Co-designing a self-compassion application for newly diagnosed cancer patients with a focus on sustained use

By Sofie van den Berg, s1859986
Supervised by Dr. Jelle van Dijk
Requested by Judith Austin
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Abstract

Over 100.000 people in the Netherlands receive a cancer diagnosis per year. These people experience significant levels of distress and are in need of psychological support. Currently, an mHealth intervention is in development for this target group with a focus on self-compassion. The project uses a co-design approach, in which the target group is actively engaged in the design cycle. Based on theories from within the interaction design and held co-design workshops, an interface was designed. A focus on user experience design to stimulate continued usage was applied. With co-design, input from the target group was used to evaluate several iterations of the interface, including the homepage, functions, and interactions. Finally, the prototype was evaluated using a SUS-test. Based on the results, the prototype received positive marks on the field of usability and learnability, meaning that co-design might have a positive influence on these two factors. This paper closes with a brief discussion on the differences in literature and user input, the ways in which co-design influenced the actual prototype and the impairments of this prototype.

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1. Introduction

In 2018, the prevalence of cancer in the Netherlands was around 606.600, which is around 3,5% of the entire Dutch population. In that same year, 116.500 new cases were discovered amongst the population (Volksgezondheid en Zorg, 2019). Studies have shown that at least one-third of all cancer patients suffer from significant levels of distress, anxiety, depression and impairment of their quality of life (Robert, et al., 2017). However, psychosocial screenings are not part of the routine screenings that cancer patients have to go through (Carlson, et al., 2004).

Interventions aimed at improving the quality of life of cancer patients are scarce, this is why there is not a lot of information available on successful interventions. A few studies have been done where a digital intervention environment was introduced to cancer patients, to help them cope with distress. The results were fairly positive (Devine, et al., 2018). There is a scarcity in reviews on the effect of digital interventions on cancer patients. However, in other medical fields, these digital interventions have been a success already (Robert, 2017). That seems to be a good argument to focus on digital health interventions.

1.1 Project context

In 2018, the Centre for eHealth and Wellbeing Research of the Psychology department at the University of Twente set up a project to develop a low threshold mHealth intervention for patients diagnosed with cancer. With the help of co-creative workshops with the target group, they have already conducted a lot of research within the user requirements and the content of the intervention. For this project, they have requested that an interface should be designed. This interface should highlight exercises that teach the user to apply self-compassion to their lifestyle.

1.1.1 The main problem for the client

As mentioned before, the client has been working on the application for over a year. In 2019, a software developing company has been contacted in order to build the application. This causes for a communication problem between psychologists and technicians. For an application like

this, it is important that the engineers of the company understand precisely what the application should achieve and what kind of goals it has.

As a Creative Technologist, I am able to build a bridge between those two, where they can better understand each other. This metaphorical bridge will be the design of the interface for the application. This interface will be built upon the psychological theories and co-design sessions, but also on interaction technology theories and user experience practice.

1.1.2 The design challenge

The design challenge for this graduation project is to design (certain parts of) an interface for the self-compassion application. There are 2 challenges within this project.

The first being the overall style and design of the interface. To be able to make an effective, several design theories are checked in order to design an effective interface. From this research certain interaction principles are chosen for the interface design.

The second is to find theories and models that can be introduced to the interface to ensure continued usage. Aspects and elements should be introduced to the interface that will keep the user engaged and enjoying the application.

1.1.3 Self-compassion

The existing interventions are mostly focusing on behavioral adaptation of the patient. While this can have its benefits, it is also important to address the emotional side of things. There is a growing popularity in the area of using the method of self-compassion (Sirois & Rowse, 2016). The method focuses on being aware of your own suffering and that it is a common experience for all of humanity (Campo, et al., 2017). This therapy has caught the attention of the growing popularity in digital health interventions (Gilbert, 2014). To see if this therapy has any beneficial effects on newly diagnosed cancer patients, it was decided to choose self-compassion as a method for this application (Austin, 2019).

1.2 Research question

This brings us to the research question of this graduation project.

> *How can co-design help self-compassion best be delivered to patients with cancer through a mobile application interface in a style and with interactions that fit the user group and ensure continued usage?*

In order to answer this research question, six sub questions have been defined that will each focus on a different aspect. The sub questions are listed below:

1. What are important characteristics of the target group for the design of the interface?
2. Which interaction principles and style most clearly communicate the intended self-compassion exercises on a mobile platform?
3. Which interaction principles can best be used in this interface to ensure continued usage?
4. How can the prototype be designed in a way in which it can help psychologists to communicate with technologists in the production of this application?
5. How is the prototype received and evaluated by possible end-users (do they think they will use it?)?

1.3 Deliverables

At the end of the project an interface design is presented. This interface covers the design of the homepage, including the functionalities. The interface is presented online.

2. Method

This chapter will explain the method used to answer the research question. The answer will come in the form of a design of an interface, with an experienceable prototype that can be evaluated by end-users.

2.1 State of the Art

The first step towards the designing of an interface is focused on gathering insights and information into what has already been done in this field of research. The following themes return in the State of the Art chapter of this report:

- Target group
- Existing apps/interventions
- Self-compassion and other theories
- Interface design theories
- Interaction principles

With enough background knowledge and user research, one can enter the design phases. The research for this graduation project follows the Creative Technology method (Mader & Eggink, 2014). This is a circle consisting of four different phases: Ideation, specification, realisation, and evaluation (See figure 1). All of these phases are explained below. It is important to notice that this loop does not result into a single result. The phases overlap into each other, resulting in a cycle that has no specific end. This is called 'Iterative Design'. It is impossible to make the perfect design in one cycle, as one cannot predict how all the aspects will work out in a real-world scenario. So, alternative to that, a designer can keep designing until the design feels right for designer and user. Iteration can be implemented into the design cycle by making prototypes and those will be tested by a group of test-users (Buxton & Sniderman, 1980).

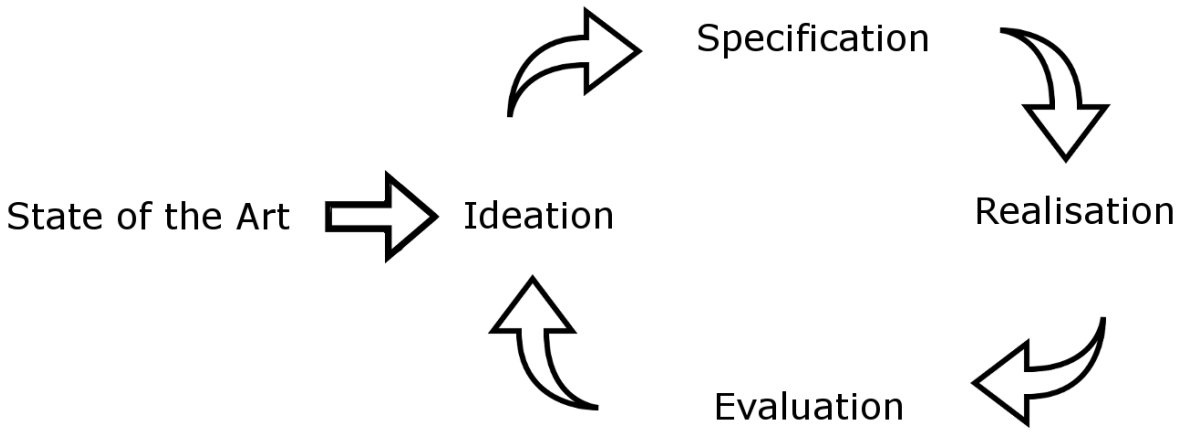


Figure 1. Visualization of used method. Adapted from "A design process for creative technology." by Mader, A., & Eggink, W., 2014. In DS 78: Proceedings of the 16th International conference on Engineering and Product Design Education (E&PDE14), Design Education and Human Technology Relations, University of Twente, The Netherlands, 04-05.09. 2014.

According to Figure 1, a more elaborated explanation per phase will be given below.

2.2 Ideation & Co-Design

This is the first phase of the design cycle. The first part of this phase is about sketching numerous ideas. It is not the goal to immediately design the perfect prototype, but to generate as many ideas as possible. This method of working is supposed to stimulate the creative mind of the designer. From this pile of ideas, a selection will be made that will be developed further. This goes on until one solid idea remains. Boden (1990) suggested three different approaches to this strategy. The first is using a combinational strategy, to combine the best aspects of others ideas into a new idea. The second is an exploratory strategy, in which different search procedures are applied to come up with new ideas. The third is a transformational strategy, in which the designer edits certain aspects of their ideas, so that the solution fits the problem better (Yilmaz & Seifert, 2010).

Another important aspect of the project itself is the concept of co-design. Especially during the Ideation phase, the input from these co-design session is vital to the development of the product. Co-design is defined as 'the collective creativity as it is applied span of a design process'. Co-design has advantages over the normal design process, as it directly involves the input of its end-users. When designing for and with users, the product adapts to the users' needs

better than when users are not directly involved in the design process. Rapid prototyping enables experts and everyday people to combine their strengths (Sanders, L., & Simons, G., 2009). During the current project, users have been invited for four sessions where they shared their opinions on the design of the product. Participants in the workshops were asked what they would like to see in the interface. This follows the concept of participatory design, where users engage in the design of a product. Based on the participant's needs and wishes, a product is developed.

For the ideation phase, input from the previous workshops are used to come up with a design idea. User's needs and wishes are considered for the prototype. During the phase, two workshops are held where participants can give their input on the ideation of the prototype. Again, this input is used for the finalization of the ideation phase.

2.3 Specification & Realisation

In the second phase, the idea that was formed in the ideation phase, is refined into a more qualitative prototype. As the most important part of this project was the co-design session with the users, this phase includes the specification and the realisation part. Working with the requirements from the previous chapters, the idea gains a more concrete form. During each iteration short evaluation rounds are held. From this evaluation, the prototype gains more structure and possible flaws are pointed out. At the end of this phase, a complete prototype is presented.

2.4 Evaluation

In the 'last' phase, the finished prototype is tested with its intended target group. It is important to see if the requirements are met when real users are interacting with the prototype. At the end of the phase, the prototype is evaluated with the results of the user tests. Of course, evaluation has already been included into the design process from the start. However, this final phase focuses more on the uptake of the interface itself. No more design decisions are based on this evaluation. This last evaluation user test is done with the final prototype and a setting is used that is natural for the interface. This way, the focus can be on the usage of the technology. Data is collected with the use of audio recordings and video material, where the user's actions are analyzed. Criteria for this is the flow of usage, clarity of functions, and opinions of users on the

overall design. The results of this evaluation judges whether the prototype was designed according to the user's needs. If negative results occur, this means that the prototype needs to be iterated once more (van Gemert-Pijnen, et al., 2011). More about this evaluation method will follow in its chapter.

Another important aspects during this phase is to review related work, as to position the result in the field of existing work. This enables the researcher to reflect upon the finished prototype, where it can be explained why certain design decisions were made (Mader, 2014).

3. State of the Art

3.1 Target group

As stated in the introduction, cancer patients are a population in which distress is a common symptom.With 9 million people diagnosed per year, morbidity is rising. Newly diagnosed cancer patients experience (severe) anxiety and depression, as their daily lifestyle is impaired by their treatment and symptoms (Sanson-Fisher, et al., 2000). Patient experience distress, which can impair their adherence to their treatment and decrease their will of survival. Both outcomes can severely decrease their quality of life. However, only a small fraction of these patients receives sufficient psychological care in return (Merckaert, et al., 2010). Before any conclusion can be made on the amount and type of treatment, it is important to look at the different symptoms the target group suffers from and how these affect their lifestyle.

First of all, it is important to define a term that will re-occur in this report frequently. Quality of Life (QoL) is a means to measure the evaluation of an individual's life experience. Using QoL as a measurement makes it possible to see the psychological consequences of different types of treatment. It should be kept in mind that the way QoL is measured, is mostly subjective (Morrison, (2016). *Introduction to Health Psychology*. Harlow: Pearson). Using this theory, it is possible to determine which cancer symptoms are hindering cancer patients the most.

Cancer patients will experience multiple symptoms before, during and after their treatment. The most common symptoms are: fatigue, pain, sleep disturbance, difficulties in physical functioning, and depression (Janz, et al., 2007; Satariano, et al., 1990). Research into breast cancer patients showed that over half of the women reported fatigue being a symptom with the most impact on QoL. This results in higher occurrences of depression, pain and sleep disturbances (Janz, et al., 2007). Not only symptoms are an influence on QoL.

A study done by Lehto, et al., stated that, overall, psychosocial factors were the strongest predictors of QoL outcomes. Meaning the amount of support, coping strategies, perceived status of disease and the amount of daily adjustments (Lehto, et al., 2005 ; Kim & Kwon, 2007). Patients who were higher in their will to seek social support, had a higher comfort level in their QoL scores (Kim, 2007). However, when patients were using an avoidant coping strategy, they would suffer from lower QoL scores (Lehto, 2005). The medical condition of the patient was also a strong predictor for the QoL. Especially the perceived status of disease (Kim, 2007). This

also shows in the results of patients that had to adapt their daily lifestyle with many adjustments. These individuals had lower QoL scores (Lehto, 2005). All these factors can be used to create a feedback system in which QoL scores will be influenced positively.

When designing an interface for a target group, it is important to listen to their needs and wishes. In the previous co-design sessions, participants have already mentioned their needs. The literature states that patients are unsatisfied with the psychological support they receive, that there are high unmet support needs and that they would like to receive more information. Information provision seems to be a recurring need in this target group. This way, the user group can effectively process their concerns (Beatty, et al., 2008). Even in the co-design sessions, there were participants that seemed to request that there was some information provision aspect in the interface. They wanted to learn more about expectations, tips, and assistance. As mentioned before, optimism can be a positive influence on QoL, and the participants seemed to like the idea of the interface giving positive feedback and using a positive tone in the messages.

3.2 Self-compassion

For this project, the theory of 'Self-compassion' was chosen as the theory base for the application. As mentioned briefly in the introduction, self-compassion focuses on being aware of one's own suffering and not simply avoiding it. Using kindness towards one-self and others, people are more keen to alleviate their own suffering instead of seeing it as a failure in life (Neff, 2003). In this chapter, self-compassion and its results will be explained more in depth.

To start with, there are two different theories about self-compassion. One, by Kristin Neff, states that there are three different components to self-compassion. Self-kindness, self-criticism, and mindfulness. The main goal of this theory is to gain a positive attitude towards oneself, promoting productive behaviors against suffering and excluding emotions of self-judgement (Neff, 2003).

The second theory, by Gilbert, takes a different approach, which focuses more on an individual's emotions. In this theory there are three emotional components. The threat-protection system, which is alert for threats and can activate a defensive mechanism; the gathering system, which provides information on how many resources are available for our survival (our needs); and the safety system, which allows us to rest and calm down. These three systems regulate each

other and our emotions. The model is called ‘the three circle model of emotion’ (Gilbert). This interface will take the latter theory as its focuspoint.

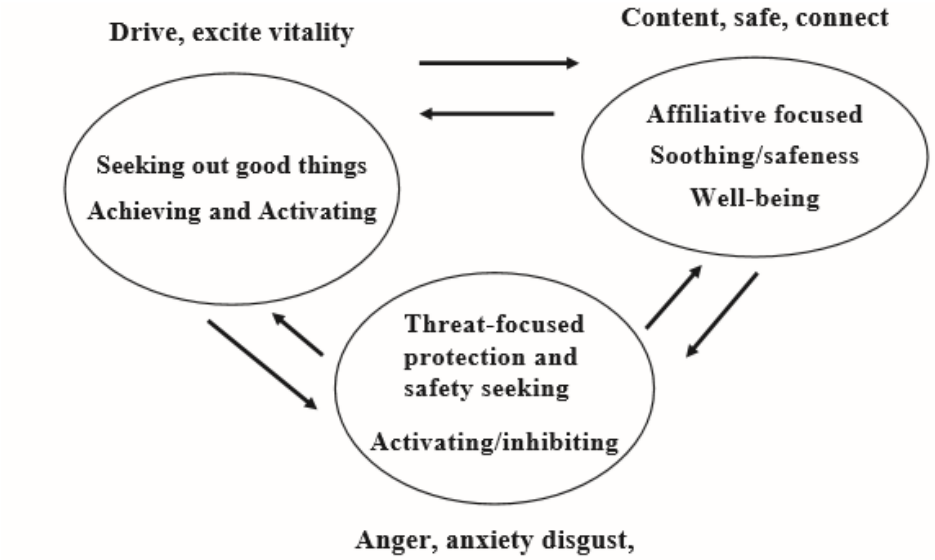


Figure 2. The three emotive systems of Gilbert. Adapted from “The origins and nature of compassion focused therapy.” by Gilbert, P., 2014, British Journal of Clinical Psychology, 53(1), 6-41.

According to Gilbert, these three systems were developed thousands of years ago to promote human survival. Thousands of years later, humans developed intelligent cognitive abilities, which do not always work with our old emotions and motives. As an example, when a prey animal is chased down by a predator but escapes getting caught, the prey will most likely calm down after a while and continue gathering food or resting. Putting a human in this situation will likely initiate feelings of anxiety, as to when the predator might attack again. So, these cognitive abilities can keep humans ‘trapped’ in the threat-protection state. Not only physical threat can activate the threat-protection system, but also emotional threat. Self-criticism is one of the most common ones, as it constantly stimulates the activation of the threat-protection system. If any of the three systems are in imbalance, mental health problems will occur in the long run.

Now, to counter these problems in our ‘old brain’, compassion-focused therapy (CFT) has been gaining evidence of effectivity. Methods that are used in this therapy are ranging from breathing exercises to recall of being compassionate. Another important part of this therapy is self-identity. One must see themselves as a particular ‘self’, so one can reflect and reason on

themselves. When patients start to compare their stories with others, they will see that shame is part of being human, and that all minds have their own conflicts.

During the co-design sessions with the target group, the arrangement of the therapy sessions has been designed. These are partly based on Gilbert's five phases of CFT. The following six modules have been proposed, as shown in Figure 3.

- Module 1: Introduction to self-compassion and beginner exercises in mindfulness
- Module 2: Introduction to three emotional system and how to handle fear and stress
- Module 3: Becoming aware of self-criticism and how to use self-compassion
- Module 4: Accepting and setting goals
- Module 5: Accepting compassion of others and meaning something for others
- Module 6: How to act after the intervention?

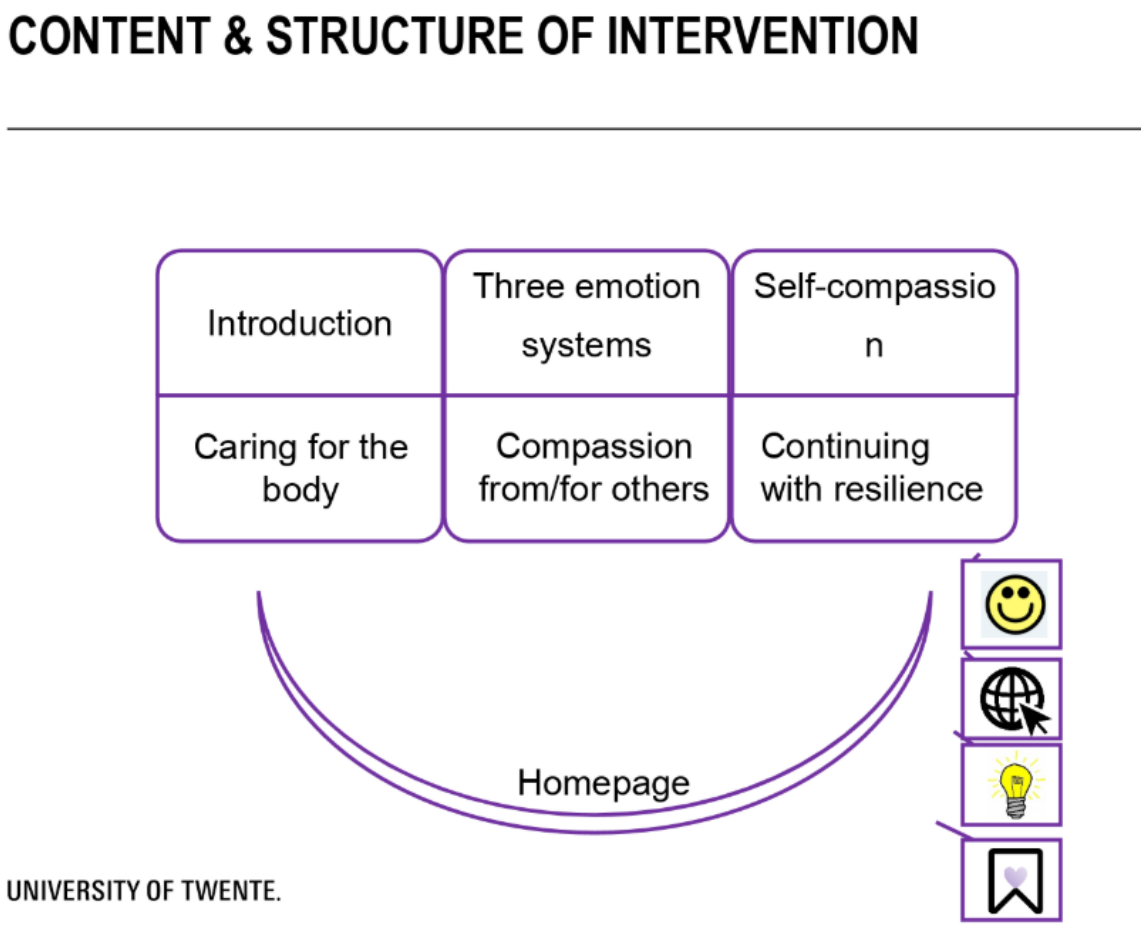


Figure 3. Structure and content of the intervention. By Austin, J., 2019.

These modules will be followed and unlocked in a linear manner. Patients will have to learn what self-compassion is before they can start with the exercises (psycho-education), and will then continue to delve further into the materials.

3.3 Interaction Design

Interaction design focuses on the shaping of digital artifacts with a focus on enriching the user experience. The goal of this design principle is to create better or new interactive systems (Fallman, 2008). With this focus on desirable end-user experience, interaction design can deliver great digital products that are pleasurable for users to use. This was the reason to use this design principle for this interface, to tackle the effectivity and engagement of the application.

3.3.1 User Experience Design and Co-Design

This interface will be designed for a specific target group, which is mentioned earlier in this chapter. When designing a system for users, one must have a deep understanding for whom they are designing. It is important to know about their daily activities, emotions, and motives. This way, one can design for the user experience (Gruen, et al., 2002). But what, exactly, is 'user experience'?

User experience can be defined as the experiences caused by the use of a product. However, when designing for a user experience, one can focus on emotions and other psychological needs (Hassenzahl, 2013). Experience is also what a user adds to the interaction. This means that an experience can be different per user, there is no strong control over what kind of experience you design. Good experience design requires the designer to know the user's situation and how their users engage with the product (Wright, et al., 2008). *How does it feel to act through a product, the moment it is used?* Is a question a designer can ask themselves when designing for user experience.

But how can we understand and design those experiences? For this project, a co-design approach was chosen. During the design phase, researchers, designers, and potential users are brought together to cooperate. With this design-style, different perspectives are brought together and a greater understanding of the product's demand is experienced (Steen, M., Manschot, M., et al., 2011). Co-design can have several benefits including: better system requirements, better fit between system and user, and improved satisfaction (Kujala, S., 2003). Co-design has already

been applied to multiple projects in the mHealth branch and there is a base of evidence that suggests that this design method can increase usage and acceptance of mHealth interventions (Eyles, H., Jull, A., et al., 2016).

3.3.2 Design for Mindset Change and Continued Usage

The overall goal of this application is to persuade people into adopting a different behavior, or mindset even, and continued usage of these applications. In order to change their behavior and cognitions, several design choices have to be made. Three methods will be highlighted that will be included in the design of this interface.

3.3.2.1 *PSD Model*

One of the first models that can be applied to the interface design is the 'Persuasive System Design' model by Oinas Kukkonen. All technology that is designed with the intent to change the user's behavior or attitude is persuasive in a way. This persuasion can have three different outcomes: reinforcement, shaping or change of a specific behavior. The most successful outcome is a shaping one, where a pattern for a specific behavior is created, but not reinforced onto the individual (Oinas-Kukkonen & Harjumaa, 2009). This model can nudge people into using a certain technology more than once.The PSD model contains principles that explain how persuasive technology should be designed.

In total, there are 7, as can be seen in the figure below. The second, third and fourth principles are of importance when designing the system. The second principle states 'Persuasive systems should aim to contain commitment and consistency', this is all about how users will stay with the technology when they make a commitment to it. The third principle states 'Persuasive systems should use both indirect and direct persuasion strategies'. This is based on the ELM model. The fourth principle states that 'Persuasive systems should use incremental persuasion'. The system should 'coax' people into a certain target behavior by making small steps towards that behavior.

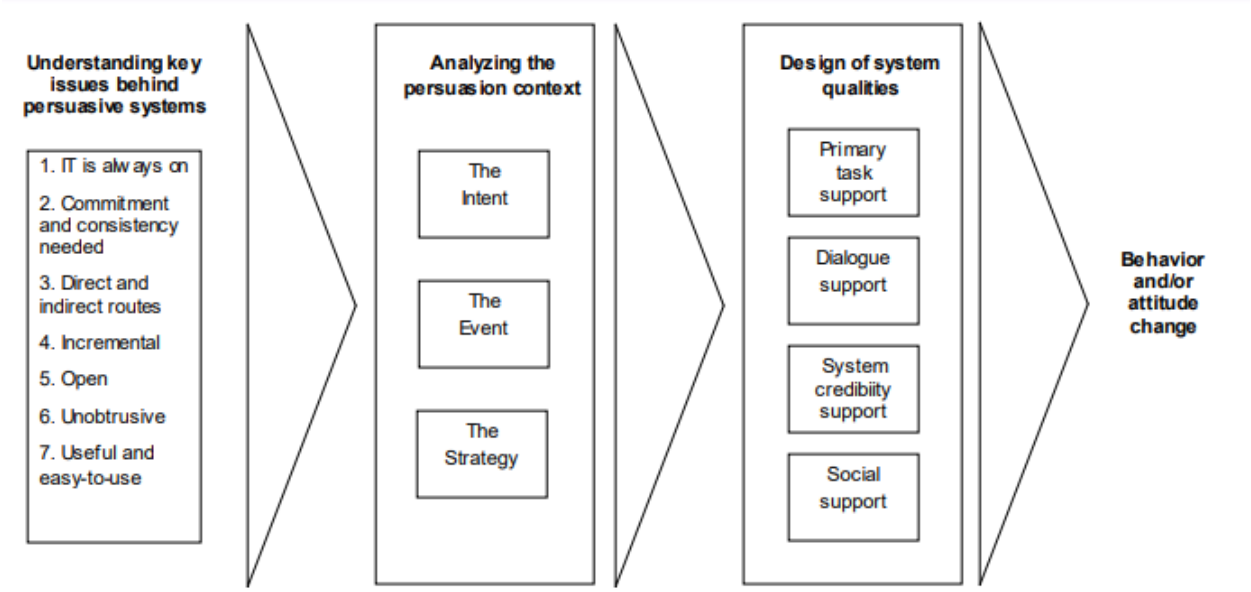


Figure 4. PSD model by Oinas Kukkonen. Adapted from "Persuasive systems design: Key issues, process model, and system features", by Oinas-Kukkonen, H., & Harjumaa, M., 2009, Communications of the Association for Information Systems, 24(1), 28.

To help design persuasive technology without crossing ethical boundaries, the PSD model contains two other principles, with which several (ethical) issues with persuasive technology can be avoided. 'Persuasive systems should always be open' is a principle that says that the persuasive designer bias should always be noticeable for the user. 'Persuasive systems should aim at unobtrusiveness', means that persuasion should not be used at improper moments for the user.

Using these principles with the design, certain system features can be implemented into the interface. There are four categories in total. Primary Task Support, Dialogue Support, Credibility Support, and Social Support. These four categories all contain different principles that will benefit the persuasion. During the co-design sessions, users have shown and told what they would like to see in the application. With this information, a table has been constructed with multiple persuasive design requirements for the interface. The table is depicted below.

Table 1. Persuasive System Design Model principles. Adapted from "Persuasive systems design: Key issues, process model, and system features", by Oinas-Kukkonen, H., & Harjumaa, M., 2009, Communications of the Association for Information Systems, 24(1), 28.

Persuasive System Design Model

Primary Task Support	**Dialogue Support**	**Credibility Support**	**Social Support**
Personalization	Feedback	Security	Sharing information
Structure	Reminders	Expertise	
Motivational elements	Liking		
Information modalities			

The first column depicts all principles that support the user into fulfilling the system's primary task. Personalization was found to be a wanted aspect, as long as it stayed minimal. Patients appreciated personalization when it regarded the length of the modules, voice- and audio related exercises and getting suggestions for future exercises. Structure was found to be wanted regarding being able to skip certain parts, receiving new content, and not being restricted to following certain parts of the intervention. Motivational elements were only valued when they were solicited in small, positive messages. Push-notifications were seen as a positive aspect to the interface. Lastly, information modalities cover aspects like, changing the content of the modules from text, to animation, to audio.

The second column depicts how to system communicates with the user. Feedback was a highly requested aspect, as users wanted feedback on their input in the app. This would enable ongoing reflection. As stated in the previous paragraph, the use of push-notifications in the form of reminders will also be included in the interface design. Lastly, liking was added to this column without it being mentioned in the co-design sessions. Liking is based on the look and feel of the system itself. It should be appealing, when an interface is visually attractive, it has a chance of being more persuasive.

The third column depicts principles that make the system more credible. The system should be secure and not leak any data to outside people. When a system is and feels safe, users are more likely to keep using it. Lastly, expertise is an aspect where the systems is viewed as an expert tool. This can be done by providing information, or even showing that it is in cooperation with other firms of importance.

The fourth column depicts motivation by using social leverage. During the co-design sessions, users were not that interested in many of the social support principles. Most of these principles use gamification aspects. Our target group was not interested in that. They did, however, appreciate sharing information, but only if it was indirect. As an example, they preferred seeing quotes and short stories on a profile more than having direct contact with others. This was due to the fear of comparing.

With these persuasive principles, the interface can work on guiding its users into following the content of the intervention. There is no hard proof that using these persuasive features will guarantee that the end-users will follow the self-compassion modules. Studies have been done that did not prove a *direct* link between behavioral change and the persuasive features in an application. However, the studies also found that using various persuasive features together will bring forth a behavioral change outcome (Räisänen, et al., 2010).

3.3.2.2 Gamification

Outside of the PSD model, there are other options to engage users into an interface. 'Gamification' has been a trend for a lot of app designers, lately. The idea behind it is that the designer uses the power of game elements to support users into fulfilling the primary task of the application. Classic examples of game elements are point systems and badges. These are more competitive oriented (Wolf, et al., 2018). However, these mechanics are mostly applied to applications that are used in a more general context. Can they be applied to mHealth as well?

Changing to a different field brings difficulties. This also seems to differ per target group, disease type, and application itself. mHealth applications that are aimed at the self-management of diabetes patients can benefit from a gamified application, as a study by Miller confirmed that continued usage and engagement was improved by adding these mechanics (Miller, et al., 2016). This study was aimed at a younger audience. Applications that are aimed at children are more likely to have a gamified stamp on then, than applications aimed at adults (Giunti, et al., 2017). However, there are more elements that just the leaderboards and points.

It is true that applications aimed at children might have more noticeable game elements in them. However, gamification does not only work when these elements are clearly visible and obviously connected to games. Elements as simple as seeing progress, statistics, narrative, goals, and logs are also gamified elements (Giunti, 2017). Even these elements receive the same

benefits as the other elements: the promotion of autonomous motivation (Wolf, 2018). Using game elements should not erase the experience of the application: it is simply framed in other lens. The application itself already has aspects that are able to engage users, these gamification elements are simply meant to enlarge this engagement.

Participants in the co-design sessions were not interested in a point system, or the aspect of badges. Their opinion on this was that it would make a game out of their illness. The application should remain serious. Participants liked it when they could see their progress in the six modules, be able to track what answers they have filled in in the past (log), and see their statistics. So, for this interface, gamification aspects will be used, as long as they are subtle and do not gamify the goal of the application.

3.3.2.3 *The role of Interactivity*

Interactivity is a key part of any application. Today, interactivity can be found everywhere, from websites to applications on a smartphone. Adding interactivity to something can reveal more detailed information, but can also hold engagement more. The role of interactivity can change depending on the level of motivation and engagement of the user. According to the ELM model, when users have high involvement, they will fully use the interactions offered (Liu & Shrum, 2009). In Figure 4 below, the ELM model is specified more clearly.

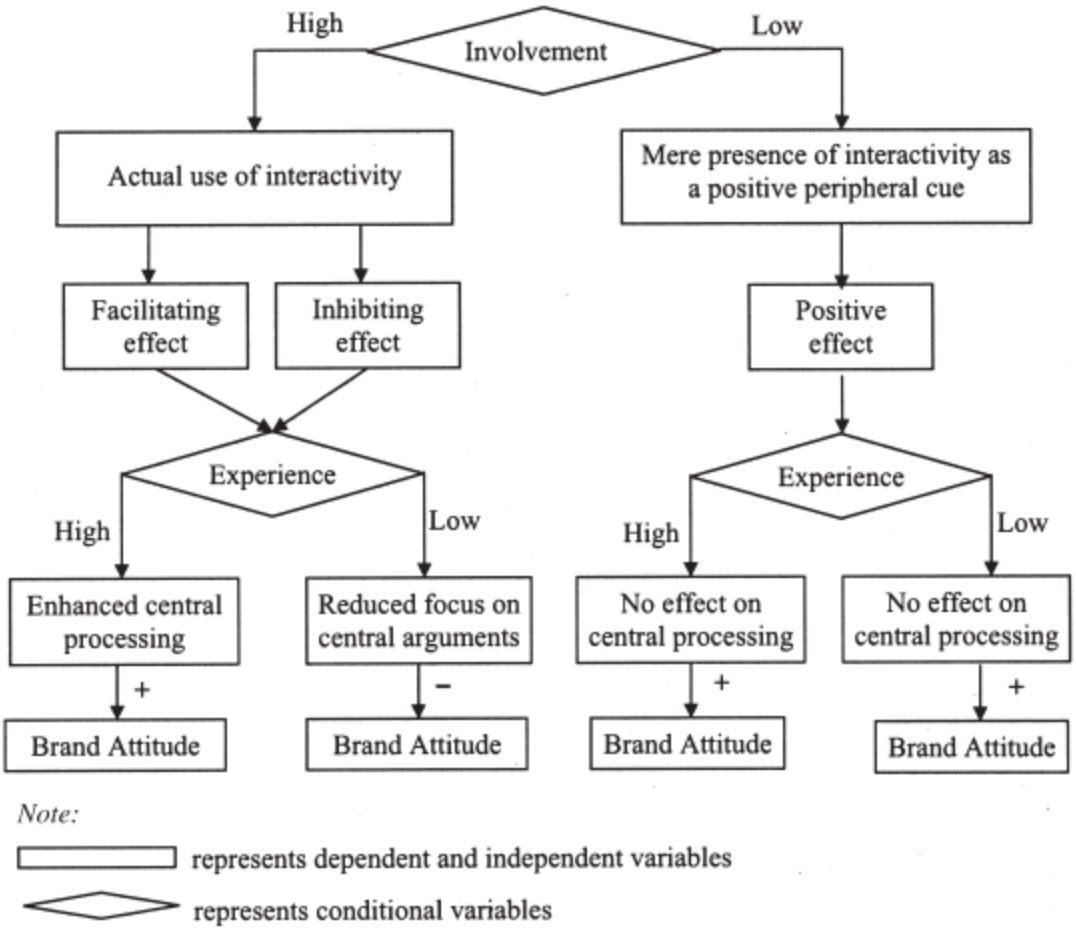


Figure 5. The ELM model. Adapted from "A dual-process model of interactivity effects", by Liu, Y., & Shrum, L. J., 2009, Journal of Advertising, 38(2), 53-68.

In short, when users are highly involved in the content of the application and have a good experience of interactivity, the user will process more information centrally. Following Figure 5, users are not likely to process any information centrally when involvement is low. This means that users should be actively using the application in order for it to have any positive or noticeable effects.

About interactivity, ever since computer-based learning was introduced into the educational setting, e-learning has gained popularity. This is especially because of the interactivity. On applications people can have a certain degree of control over the content. For example, audio sources can be paused, animations can have interactive components, and interfaces present a greater amount of choice. This all increases the user's attention, involvement and engagement. Studies done on e-learning environments say that interactive environments

engage the users more into the content, than when they are not interactive at all (Delen, et al., 2014).

Especially when dealing with cancer patients who are undergoing chemotherapy, in which their cognitive functions are less than average, interactivity can be a way to make learning easier. Replacing text by imagery will reduce the cognitive load of the interface. Which enables patients to continue using the app *and* the interface to set the mindset change in motion. During the ideation phase a lot of user-based interaction research will follow.

3.3.3. *The Role of Prototyping*

In order to design and create an interface, a designer must loop through several design iterations before a finished design can be delivered. In the previous paragraphs, several aspects and models have been discussed that should be implemented into the design of the interface. However, in practice, it is not always that easy to implement everything a designer wants into a product. Overall, design decisions are based on little information, as you are making decisions about something that does not exist yet.

These decisions can be made by contemplation alone. However, a designer can also introduce the question to the concrete world. A prototype. Making a physical representation of the design is useful for two reasons. Exploration and validation. Exploration entails seeking solutions for possible design challenges and fine-tuning certain interactivities. Validation entails looking for validation on the made design decisions (Frens, et al., 2013). A physical prototype can range from a simple sketch on paper, to a completely working interface on a tablet. Different design decisions can be made at different stages. So, first, it is important to look at what medium is best to use during the different design phases.

As mentioned before, there are many different media you can choose when prototyping an interface. To keep it simple, a division will be made between paper and computer software prototyping. Both ways have their pro's and con's. Software can be a really effective method of communicating the design in its working context, while paper prototypes usually need a Wizard of Oz method to work. However, paper prototypes are more useful for aspects like brainstorming, efficiency, and early design sketches. Using software tools from the beginning might cut off the nuance of the design decisions, as it is all about 'making it work' instead of

designing for the experience (Cook & Bailey, 2005). So, what are paper prototypes and what do they provide?

During the ideation phase of design, many ideas will shape up. Paper prototypes are easy to make, as a sketch already fulfills its deed as a prototype. Brainstorming and re-interpretation are two main functions of sketching. The first, brainstorming, being a way to sketch out as many ideas as possible and seeing which design looks best. While the other, re-interpretation, is seeing how others see the design and how others interpret it (Lugt, van der, 2002). Making paper prototypes is a quick process, which enables the designer to explore different corners of the design itself.

Paper prototypes can only take a design so far. Especially for an interface design, it is necessary to move to a different medium. Using software will enable the designer to create a new experience when testing the prototype, a more realistic experience where different kinds of information can come from. Soft- and hardware give a new dimension to interactivity, one that paper cannot provide (Frens, 2013).

To counter this dilemma between two media, paper prototypes will be used to sketch out the early design ideas, as they provide insights that are needed to design for the experience, while software prototypes will come in use for the later design ideas, to test the experience.

3.4 Requirements

These requirements are not definite and are fully open to change, as further research and testing can change the mindsets of the requirements. For now, the requirements are based on the state of the art research.

- The interface should use self-compassion as a central method
- The interface should use positive endorsement
- The interface should consist of six different modules that will all provide different information
- The interface should have interactive components and less focus on a text-heavy design
- The interface should focus on ensuring continued usage
- This interface should focus on designing for a mindset change

In this chapter we've covered several aspects of importance to the design of this interface. First, the target group was analyzed to see what their most important needs and wishes

were. Not only by desk research, but also by previous user-based research. Second, the self-compassion method was analyzed. The most important characteristics of the therapy and its underlying theory were presented to give the reader a more in depth insight into what the content of the future application would be. Third, a more in-depth research into interface design was presented. Multiple design methods were presented, to show how continued usage could be stimulated, accompanied by methods that would improve the chance of possible behavior change. The chapter was concluded by a list of requirements gathered from the background research.

In the following chapter, the ideation phase will start. In this chapter the first design ideas will be presented and evaluated by the user target group. With this chapter, the design cycle will start.

4. Ideation and Co-Design

During the Ideation phase, a co-design approach was followed, where end-users are actively involved in the design of the interface. This meant that the first ideation steps were focused on creating mock-up interface elements that could be used for evaluation in a co-design session. During these evaluations users can actively give their opinion about the design of the interface and give their own ideas and insights.

4.1 Ideation of the designs to be used in the co-design session

As a first step, the transcripts of the earlier co-designs sessions were used to gather important insights. These sessions were held on several dates during 2018 and 2019 in Enschede and Groningen. Following the content of these previous sessions, the following insights were derived.

- Users liked the metaphor of ‘going on a journey’ to compare to their battle against cancer.
- Users like the reflection exercises, but do not want the app to be too ‘zweverig’.
- The app should communicate in a positive and simple manner.
- Personalization was not seen as an essential part of the app.
- Users want to be able to skip exercises.

Building upon these findings and those of the literature, the following three materials were created: the overall design of the homepage, the wireframe and functionalities of the homepage, and the interactions of one of the modules (module 2).

4.1.2 Wireframe and functionalities of the homepage

The wireframe is the skeleton of an application. It is a visual representation of the content and functionalities of the several pages in an app. The basics of the functionalities will be explained in the wireframe. It is the ‘blueprint’ of the app, as it makes it easier to communicate certain design and interactions ideas to other stakeholders. Wireframes can change over time, these

visual representations make it easier to see what changes were made due to certain decisions (Hufford, B., 2019).

For this project, the client wanted to have a homepage with all its functionalities mapped out and designed. The client already had several functions mapped out in their own prototype. The functions that were asked to be displayed on the homepage were: a personal page (profile), a favorites page, a links page, a settings page, a moodmeter page, and a 'lichtpuntje van de dag' page. So, the wireframe of the complete system looks as follows.

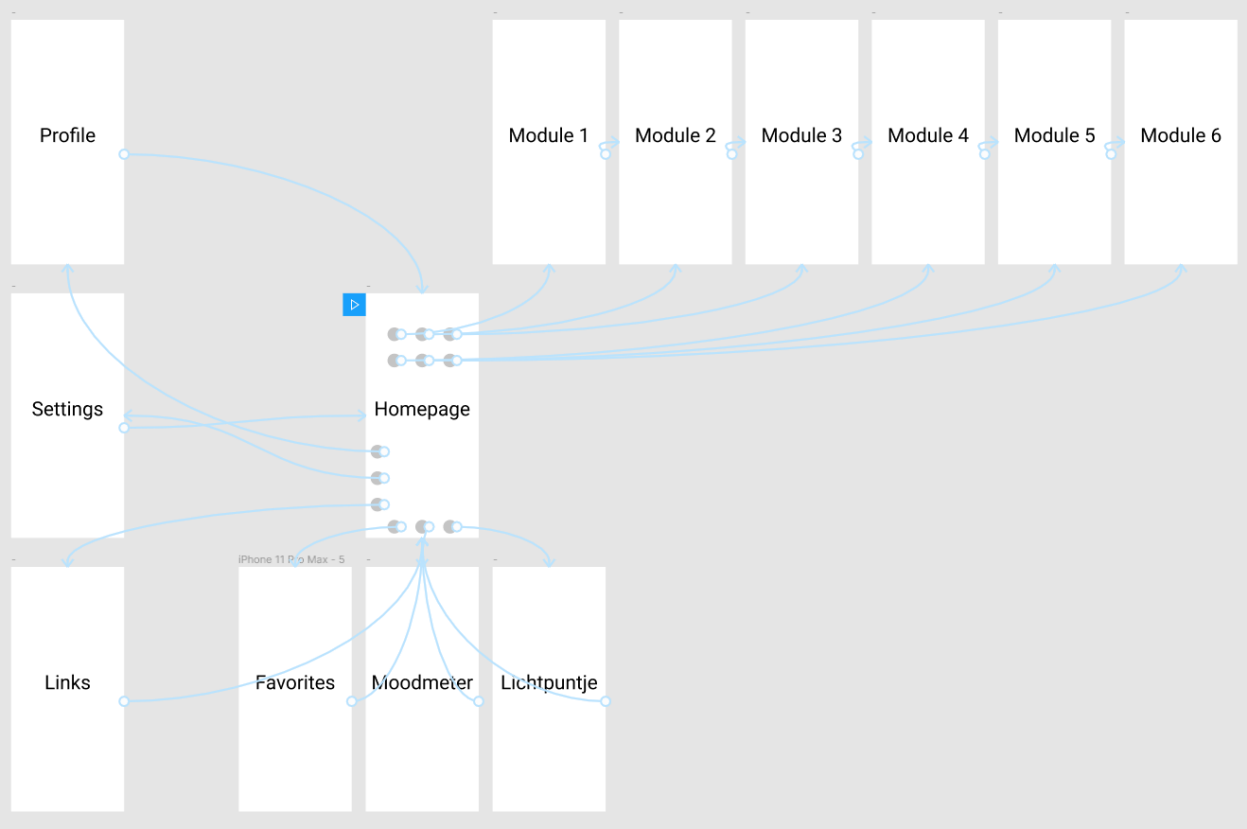


Figure 6. Wireframe of the self-compassion interface.

As shown in Figure 6, the homepage leads to several different other pages. When designing a wireframe, a designer can see where simple errors can occur. For an example, if the homepage leads to a new page, there should be a button that leads back to the homepage. This wireframe was used for the prototype that will be shown later in this chapter.

4.1.2.1. Icons

Icons are an important factor in interface design, as these small pictures should express to what page they lead, without using too much text. As icons are not new to interface design, it was chosen to look at universally used icons to make a design on what icons will be used for the first prototype.

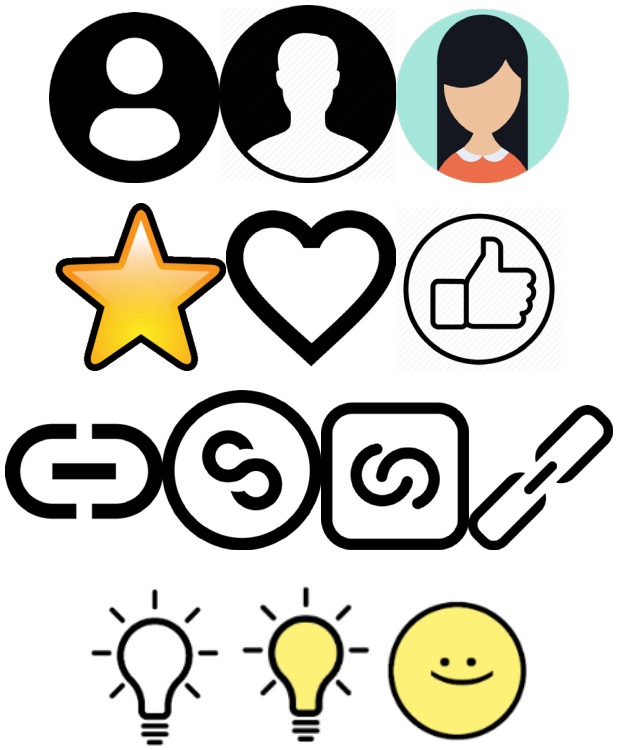


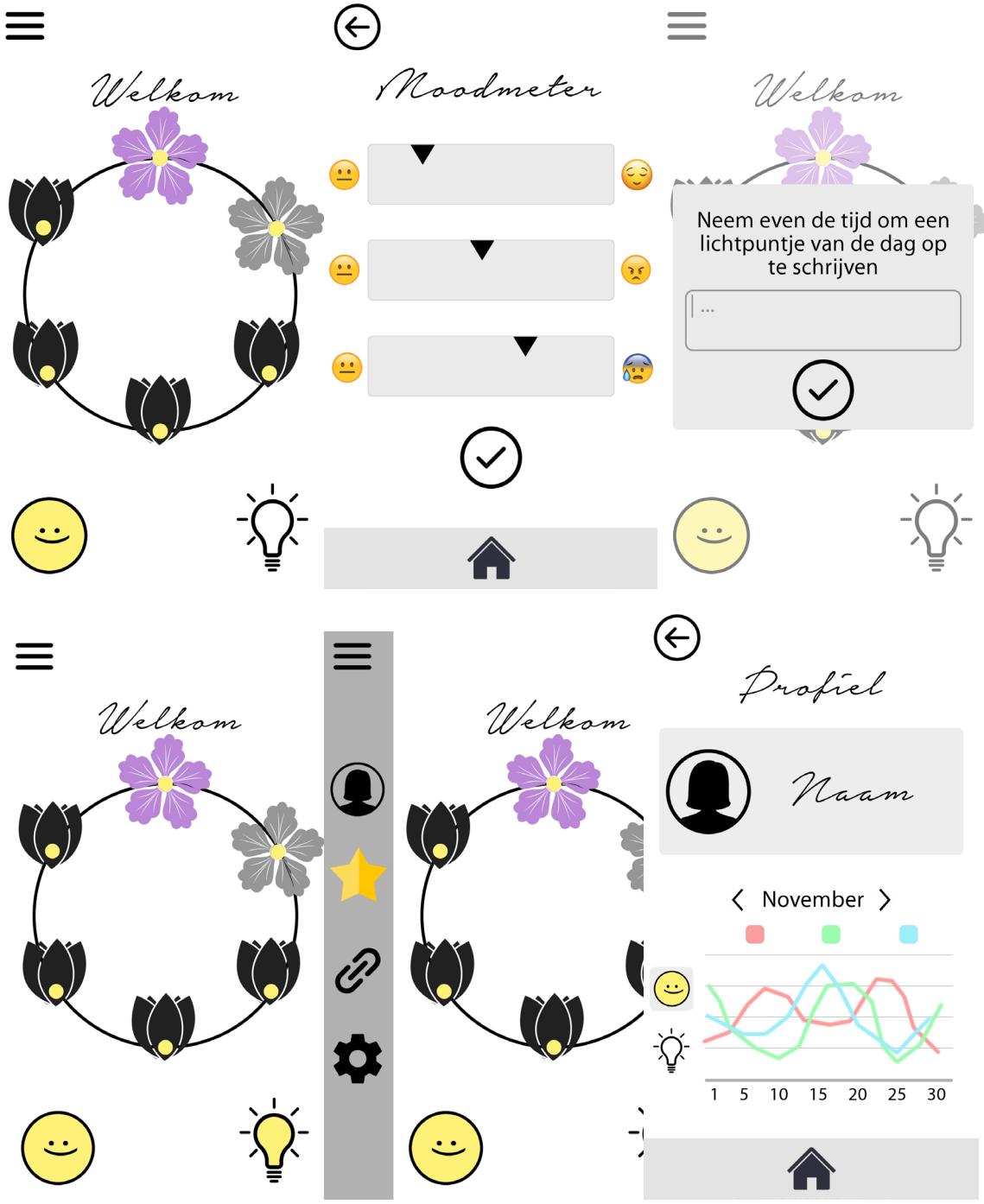
Figure 7. Icon inspiration. With a-c) profiles, d-f) favorites, g-j) links, k-l) ‘lichtpuntje van de dag’, and m) moodmeter.

The main goal for these icons is that the function of the page behind them is clear. This way, users will be able to navigate easily through the homepage without having to think about which icons to press to go somewhere.

4.1.2.2. Functionalities of the homepage

As mentioned before, the client wanted the homepage to redirect to six different pages. In this design, it was chosen to use a menu button in the top left corner. Four of the six functionalities will be included in the menu. This leaves the moodmeter and the ‘lichtpuntje van de dag’ out of the menu. This is because the client wants to stress their importance. These two functions should be used daily as an exercise, so their presence should be high on the homepage.

Below in figure 8 the collection of pages can be found, which will be explained in more detail below.



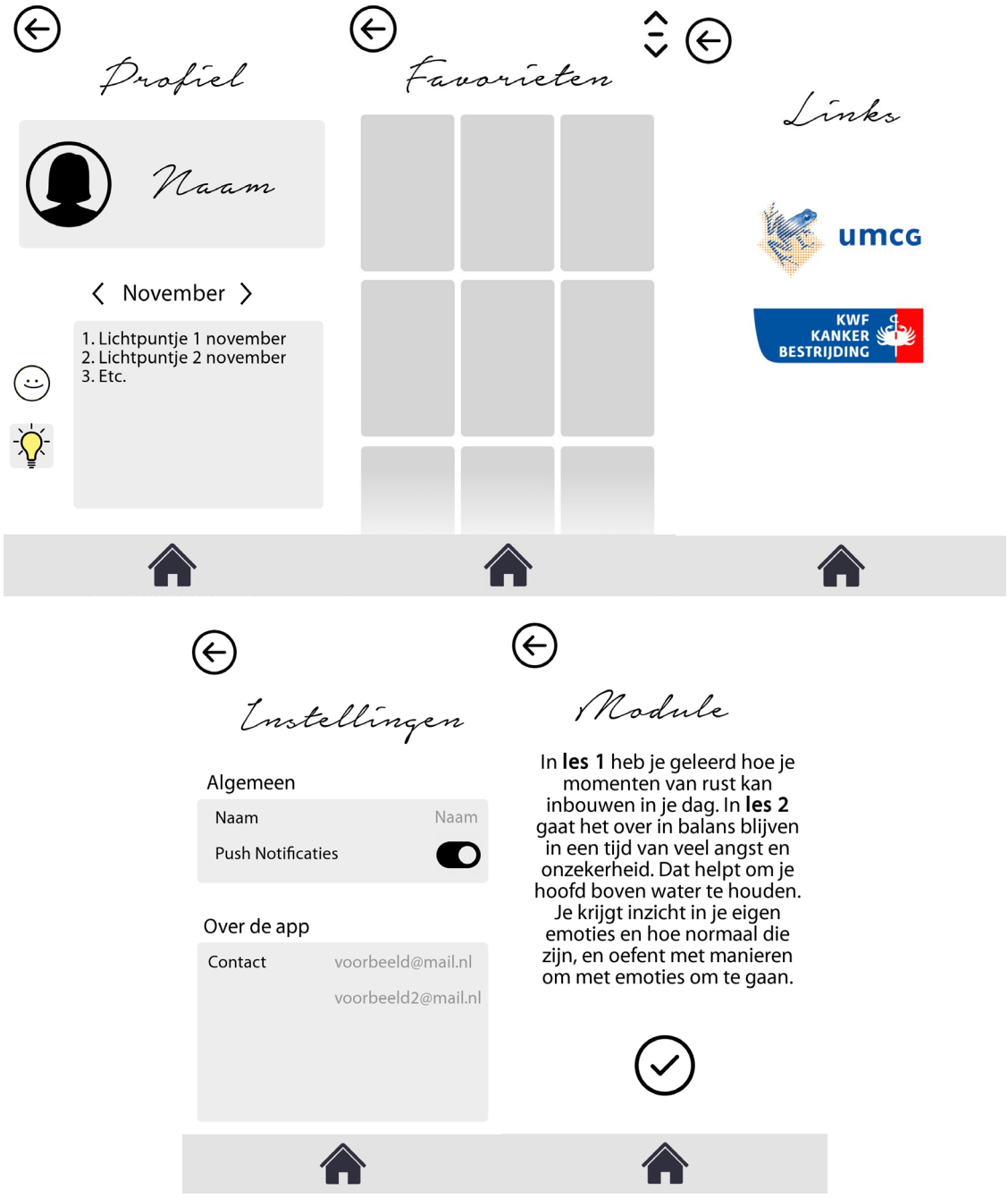


Figure 8. Pages for the interface. With a) the homepage, b) the moodmeter, c) 'lichtpuntje van de dag', d) homepage with finished 'lichtpuntje van de dag', e) homepage with menu, f) profile with moodmeter data, g) homepage with 'lichtpuntjes' data, h) favorite page, i) links page, i) settings page, and j) module opening.

In Figure 8.a, the opening homepage is shown. A more detailed explanation about the design of this page can be found below. 8.b depicts the moodmeter. The client had already decided that the

moodmeter should include multiple scales that measure emotions. For this mock-up, three emotions were used: anger, calmness and fear. Users can move the bars to adjust them to their current mood. 8.c depicts the ‘lichtpuntje van de dag’, where users can fill in a positive experience of the day. The client wanted this to be a simple fill-in form, so it was designed as a pop-up on the homepage. 8.d depicts the homepage when the user has filled in the ‘lichtpuntje van de dag’. 8.e depicts the menu, which slides in from the left. On it is access to the other pages of the homepage. Design was based on a menubar, used in most apps. 8.f depicts the personal page. Users can see their ‘profile’ here and their daily moodmeter and ‘lichtpuntje van de dag’ results (which is shown in figure 8.g). The results are in a simple graph and list. 8.h depicts the favorite page. On every page in the 6 modules, users can tap on a star icon. Pages that receive this star are stored in this page. Pages can be saved with a title and users can easily find them in this database system. 8.i depicts the links page. Important websites are placed here, preferably with an image that has a URL embedded in it. When clicked, the app will redirect the user to their browser client. 8.j depicts the opening of the module. The client wants users to receive a short intro before going into the module.

4.1.3. Homepage design

Another big part of the homepage is the progress bar. The client wants to have a visual attractive progress bar that changes respectively with how far the user is in their self-compassion intervention. This is due to motivating the user to finish a module and to show how far the user is in a module. There will be three ideas:

The first idea that was suggested was a circle with six flowers. Each flower represents a module and when this module is reached, the flower will open up. The progress of a module is visualised by the color of the petals. When a user completes a section of the module, the color of a petal will change from grayscale to its true color.

A few design ideas for this visualisation. The first being how to handle the six flowers. There could be 6 different styles of flowers, representing the different methods per module. However, this could be too busy for a small screen. Different colors per flower can be used as well. Below, Figure 9 shows the inspiration used to design the flower petals. All flowers will have five petals to represent 20% completion in a module.

Figure 9. Ideation for flowers.

As shown in the figure above, inspiration for the flowers was taken from different species. In Figure 10.a, below, a first sketch is presented.

The second idea took a different perspective. During the co-design sessions, participants were fairly positive about using the metaphor of 'going on a journey and gathering tools' for the intervention. So, a compass idea was proposed. The needle would point towards the module the user was currently in. A progress bar will be added as a motivational aspect for the user. When completed, the progress bar will make a full circle inside of the compass. A first sketch is presented in figure 10.b.

The third idea was a free idea that was not taken from feedback from the workshops. The first sketch was dedicated to the evolution of a caterpillar into a butterfly. This sketch is presented below in figure 10.c.

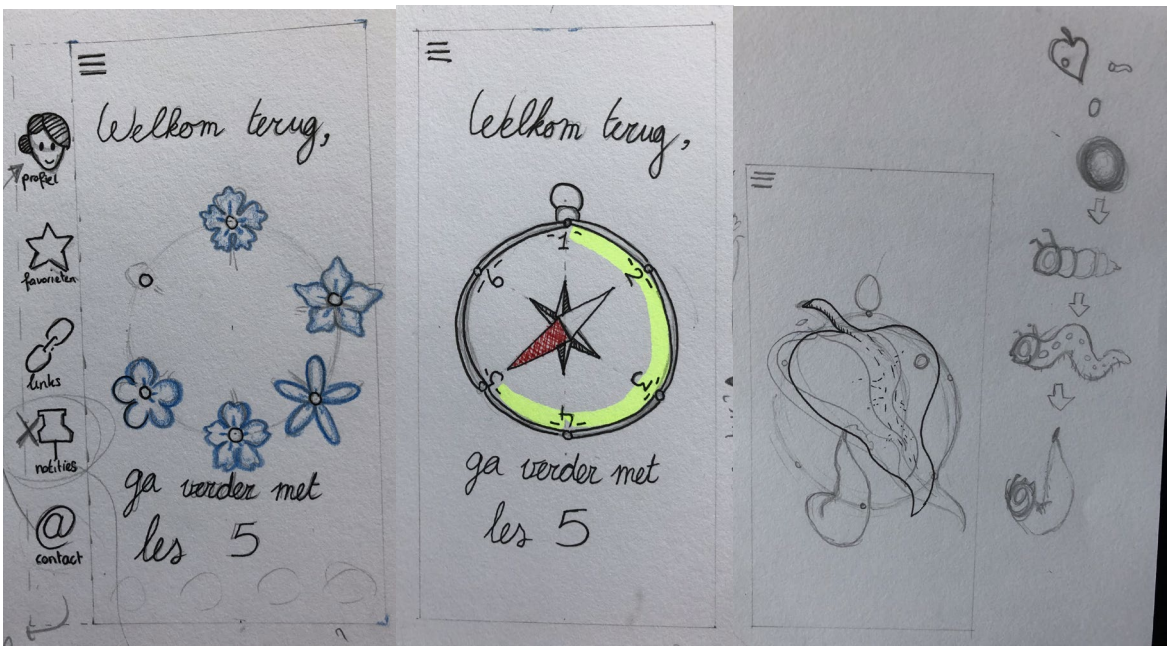


Figure 10. First ideation sketches of the homepage. With a) flowers, b) compass and c) caterpillar

These three sketches were presented to the client to receive feedback before the workshops. The sketch of figure 11.c was discarded because the idea of evolution did not match the battle against cancer, as users might associate a butterfly with a cure for cancer. This would give the wrong impression, as this app would not give the user any cure towards cancer but is just an intervention to help improve their quality of life.

A suggestion from the client was to change this idea into a tree, which would use branches or leaves as a completion method. Much like the idea of a tree of life. Certain parts of the tree would receive color upon completing a module, or more leaves would be added when a module was completed.

The two first sketches in Figure 11 were taken into the next design iteration. Moving from paper to digital prototypes, the designs got a more universal and polished look.

Figure 11. Second iteration homepages. With a) flowers, b) compass, and c) tree.

These were the designs that were presented to the users in the workshop.

4.1.4. Module 2 interaction

For module 2, the whole flow had to be sketched out. The script was already there, but needed some illustrations, animations and interactions to be complete. Redundant text should be avoided as much as possible, as this unattractive in an application interface.

First, a visualisation of the script was made, with the goal to minimize the amount of text given in the script. The first ideation mostly provided insights for interaction ideas. For the next iteration, the goal is to focus on the interaction, as this is the main part of the project.

Due to time constraints before the first workshop in Enschede, the interactions for the module was made on a very simple application (Tiim module). The goal for the workshop was to see if the content of the workshops would catch on with the users. So, the level of interaction in the application was low.

4.2 Co-design workshop

4.2.1 Co-design set-up

The first workshop was planned on November 16th 2019, in a convention room in the DesignLab at the University of Twente. There were a total of 9 participants, of which 6 were patients and 3 were nurses. The workshop set-up is summarized below.

- Opening: Participants were given a short introduction of the activities of the day.
- Homepage elements: An interactive part in which users are asked what the icons of the interface stand for. Participants are given a form with the six icons and are asked to write down to what sort of page this icon would lead to.
- Homepage design: An interactive part in which users were asked what their opinions were about the three homepage designs (Figure 10 a-c). Participants were asked to mark their favorite design with a post-it note.
- Roleplay offering app: A roleplay section between one of the patients and one of the nurses in which the nurse has to offer the app to the patient.
- Using module 2: The participants were given the application either on a phone, tablet or on a paper booklet. Users were given 20 minutes to read through it and mark their pro's and con's with green and red stickers respectively. They could write down notes on the paper as well.
- Roleplay recommending app: A roleplay section in which two patients act out a scene in which one patient recommends the app to another patient.
- Summary and ending.

The transcriptions do not include the identity (gender, age or name) of the participants and are solely used for this project.

4.2.2 Co-design Results 1

In the following section, the results of the co-design workshop will be discussed. The transcripts entail sensitive data, so they will not be included in the report. However, quotes of the participants will be given in the results.

4.2.2.1 Homepage functionalities

For the designed prototype the sections about the homepage elements and homepage design were of greatest importance. The following results were gathered for the homepage elements. For a more elaborate results section, see Appendix A.

Table 2. Summary of findings homepage functionality test in workshop 1.

Page	**Clarity Icon**	**Clarity Page**
Profile	Unsure, was seen as more appearance related.	Undetermined features caused confusion what this page was for.*
Favorites	Very clear.	Very clear, liked the idea of being able to relocate exercises.
Links	Unsure, was seen as 'attachments'.	Clear, liked the idea of being able to be led to information-based websites.
Settings	Very clear.	Undetermined features caused confusion, idea of daily push notifications not received well.*
Moodmeter	Unsure, participants guessed in the right direction, however.	Clear, idea of moodmeter was received well.
Lichtpuntje v/d dag	Unclear, participants thought it would be a 'tips' section.	Clear, however, was received with mixed enthusiasm.**

*= The features for the profile and settings section were not completely developed yet, by the time this prototype was made. Therefore, the features of these two pages were overlapping.
**= Participants said that this exercise might bring them down when they are not able to come up with something positive.

4.2.2.2 Homepage design

After the session about the homepage functionalities, the participants were presented with the three homepage designs, depicted in Figure 15. Participants could choose one of the three designs as their preferred design.

Out of the 8 participants 3 (37%) chose the flower design. Participants reasoned that the flowers were too feminine for male users. Participants did like the idea of seeing how flowers would open up the closer the user would get to the module. The participants did not like the black, closed flowers.

Out of the 8 participants 1 (13%) chose the tree design. The design was received with positive response, but the progress in this design was unclear.

Out of the 8 participants 4 (50%) chose the compass design. In previous workshops, the participants had talked about certain metaphors, of which one consisted about a ‘journey’.

4.2.2.3 Module 2

During the activity in which users had to go through a complete module, participants gave feedback on how they saw the module. There were a total of 4 pairs. The most important findings are summarized below.

Table 3. Summarized findings of module 2 script in workshop 1.

Pro	**Con**	**Suggestions**
App provides summaries of previous and current module	Too much text	Animations or videos are preferred over text
Use of humor	Asking multiple questions at once	Addition of voice-overs
Being provided with choices	Experiences of other patients	Provide a place where users can go for more information about a certain part of the theory
Reflection exercises	Theories provided in module might be too difficult	Ability to see the change in answers given per exercise
Information provision	Complicated text	Do not make the text to

		‘zweverig’
Calming exercises	Not being able to skip exercises	More provision of practical tips
Cool color palette		

One important thing to recall is that the participants had to read a week’s worth of content in just under 30 minutes. This means that repetition issues are more obvious and the amount of text seems more than it is.

4.2.3 Adaptations after workshop 1

The following aspects were changed for the second workshop (these changes can be seen in figure 13 below, as well):

- The lightbulb icon was changed into a sun icon.
- The icon for the moodmeter was changed from a smiling icon to a question mark.
- The icon for the links page was changed.

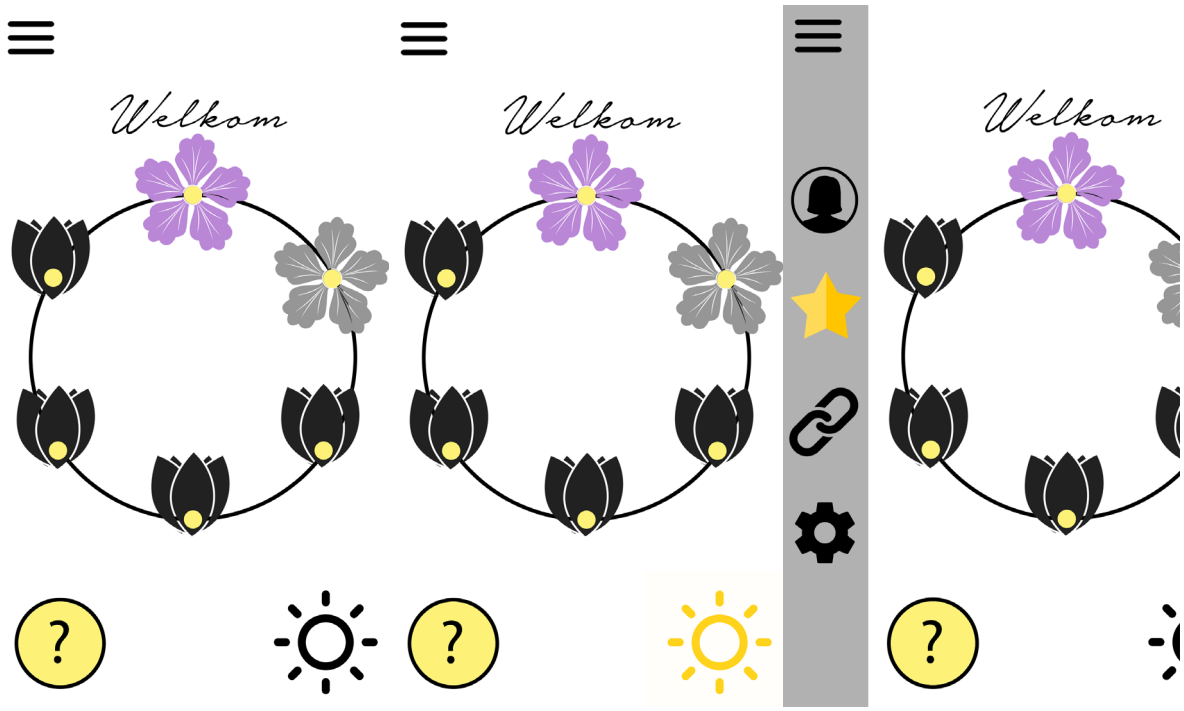


Figure 12. Adaptations to interface after the first workshop in Enschede.

4.2.4 Co-design Set-up 2

The same set-up was used as mentioned in section 4.2.1, during this workshop 6 participants were present.

4.2.5 Co-design Results 2

The results of workshop 2 will be summarized below. Data was again recorded by audio recorded and the results were gathered from the transcripts of the audio data.

4.2.5.1 Homepage functionalities

The following results were gathered for the homepage functionalities and their icons.

Table 4. Summarized findings homepage functionalities test workshop 2.

Page	**Clarity Icon**	**Clarity Page**
Profile	Mostly clear	Clear
Favorites	Very clear.	Very clear, liked the idea of being able to relocate exercises.
Links	Mixed, some participants knew, other did not.	Clear, participants made suggestion to add links themselves.
Settings	Very clear.	Clear, however, push notifications were a topic of discussion.
Moodmeter	Unclear, adaptation made participants think it was a FAQ section.	Clear, participants did not want to receive feedback on their mood right away.
Lichtpuntje v/d dag	Unsure, but participants were thinking of something positive.	Clear

4.5.2.2 Homepage Design

After the homepage functionalities, the three homepage designs were presented to the participants again. Participants were asked to pick their preferred design.

Out of the 6 participants 4 (67%) chose the flower design. The participants were more in favor of the flower design. The flowers were picked by participants because the progression line was more clear.

Out of the 6 participants 0 (0%) chose the tree design. Participants thought that the idea of progression was unclear and illogical. Another point of criticism was that the tree would not look that great on a small screen.

Out of the 6 participants 2 (33%) chose the compass design. Participants liked the design, but were confused about the progression method. As it is a compass, the needle does not make a full circle, but points to every direction. A progress bar across the compass would help battle that problem.

Overall, one participant stated that when using a circle, or any other shape, as a progression method, you cannot have a clear sequence. In a circle, you can start anywhere, so this undermines the principle of the progression method where you have to start at 1.

4.5.2.3 Module 2

During the activity in which users had to go through a complete module, participants gave feedback on how they saw the module. There were a total of 3 pairs, all accompanied by a supervisor. Users were asked to attach stickers to aspects they liked or did not like. The audio recordings were transcribed and the most important findings are summarized below. One of the audio recordings malfunctioned, so one transcript was missing and was replaced by a quick summary from memory.

Table 5. Summarized findings module 2 script in workshop 2.

Pro	**Con**	**Suggestions**
Focus on emotions	Complicated theories	Use better text formatting, make use of paragraphs, etc.
Reflection exercises	Experiences of other patients	Add voice-over options

Practical tips	Too much text	Make the text as simple as possible so it fits an entire population
Use of images instead of text	Unclear text	Use animation and videos over text
Good color palette	Better consistency need in theory text	Provide more answering options than just ‘yes’ and ‘no’
Being provided with options for certain exercises		
Summary at the end of the module		

4.5.3 Adaptations workshop 2

The icon for the moodmeter will go back to a smiley-face, to indicate emotions. Another adaptations is changing all English-sounding titles to Dutch titles.

4.6 Final Decisions/Changes

After two workshops and useful feedback from real end-users, the concept of the interface is clear. During the workshops, it became clear what users would like to see in the homepage: both clear and aesthetically pleasing functions. Due to the two participant groups having polar opposite opinions, it was chosen to blend the two ideas of the homepage design into one.

The flowers were preferred due to their aesthetically pleasant presence on the screen and their clear progression bar. The compass, on the other hand, was preferred due to the participant’s metaphor of ‘going on a journey’. Combining these two ideas resulted in an entirely different approach.

The idea is to build more upon the metaphor, but not putting too much focus on it. The main idea is to design the homepage like a map of the world. There are six destinations, the six different modules, which can be reached by a plane that slowly travels towards the destination. This is to simulate the journey the users have to undergo to reach the end of the intervention. Users can see the destinations beforehand, click on them to see a quick synopsis of the content,

but cannot open them when the plane has not yet arrived at that specific destination. Users can always go back, to destinations they have reached before, but not forward.

4.7 Requirements

With the new insights of the ideation phase, the list of requirements listed in the previous chapter will be adapted. New requirements for the homepage and module 2 were added because these requirements were not set up before. These requirements are based on the feedback received in the workshops.

Table 6. Requirements after Ideation phase.

Homepage	**Module**	**Interface**
Should have different functionalities implemented	Should have minimal and simple text, preferably replaced with video's and/or animations	Should be completely in Dutch
Buttons should be clear and understandable for all users	Should include reflection exercises	Should use self-compassion as a central method
Should have visible completion bar	Should include summaries of previous lessons	Should use positive endorsement
Should not be too feminine or masculine	Should enable users to skip certain parts	Should make use of push notifications
Should have a nice and simple design	Should avoid using experience stories	Should focus on continued usage
	Should include option for voice-overs	Should focus on mindset change
	Should give practical tips	

5. Specification & Realisation

Based on the adapted requirements list in the previous chapter, the design of the working prototype was made. The goal of this phase is to create a prototype that will function like the end-product would. A difference with the previous phase is that this prototype should look and feel like a complete interface. In this way, it is possible to communicate between the client and the app developer. The interface mock-up will include the theories the client wants included into the design, but designed in such a way that it is possible to be implemented into an existing application. Especially the creation of interaction ideas is essential during this phase.

The prototype was made in 'Figma' a UI/UX design tool. This tool enables to create interface designs from scratch and also adds some minor UX features, such as transition to different pages and the mock-up of interaction. Based on the concept of prototyping mentioned in the State of the Art chapter, especially in interface design, it is important to make the move to a digital medium. The prototypes presented before were all created either on paper or by drawing digitally. There was little to no interaction design included. With Figma, the interaction can be included in the design by designing the interaction flow. This enables to evaluate the prototype based on usability, instead of only design[1].

5.1 Homepage Functionalities

5.1.1 Final Design of the Icons

Based on the insights gathered in the ideation phase, the first step was to complete the design cycle of the buttons. During the ideation phase, the focus was to make sure users could understand what the buttons meant without the use of text. This concept was taken into the realisation phase as well. Having a limited use of text can keep the homepage less cluttered and more clear. In the last phase, the buttons were gathered from google, which meant that there was

[1] Final prototype: https://www.figma.com/proto/PBLjW5QrHm5VOR5JTRTA5V/Homepage-Wireframe?node-id=1%3A2&viewport=821%2C338%2C0.13317084312438965&scaling=scale-down

not a uniform style. For the realisation prototype, however, it was chosen to gather the icons from one operating system. iOS was chosen for this purpose, as Apple has a clean design style.

The icons for the buttons are depicted underneath in figure 14.

Figure 13. Button icons with: a) menu, b) close menu, c) lichtpuntje v.d. Dag, d) moodmeter, e) profile, f) favorites, g) links, h) settings, i) cancel, j) confirm, k) home.

5.1.2 Final Design of the Homepage

The first page that was designed was the homepage, and especially the new design of the homepage. With the new concept, there were no previous building blocks to work with, so the whole file was started from scratch. Working with the program functions and already existing app/interface buttons, the new homepage was created. As shown below in Figure 15. The homepage is of course the starting point of the interface, so with this design the overall look-and-feel of the interface was set. Especially in terms of colors, fonts, and button styles. Most design decisions were based on the input from the workshops.

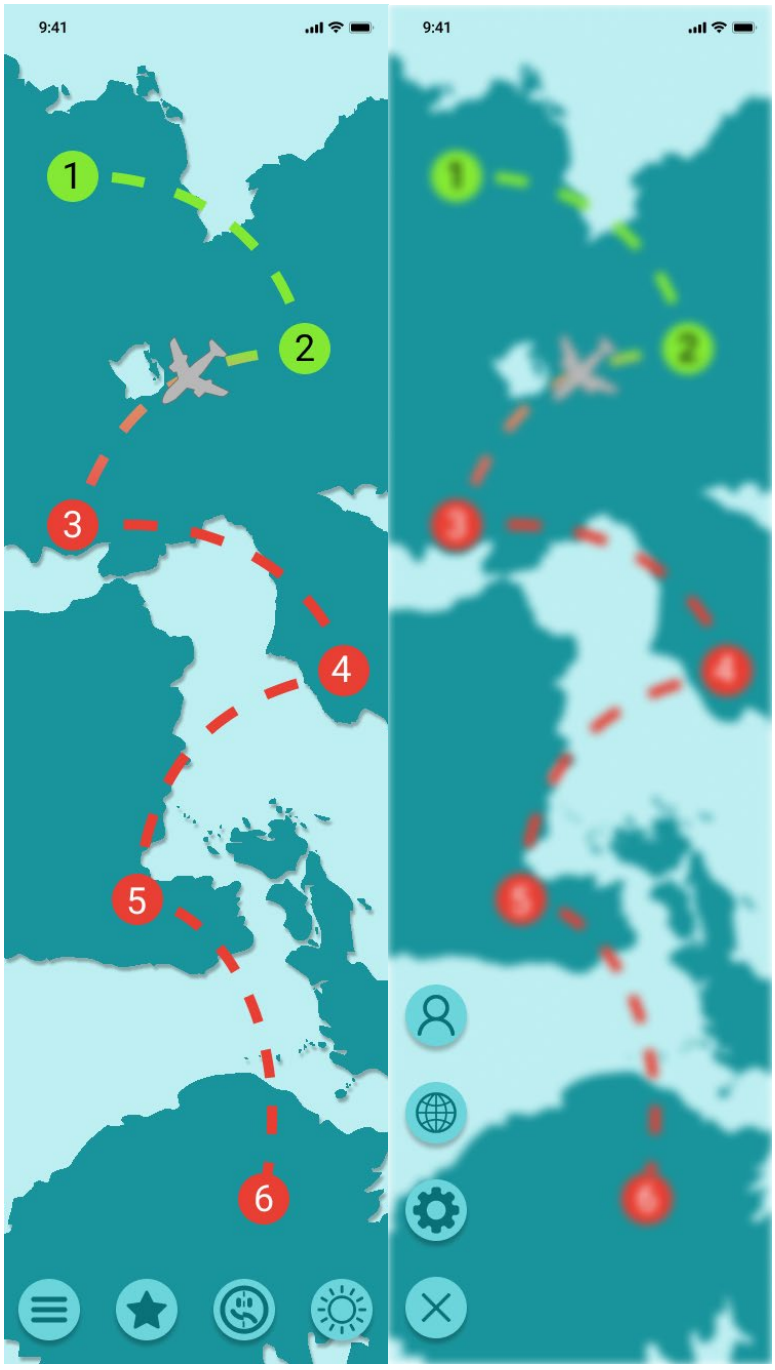


Figure 14. Homepages created in Figma. With a) Homepage with closed menu, and b) homepage with opened menu.

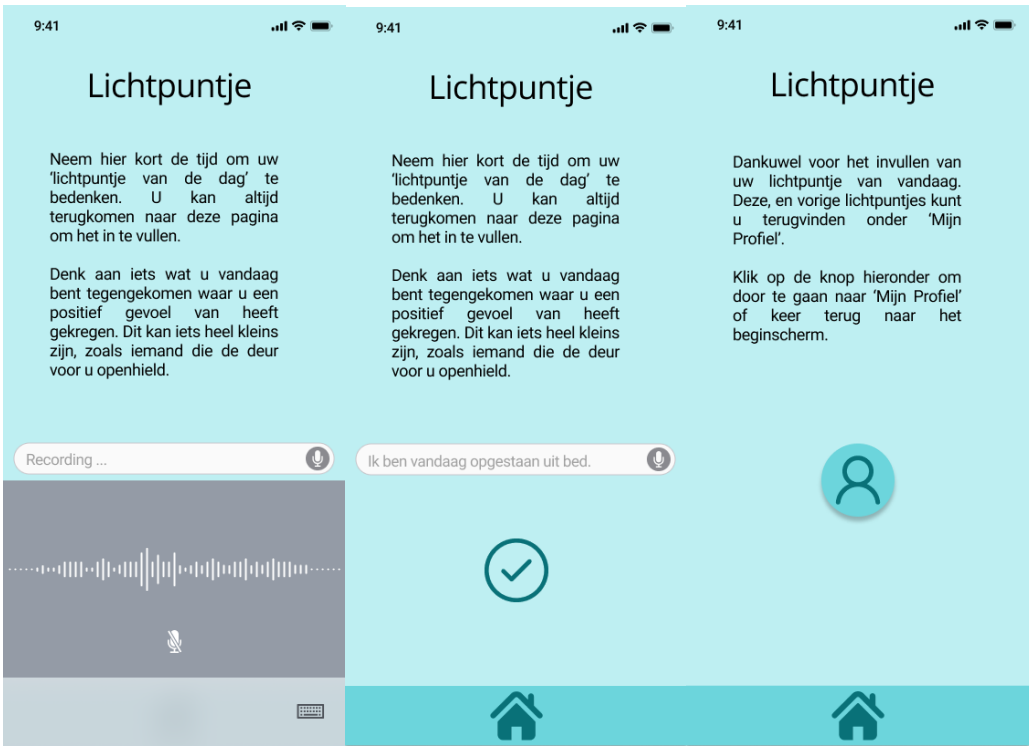
During the workshops users mentioned that the use of calm, watercolor colors had their preference. So, for the base of the homepage, blue was used, using a darker shade for buttons and the map of the world. The color blue was not seen as a masculine color. A clear font was used for any text input, which was used for the rest of the app as well to keep a uniform design.

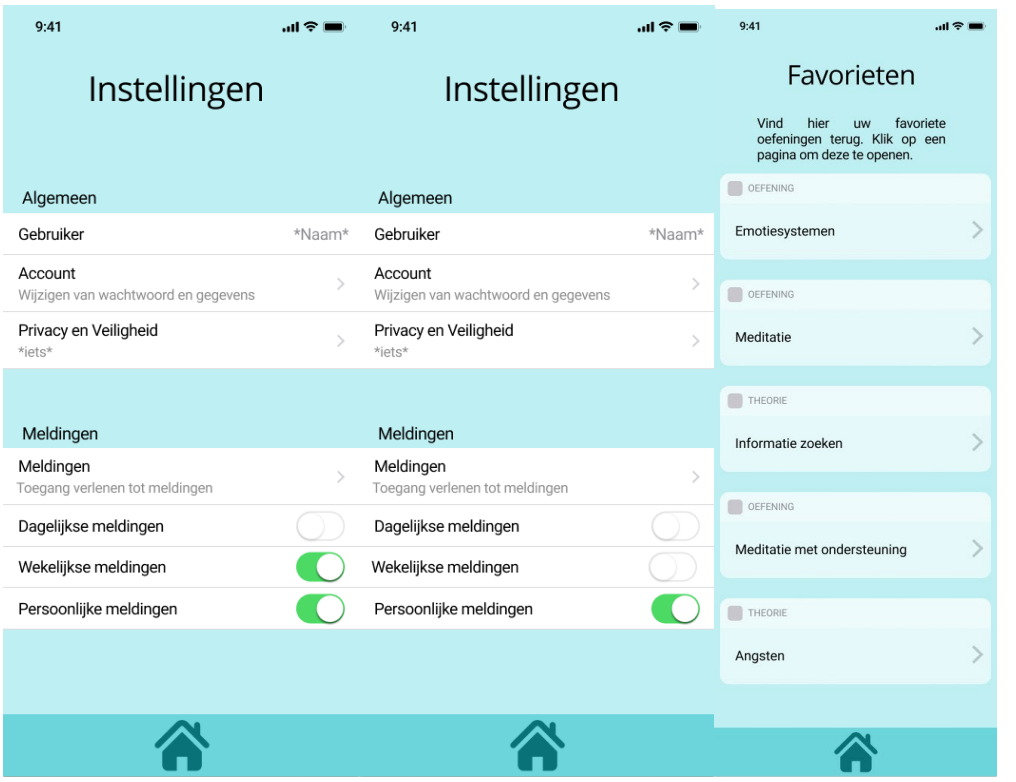
5.1.3 Final Design of Homepage Functions

Below, a collection of all pages created for the homepage functionalities is shown. These are based on the collection shown in Figure 11 in the previous chapter.


9:41
Stemmingsmeter
Vul hier uw huidige stemming in. Maak gebruik van de [..] hieronder om aan te geven in welke mate u de desbetreffende emotie voelt.
9:41
Stemmingsmeter
Vul hier uw huidige stemming in. Maak gebruik van de [..] hieronder om aan te geven in welke mate u de desbetreffende emotie voelt.
9:41
Stemmingsmeter
Dankuwel voor het invullen. De ingevulde stemming kan terug gezien worden in 'Mijn Profiel'.
Op basis van uw ingevulde waardes heb ik optionele feedback voor u. Wilt u deze feedback inzien?
(Feedback kan altijd terug worden gevonden in 'Mijn Profiel')


9:41
Stemmingsmeter
Jammer dat u zich niet zo lekker in uw vel voelt. Hieronder worden drie oefeningen aangeboden die u misschien zouden kunnen helpen.
MEDITATIE
Neem even een korte adempauze om tot rust te komen.
OEFENING
Emotiesystemen
FAVORIETEN
Kijk tussen uw favoriete oefeningen
9:41
Lichtpuntje
Neem hier kort de tijd om uw 'lichtpuntje van de dag' te bedenken. U kan altijd terugkomen naar deze pagina om het in te vullen.
Denk aan iets wat u vandaag bent tegengekomen waar u een positief gevoel van heeft gekregen. Dit kan iets heel kleins zijn, zoals iemand die de deur voor u openhield.
CLICK
9:41
Lichtpuntje
Neem hier kort de tijd om uw 'lichtpuntje van de dag' te bedenken. U kan altijd terugkomen naar deze pagina om het in te vullen.
Denk aan iets wat u vandaag bent tegengekomen waar u een positief gevoel van heeft gekregen. Dit kan iets heel kleins zijn, zoals iemand die de deur voor u openhield.
Ik ben vand
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123 space @ . Go


9:41
Lichtpuntje
Neem hier kort de tijd om uw 'lichtpuntje van de dag' te bedenken. U kan altijd terugkomen naar deze pagina om het in te vullen.
Denk aan iets wat u vandaag bent tegengekomen waar u een positief gevoel van heeft gekregen. Dit kan iets heel kleins zijn, zoals iemand die de deur voor u openhield.
Recording ...
9:41
Lichtpuntje
Neem hier kort de tijd om uw 'lichtpuntje van de dag' te bedenken. U kan altijd terugkomen naar deze pagina om het in te vullen.
Denk aan iets wat u vandaag bent tegengekomen waar u een positief gevoel van heeft gekregen. Dit kan iets heel kleins zijn, zoals iemand die de deur voor u openhield.
Ik ben vandaag opgestaan uit bed.
9:41
Lichtpuntje
Dankuwel voor het invullen van uw lichtpuntje van vandaag. Deze, en vorige lichtpuntjes kunt u terugvinden onder 'Mijn Profiel'.
Klik op de knop hieronder om door te gaan naar 'Mijn Profiel' of keer terug naar het beginscherm.


9:41
Instellingen
Algemeen
Gebruiker
Naam
Account
Wijzigen van wachtwoord en gegevens
Privacy en Veiligheid
iets
Meldingen
Meldingen
Toegang verlenen tot meldingen
Dagelijkse meldingen
Wekelijkse meldingen
Persoonlijke meldingen
9:41
Instellingen
Algemeen
Gebruiker
Naam
Account
Wijzigen van wachtwoord en gegevens
Privacy en Veiligheid
iets
Meldingen
Meldingen
Toegang verlenen tot meldingen
Dagelijkse meldingen
Wekelijkse meldingen
Persoonlijke meldingen
9:41
Favorieten
Vind hier uw favoriete oefeningen terug. Klik op een pagina om deze te openen.
OEFENING
Emotiesystemen
OEFENING
Meditatie
THEORIE
Informatie zoeken
OEFENING
Meditatie met ondersteuning
THEORIE
Angsten

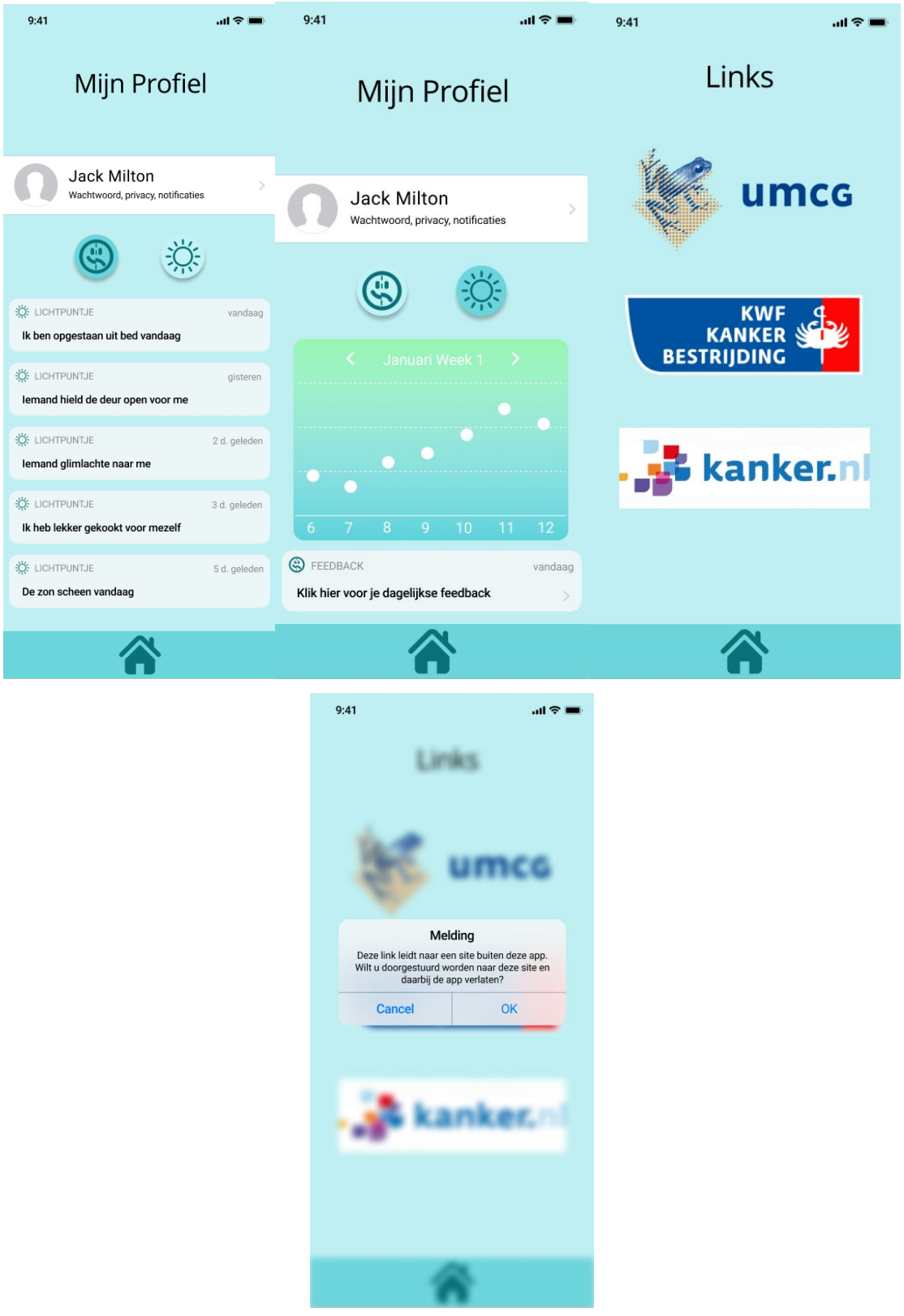


Figure 15. Pages of the interface made in Figma. With a) moodmeter, b) moodmeter with

inputted values, c) moodmeter with questions about feedback, d) moodmeter with feedback, e) lichtpuntje, f) lichtpuntje with keyboard, g) lichtpuntje with recording, h) lichtpuntje with finished answer, i) lichtpuntje with feedback, j) settings, k) settings with different notifications, l) favorites, m) profile with lichtpuntjes, n) profile with mood, o) links, p) links with alert for leaving app.

5.2 Final Design of Module 2

The second part of the assignment was to create the interaction flow of one of the modules. Below, a collection of pages can be found that form the script of the module. These figures are in the right order.

9:41

Module 2

In **les 1** heeft u geleerd hoe je momenten van rust kan inbouwen in uw dag. In **les 2** gaat het over het over in balans blijven in een tijd van veel angst en onzekerheid. Dat helpt om het hoofd boven water te houden.

U krijgt inzicht in uw eigen emoties en hoe normaal die zijn, en oefent met manieren om met deze emoties om te gaan.

Klik op de knop hier beneden om verder te gaan.

9:41

Terug

Emoties

In dit eerste onderdeel leert u hoe de hersenen werken. Vooral in combinatie met **emoties**.

Miljoenen jaren geleden leefde de mens nog in erg ruwe condities. Hierbij waren emoties zoals **woede**, **angst** en **kalmte** heel erg belangrijk om te overleven.

Deze 'emotie systemen' zijn nu ook in onze huidige hersenen te vinden.

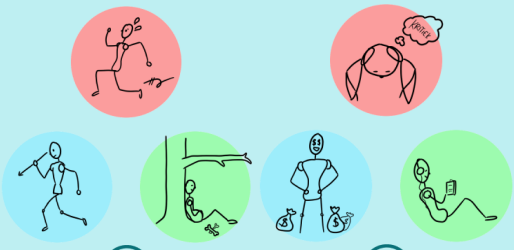
9:41

Terug

Vroeger

Vroeger was onze leefstijl vooral gericht op het overleven. Hierbij kregen drie emotie systemen de voorkeur.

Het **beschermingssysteem**, waar mensen constant alert waren voor gevaar.
Het **verzamelsysteem**, waar mensen vooral voedsel verzamelden om te kunnen overleven.
En ten slotte, het **rustsysteem**, waar mensen tot rust konden komen om te slapen.



9:41

Terug

En nu

Tegenwoordig leven we niet meer in deze omstandigheden. Hierdoor zijn de functies van de systemen veranderd

Het **beschermingssysteem**, zorgt nu voor stress en gepieker.
Het **verzamelsysteem**, zorgt nu voor een drang naar meer geld of macht.
En ten slotte, het **rustsysteem**, wanneer mensen een moment van rust voor zichzelf vinden.

9:41

Terug

Oefening uitleg

Hieronder ziet u de drie emotie systemen die een belangrijke rol spelen in ons allerdaagse leven.

Welke gevoelens vindt u passen bij welk systeem?

Sleep de juiste woorden in de cirkels.

9:41

Terug

Oefening

Sleep de juiste woorden naar de cirkels.

Betrokkenheid **Rust** **Streven** **Piekeren** **Kritisch** **Boosheid** **Lust** **Alert** **Balans** **Vriendelijk** **Energiek**

Bescherming

Verzamel

Rust

9:41

Terug

Oefening

Sleep de juiste woorden naar de cirkels.

Kritisch

Lust

Bescherming **Piekeren** **Boosheid** **Alert**

Verzamel **Streven** **Betrokkenheid** **Energiek**

Rust **Balans** **Rust** **Vriendelijk**

9:41

Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.

Bescherming

Verzamel **Rust**

Wanneer alle systemen in balans zijn, is rust mogelijk.

9:41

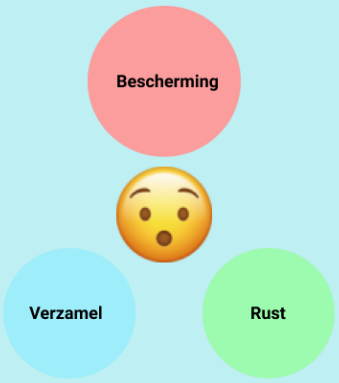
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een actiever beschermingssysteem zorgt voor een alerte houding.

9:41

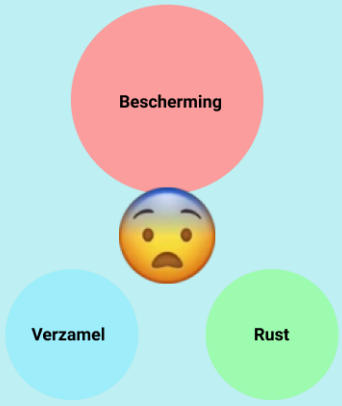
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een overactief beschermingssysteem zorgt voor constante stress.

9:41

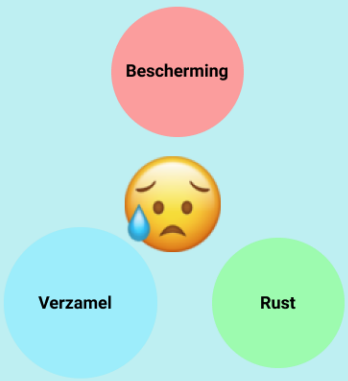
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een actiever verzamelsysteem zorgt voor een drang naar meer.

9:41

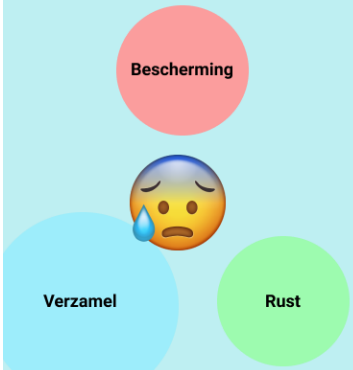
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een overactief verzamelsysteem zorgt voor uitputting van resources.

9:41

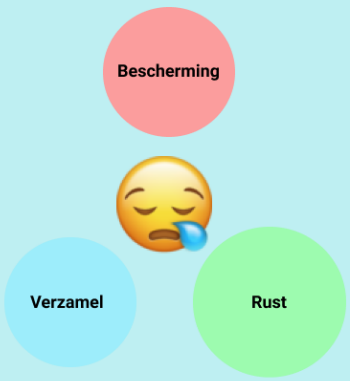
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een actiever rustsysteem zorgt ervoor dat er minder wordt gedaan.

9:41

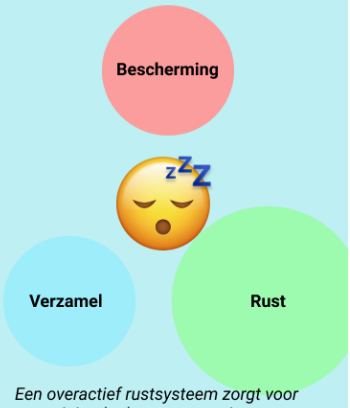
Terug

Uit Balans

De drie systemen hebben we allemaal nodig voor een gezond leven. Soms raken de drie systemen **uit balans**. Dan is iemand overstresst of kan iemand niet stoppen met [..].

Probeer de oefening hieronder uit om te zien wat er gebeurt als de systemen uit balans zijn.

Maak de cirkels groter of kleiner.



Een overactief rustsysteem zorgt voor een minimale drang om nog iets te doen.


9:41
Terug
Emoties en kanker
De diagnose van kanker kan de emotie systemen uit balans brengen. Je lichaam raakt dan in een soort dreigstand. Dat is niet vreemd, want de ziekte is levensbedreigend.
Een overachtief beschermings- en jaagsysteem zijn daarom ook niet vreemd. Dit kan het lichaam extreem uitputten. De rust en verbondenheid die nodig zijn voor emotioneel herstel blijven dan achter.


9:41
Terug
Hoe zit het bij u?
In les 1 gaf u aan dat dit uw manieren waren om tot rust te komen.
RUST
vandaag
Als ik me rot voel dan ga ik buiten een kwartiertje wandelen. Soms helpt het me ook om mijn gedachten op iets anders te richten, zoals een boek.
Wilt u hier nog iets aan toevoegen?
CLICK


9:41
Terug
Hoe zit het bij u?
In les 1 gaf u aan dat dit uw manieren waren om tot rust te komen.
RUST
vandaag
Als ik me rot voel dan ga ik buiten een kwartiertje wandelen. Soms helpt het me ook om mijn gedachten op iets anders te richten, zoals een boek.
Wilt u hier nog iets aan toevoegen?
De hond uit
Q W E R T Y U I O P
A S D F G H J K L
Z X C V B N M
123
space
@
.
Go


9:41
Terug
Hoe zit het bij u?
In les 1 gaf u aan dat dit uw manieren waren om tot rust te komen.
RUST
vandaag
Als ik me rot voel dan ga ik buiten een kwartiertje wandelen. Soms helpt het me ook om mijn gedachten op iets anders te richten, zoals een boek.
Wilt u hier nog iets aan toevoegen?
De hond uitlaten.


9:41
Terug
Angst
Angst bij kanker is heel normaal.
De patiënten die deze app hebben mede-ontworpen ervoeren onderstaande angsten. Welke herkent u?
1 Ik ben bang voor de dood
2 Ik ben bang mensen te verliezen
3 Uiterlijk
4 Mobiliteits problemen
5 Depressie


9:41
Terug
Meditatie
Soms kan een momentje rust voor jezelf vinden ook heel erg helpen. Meditiatie is een vorm van rust nemen voor het lichaam en de geest. Bij deze oefening kunt u het uitproberen.
Ik wil met vrouwelijke begeleiding
Ik wil met mannelijke begeleiding
Ik wil zonder begeleiding

9:41

Terug

Meditatie

Soms kan een momentje rust voor jezelf vinden ook heel erg helpen. Meditiatie is een vorm van rust nemen voor het lichaam en de geest. Bij deze oefening kunt u het uitproberen.

Meditatie
Met begeleiding

0:00 -3:05

9:41

Terug

Meditatie

Soms kan een momentje rust voor jezelf vinden ook heel erg helpen. Meditiatie is een vorm van rust nemen voor het lichaam en de geest. Bij deze oefening kunt u het uitproberen.

Meditatie
Met begeleiding

0:06 -2:59

9:41

Terug

Verbeelding

In **les 1** heeft u geleerd hoe je momenten van rust kan inbouwen in uw dag. In **les 2** gaat het over het over in balans blijven in een tijd van veel angst en onzekerheid. Dat helpt om het hoofd boven water te houden.

U krijgt inzicht in uw eigen emoties en hoe normaal die zijn, en oefent met manieren om met deze emoties om te gaan.

Klik op de knop hier beneden om verder te gaan.

9:41

Terug

Informatie Zoeken

Veel mensen hebben na de diagnose veel behoefte aan informatie. Over de behandeling, diagnose en hulpmiddelen. Informatie zoeken kan helpen om meer grip en overzicht te krijgen over de situatie.

Maar soms kan al die informatie te veel worden. Het u kan ***gestresst*** en ***angstig*** maken.

Het is daarom belangrijk om uzelf niet te verliezen in het informatie zoeken.

9:41

Terug

Tips

Hier nog wat praktische tips voor tijdens het informatie zoeken:

9:41

Terug

Tips

Hier nog wat praktische tips voor tijdens het informatie zoeken:

Zet een **wekker** en stop met informatie zoeken wanneer deze afgaat.

9:41

Terug

Tips

Hier nog wat praktische tips voor tijdens het informatie zoeken:

Zet een **wekker** en stop met informatie zoeken wanneer deze afgaat.

Bedenk **van tevoren** waar je naar opzoek bent en houd het daarbij.

9:41

Terug

Tips

Hier nog wat praktische tips voor tijdens het informatie zoeken:

Zet een **wekker** en stop met informatie zoeken wanneer deze afgaat.

Bedenk **van tevoren** waar je naar opzoek bent en houd het daarbij.

Gebruik **betrouwbare websites**: op de homepage vind je een lijst.

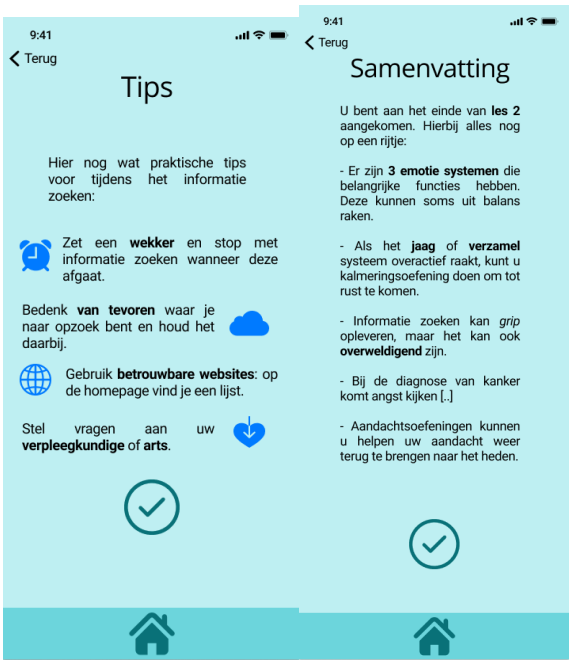


Figure 16. Design of the interaction flow of module 2.

6. Evaluation

With this evaluation the usability of the interface will be tested. An interface is not successful if users do not judge it as easy to use. This evaluation is by no means a definite way to dismiss or accept the interface, it can, however, highlight the cons and pros.

6.1 Method

6.1.1 *Participants*

The evaluation involved 22 participants. All of the participants were Dutch or had a sufficient level of knowledge on the Dutch language. The sampling method used to gather participants was via personal connection, e.g. friends and family. All participants signed an informed consent form, where they agreed to have their answers used in this report.

6.1.2 *Materials*

For this evaluation, one questionnaire was designed. This questionnaire used the 10 questions of the SUS test, provided below. The SUS test provides a quick evaluation tool that measures usability. The test entails 10 items, which can be measured with five answer options, ranging from totally disagree to totally agree. At the end of the test, a measurement level of usability can be concluded (Brooke, J., 1998). The questionnaire existed of two parts, which entailed the same set of 10 questions, see Appendix C. Participants had to choose one of the following options; completely agree, agree, neutral, disagree, completely disagree. Accompanied with the questionnaire, participants also had to use the digital prototype.

6.1.3 *Procedure*

Participants were approached for filling in the questionnaire by sending them the two links, one for the questionnaire itself and one for the interface prototype. At first, participants were asked to fill in a consent form, so that their answers could be used for the evaluation. The participants had two answers 10 questions for both the homepage and one of the modules.

6.1.4 *Analysis*

Before results can be looked into, the SUS responses will be calculated. Each question has a score from 0 to 4. The forms will be looked at in two ways. The sum of scores per question will be calculated and compared to each other. Questions 2, 4, 7, and 10 judge the learnability of the system; questions 1, 3, and 8 judge the usability of the system; questions 5, 6, and 9 judge the integration of the system. Based on the scores per question, it is possible to determine how well the interface scores per field. Per submitted form, a score will be calculated, this score will be multiplied by 2.5. When done for all items, there will be 22 scores from 0 to 100. This score determines how each participant judged the usability of the interface.

6.2 Results

6.2.1 Homepage

Taking the sum of scores for all the questions, the following figure resulted.

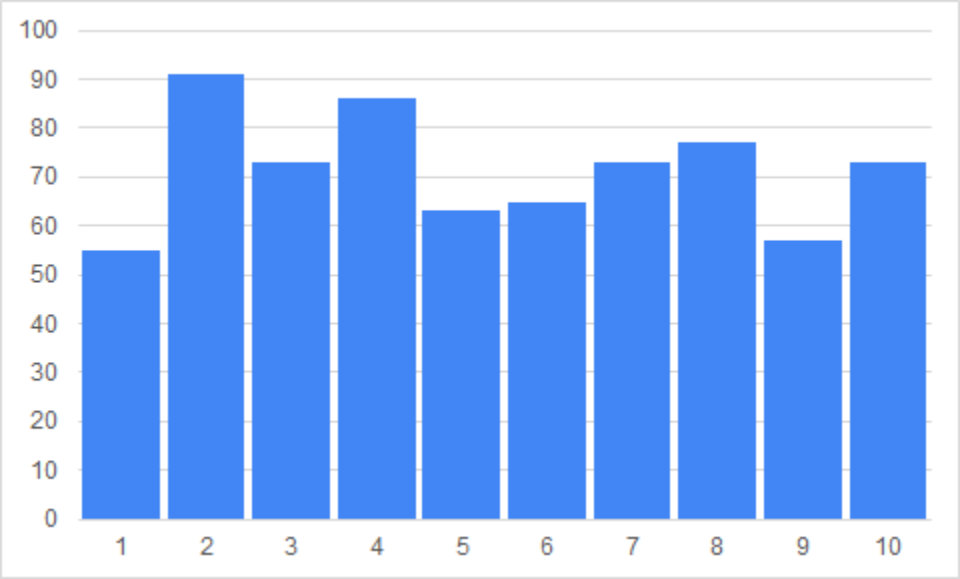


Figure 17. Results bar graph of score per item, homepage survey.

As stated before, items 1, 3 and 8 judge the usability of the system. Apart from item 1, all scores some to be above 70, which is a fairly sufficient number. Participants judged the system to be useable. Items 2, 4, 7, and 10 judged the learnability, these scores are all above 70 as well, with items 2 and 4 even crossing the 80 border. Items 5, 6 and 9 judged the integration of the system.

These scores are all below 70, which means that participants did not think the different functions of the interface were well integrated.

After calculating the scores, the results for the homepage design are as follows. All scores are depicted in the figure below to show the results curve.

Figure 18. Results curve per user of homepage survey.

The blue line marks the sum of scores of all the participants, the red line marks the 68 threshold that marks a sufficient score for an interactive product (Sauro, J., 2011). Most scores lie above the threshold, meaning that more than half of the participants thought the interface was easy to use. The average score of the interface was 77.8, which means that, on average, users think that the interface is easy to use.

6.2.2 Module Interactions

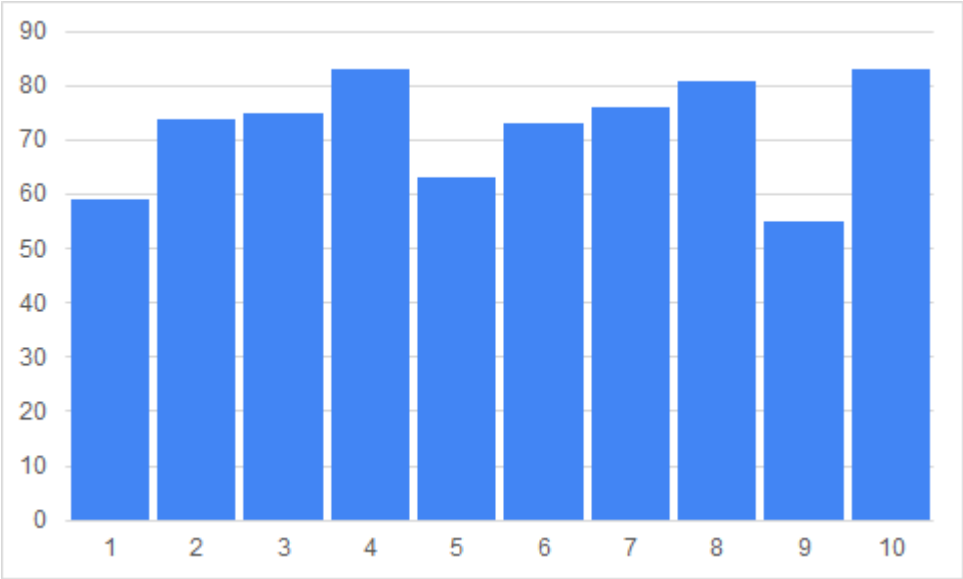


Figure 19. Results bar graph of scores per item, module survey.

Items 1, 3, and 8 have decent scores. Again, when excluding item 1, all scores are above 70, meaning participants deemed the level of usability to be high. Items 2, 4, 7, and 10 are all above 70, with items 4 and 10 even receiving scores above 80, which means that the learnability of the interface was high. Items 5, 6, and 9 were received with a lower score. Especially 5 and 9 received scores below 70, with 9 reaching below 60. The integration of the system was not deemed to be that well.

Figure 20. Results curve per user of module survey

Moving on to the score per user. Again, the blue line marks the sum of scores of all the participants, while the red line marks the 68 threshold for a sufficient product score. This time, just one score is below the threshold. This means that almost all of the participants were positive about the usability of the interface.

6.3 Conclusion

Looking back at the results, it seems that the module seems to be the most perceived easy-to-use part of the interface. The average of the module is higher than that of the homepage. However, both parts of the interface scored an above average score on the subject. The SUS test does not only measure ease-of-use, but also factors like system satisfaction, usability and learnability. Results showed that the interface scores high on two different factors: usability and learnability. This can conclude that users deem the interface to be usable, which might be a result of co-design. Integration of system components scored insufficient, so there might not be an effect of co-design on this factor While the sample size (n=22) was not great, SUS has proven to result in valid results nonetheless.

However, these results do not point the nature of usability problems. These results will merely point out that there is *a* problem, but it will not detect what the problem is. So, a drawback from the SUS test is that it will not shed a light on the motivation of why users judged the interface this way. This evaluation of therefor only a method to see how well the interface scores, but it does not diagnose if there is a problem. The SUS-test has a reputation for being a quick, but dirty evaluation measure, so evaluation should not solely rely on this test. A consideration for future research would be to take the interface to users and experts for evaluation with feedback.

7. Discussion

The main research question was: How can co-design help self-compassion best be delivered to patients with cancer through a mobile application interface in a style and with interactions that fit the user group and ensure continued usage? To answer this question, five sub questions were composed. However, in the end, some sub questions deemed to be of more importance than others.

First, the target group characteristics were of great importance due to the core method of interaction design. Input gathered from the co-design sessions and literature was translated into the final design of the prototype. As an example, both the participants and the literature stated about increased fatigue and less focus, which resulted in the interface being less text-heavy and energy consuming. However, not all input could be included into the final design. The participants had different opinions on what should be included into the interface. Especially with the homepage design, opinions were divided. Due to this split in opinions, it was decided to design a new concept of the homepage that combined the two concepts. Other aspects that were added to the interface due to input from the co-design sessions were audio recordings of the text and being able to stop and pick up where you left off. This can conclude that user input is necessary for interface design, but design decisions can still be made without user input on all aspects of the interface.

This dilemma was also seen situated around continued usage. For this interface, persuasive system design was chosen to be a key factor for ensuring continued usage. Especially with the use of push notifications and reminders. During the co-design sessions, users were not fond of the idea of the notifications. However, due to the nature of the application depending on daily usage, it was chosen to keep the push notifications included into the app. This dismisses user input. It will remain a dilemma in the design, but even participants said that push notifications will remind them to use the application. Continued usage will not be guaranteed by the use of it, but sending reminders to users might push start the application. However, this project had a too short span to test if continued usage can be ensured with this design.

Therefore, the evaluation was based on usability. As seen in the evaluation chapter, the prototype was received fairly positive. However, as stated before, by only using the SUS-test, a conclusion can only cover *how* useable an interface is, but not which factors caused a decrease or

increase in usability. Obvious limitations are that the participants are mostly from the same age group, are from the same educational levels and none of them are from the desired target group. This was due to time and resource constraints. The evaluation would be of more value when done with newly diagnosed patients from different ages and educational backgrounds. However, the flow and style of the interface have been judged by over 20 people, which is still of value to the research.

The final design included several methods of interaction design. These principles had to promote the self-compassion exercises in a way that an application does. Gamification elements and user experience design were used to implement interaction. However, during the co-design sessions, participants stated that they did not like the idea of gamification, as it would make a game of their disease. However, that definition of gamification is just one part of the method. In the final design, gamification was implemented. The progress bar, the graphs that display the results of the moodmeter, and the list of lichtpuntjes van de dag. The method of gamification can enrich the engagement and continued usage of an intervention. Again, due to time constraints, it was not possible to design complete interactions within the prototype. So, on this aspect, it is not clear if interaction design has any (negative or positive) effects.

Finally, the goal of this final design was to communicate the concept of the application between the client and the app developer. As research has been done on both the concept of self-compassion and interaction design, a designer can be a bridge between these two fronts. However, in practice this did not work out that well. Problems can lie within timing and underestimating the communication between the two fronts. Timing is due to both parties being further in the design process than anticipated. The app developer has already made a mock-up prototype that included most of the self-compassion theories and exercises. This means that the communication between the two fronts has been clear enough to create such a mock-up. Best is to enter into the process when it is still in the early design stages.

8. Conclusion

The goal of this project was to determine how an application could best deliver the method of self-compassion, with a focus on continued usage and that fits the user group. During the design phase, focus was put on especially the icons and the homepage, which were seen as the core of usability in the application. Input on these factors was gathered during co-design sessions. The end-prototype was then evaluated by 22 users, which resulted in positive results. This could mean that using co-design within a design project will have positive consequences on learnability and usability, but not on the integration of system components. This could mean that a participatory design style will increase ease of use and how fast users can learn to use the system. Co-design also fits with the requirement to fit the design within the wishes of the target group, if designers listen to their needs. However, there is no certain way to prove a direct link between the results and the addition of co-design to the design.

A subject for future research could be how well the theory of self-compassion works with end-users when they use the interface for a certain amount of time. This research would be based around the effectivity of the application instead of the usability. As this application was originally designed to help cancer patients with their decreased QoL, it is essential to see if the method of self-compassion is effective after all. Not only self-compassion, but also the medium of a digital intervention should be measured to be effective. Another important factor to look into is to see how co-design can me implemented better into the design cycle. What is the best way in which users can be included into the design? From which point in time is it efficient to implement the co-design style into the design cycle? How to make better design decisions?

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Appendix

A. Findings Co-Design Workshops

1. Homepage Functionalities workshop 1

Starting with the personal page, as seen in figure X.B, people thought it was about appearance, due to the presence of a frame around the icon. Quotes like ‘Appearance’, ‘Mirror’ were given by two participants. One user actually called it a profile, but was not really sure if it was correct. The conclusion for the icon would that it should be without frame, so that it does not picture a mirror. The page, however, caused some confusion. As the features were not determined fully yet, users had questions to what this page could operate as. Was it a place where you could change a password or name, or just a general overview of how the results of the moodmeter look? This should still be determined with the help of the application developers, as this could be included into the settings page as well (which will be discussed below).

The second page discussed was the favorite page. This icon was received well and everyone understood the universal icon. People actually called the page the ‘favorites’ page, which meant that the icon was clear. People were fond of the idea to easily browse through their favorite pages.

The third page was links. This caused some confusion because the chosen icon was slightly different than the universal one due to aesthetical standards. Users thought it meant ‘attachment’. ‘I thought it was about finding documentation’, was the input of one of the participants. Main problems were with the icon. The users liked the idea of a page that led them to websites with information.

The fourth page was settings. Again, the icon was very clear. However, as mentioned before, there was confusion about the content of the page. Especially around the push notifications. When people turn them off, they will be missing out on a vital part of the application, where it sends the user optimistic messages or subtle reminders to do the daily exercise. Users and the cliented opted for an option where users could set the push notifications to a certain amount per week.

The fifth page was the moodmeter, a vital part of the application. The icon was not entirely clear, but the users were guessing in the right direction. ‘Something to make yourself

feel happier', was the input of one of the participants. While others called it a source for inspiration or motivation to do something. Users commented that the mouth of the icon should not be happy by default because that would make the user associate that they would have to feel happy before entering their mood. Users suggested making the mouth a dotted line or blurring the face altogether. On the page itself, users did not have a lot of feedback. One user stated that maybe the smileys could be replaced by thermometers, but not a lot of other users agreed on that idea. One even stated that this was better than the classic pain measurement scales they have in the medical field. Because it used different dimensions that just one.

The sixth and final page was the [lichtpuntje van de dag]. There was a lot of confusion due to the icon. 'Tips', said one of the users. Having a lightbulb as an icon made users think they would receive tips on that page. Or that they could ask questions. None of the users guessed that correct function. Users suggested using a sun, a heart, or a candle as an icon. One of the users was against using a candle because they associated that with death. On to the functionality of the page, especially the male users were not fond of the idea. One of them stated that when they were feeling down on a day, they would not be able to come up with something positive. Users were positive when it would open with a positive text, which you can reply to. One users stated that they would feel happy when this happened and then they would be able to reply with something positive.

2. *Module 2 script workshop 1*

Pro's

- **Summary of previous lesson before starting a new one**
- Using humor in certain cases (pictures)
- Having choices between using audio during a meditation exercise
- **Being able to reflect on what you have read as an exercise (do-it-yourself)**
- **A summary of the module at the end of the module**
- The list with choices
- The information about how to search for information
- The focus on calm is good, how to calm yourself
- The color palette of the application was found good (pastel/watercolor blue and green)

Con's

- **Too much text, patients that are undergoing chemotherapy have a short attention span, so they can not read a lot of text. Keep it short and simple.**
- Some parts of the text were unclear
- On page 21 multiple questions are asked at the same time
- Do not focus too much on the past, people like to live in the now
- **Some people did not like the experiences that did not provide any tip**s
- The knowledge behind the three emotional systems might be too difficult
- Text had too many ()'s, makes it more complicated
- **Not being able to skip certain exercises**

Other comments

- Animations or short clips would be preferred over text (changing the way information is brought to the user)
- **Adding voice-overs as an option was a loved idea**
- **If you want more information, the ability to read more into it in another part of the app.**
- An ability to see which answers you gave a few sessions ago, to see what has changed
- **Text should not be too 'zweverig'**
- Experiences in the app should provide tips or positive experiences that could help the users

Some disliked the repetition of the text, but others thought patients with chemo could use the repetition (this booklet was a week's worth of content)

3. *Homepage functionalities workshop 2*

Starting with the personal page, most of the participants knew what the function was based on the icon. The function was clear, due to a design mistake in the prototype, the lamp from the previous workshop was not replaced, so participants were confused.

The favorites page was received well. Most of the participants stated a correct definition. 'Bonusmaterial' and 'important exercises' were suggestions that did not entirely fit the

definition, but were in the right direction. Participants liked the function, that they did not have to search for important pages.

The links page was received better than in the previous workshop. However, some users had not seen the icon before, so they were still confused about the definition. ‘Working together’ was one of the answers during the workshop. About the content of the page, one of the participants suggested adding ‘kanker.nl’ as it was a more information based website than KWF. Another participants asked if users could add links themselves. Due to safety problems, this addition might not be added.

The settings page was received well. Most of the participants knew the icon. Again, participants were asked how they felt about push notifications. ‘Not too often’, ‘It’s fine, as long as I can turn them off’. However, participants were aware that when they turn the notification off, they would miss part of the app. When asked about personal notifications, all participants were not in favor. ‘That would give me the feeling that I’m still in school’. If the notifications would include a positive message then participants would be in favor. Participants were especially in favor of keeping personal notifications optional.

The icon for ‘lichtpuntje van de dag’ was received a little bit better than the previous workshop, however, users still could not place what it meant. ‘Positive energy’, ‘Positive experiences’, ‘Something with energy, how you feel’, were quotes of the participants. One of the participants suggested that maybe the addition of a cloud could [benadrukken] the positive energy the sun should bring. Another participant said that the addition of titles beneath the icons would make it easier for users to find certain pages. The sun as an icon was received well, but the participants did not like that the sun was black. This way, it did not look like the sun. Participants suggested that the sun could be orange from the start and when a user has filled in the exercise, it could become yellow.

The moodmeter was the other icon that was adapted from the first workshop. This time, none of the participants were correct in their guesses what the function of this icon was. ‘Questions’, ‘FAQ’, were the most common suggestions. When the participants were told that it was a moodmeter, they suggested using color, a traffic light. Further suggestions for the icon were using three different smileys with different emotions and a thermometer. When talking about the function of the moodmeter, one of the participants suggested that feedback on the user’s mood should be an option. They said that not everyone wants feedback on their mood, all

the time. They stated it would be too confrontational if users would receive feedback the moment they filled in the moodmeter. Others participants agreed on that. On another note, the participants did not like the name ‘moodmeter’, as they prefer the app titles to be in Dutch.

4. *Module 2 script workshop 2*

Pro’s

- Good that there was a focus on the emotional systems and an explanation for why someone can feel a certain emotion.
- Reflection exercises.
- Focus on how to calm down, give yourself rest.
- **Practical tips**
- **People think in images, so the use of (funny) images is good**
- Colors were good
- Options for certain exercises were good
- Summary at the end of the module

Con’s

- Theory about emotions might be too complicated for the target group (less concentration and brain function)
- Experiences of other patients.
- Too much text on the screen.
- The wording of exercises can be better
- Better consistency in theory text

Other comments

- **The text formatting could use some adjustments, as there were too little paragraphs and important words could be bolded. Exercises should have a better lay-out, so that users are aware that it is an exercise.**
- Option to have a ‘read out loud’ option is good.
- **Make the text more simple (app should be for entire Dutch population, of different education levels)**
- Make use of animations and videos

More answers options than just ‘yes’ and ‘no’

B. Consent Form

Usability Test Homepage/Modu – Consent Form

Gelieve dit formulier goed door te lezen en vervolgens, indien akkoord, te ondertekenen.

In deze usability test:

- Zal u gevraagd worden een app op een telefoon/tablet/laptop te gebruiken.
- Zal u een kort interview afgeven.
- Zal u een vragenlijst invullen.

Deelname aan deze usability test is geheel vrijwillig. Alle data die zal worden verzameld blijft [confidential]. Alles wat uit deze test blijkt zal worden gebruikt om de app te verbeteren. Uw naam of enig andere informatie zal op geen enkele manier worden gebruikt. Op elk moment kan u uw consent innemen en zal de deelname per direct stopgezet worden.

Als u nog vragen heeft over de informatie op dit formulier of over het project, kunt u mailen naar s.h.m.p.vandenberg@student.utwente.nl.

Ik heb de informatie op dit formulier gelezen en heb geen vragen meer

_____

_____

Handtekening deelnemer Datum

C. SUS Test

- I think that I would like to use this system frequently
- I found the system to be unnecessarily complex
- I thought the system was easy to use
- I think that I would need the support of a technical person to be able to use this system
- I found the various functions in this system were well integrated
- I thought there was too much inconsistency in this system
- I would imagine that most people would learn to use this system very quickly
- I found the system very cumbersome to use
- I felt very confident using the system
- I needed to learn a lot of things before I could get going with this system