation and the participant-based evaluation helped to ensure the quality of the app and to verify that the app was moving in the right direction. The accessibility testing method helped to define a starting point.

The first brainstorming session would have benefited from more students. That also applies to the number of the interviewee and the number of students who undertake the usability questionnaire. In addition, I should have asked another person to undertake the expert evaluation, e.g. a professor because a student does not have a lot of experience.

The iterative design approach led to improve the app step by step. It was possible in an early stage to find out about requirements and problems. In addition, it addresses issues and problems before they can get out of control.

The methods that are used for coursework 2 were focussing on interacting and talking to users to gather requirements and problems. The direct exchange with several participants in the different phases of the design was very important. The understanding method that was used for coursework 1 was focussing on identifying the stakeholders and how an interaction would look like.

It was very important to ensure the anonymity of the students. While doing interviews I wrote the answers down without recording the voices. I wanted to avoid that the interviewees could feel unwell. This was one ethical issue that was relevant to think about. Another ethical issue concerns help. I tried to help participants when they got stuck with some questions to ensure that they feel comfortable.

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