MSc Graduation thesis by Liam van Dijk

CRAFTING A HEALTHY LIFESTYLE

Designing a tool for cardiac patients

Crafting a healthy lifestyle

MSc Graduation thesis 2023 - 2024

MSc Strategic Product Design
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Preface

Dear reader,

Embarking on the journey of my master's degree in Strategic Product Design at Delft University of Technology has been an enlightening experience, shaping both my identity as a designer and a human being. As I find myself on the brink of completing this academic milestone, I am thrilled to present the work that I have been captivated by over the past few months.

I had the privilege of immersing myself in a project aimed at enhancing the quality of life for cardiac patients. This project provided a unique opportunity to blend my personal passion for visual design with the ability to promote the joy of exercising. The intersection of these interests has ignited a deep sense of purpose and fulfillment to this master project.

I would like to thank my supervisors at TU Delft, Katrina Heijne and Valentijn Visch, who have been instrumental in guiding me through my project. Katrina, thank you for expanding my perspective, encouraging me to be mindful of priorities at different stages of the project, and facilitating an approach that resonates with the needs and perspectives of the patients. Valentijn, thank you for introducing me to the principles of crafting theory, connecting me with various experts, and encouraging me to consistently reassess and validate my decisions. Both your insightful feedback and valuable guidance have really helped me define and adhere to the trajectory of my work, ensuring I didn't lose my way in the world of crafting theory.

I would also like to express my gratitude to my company mentor at CardioVitaal, Bernadette van Woerden, whose expertise and assistance proved invaluable in gaining deep insights into the cardiac context. Bernadette, thank you for your thoughtful insights, for enabling effortless access to CardioVitaal's healthcare professionals and cardiac patients, and for deepening my knowledge in the field.

Additionally, I want to thank CardioVitaal & Vital10, and director Roderik Kraaijenhagen, for providing me the opportunity to engage in such a meaningful and impactful project. Conversations with cardiac patients on such a profound topic have been incredibly valuable, serving as a powerful motivator throughout my project.

Needless to say, I want to thank my family & friends for their endless support, providing me with joy, love and inspiration throughout my entire educational path.

Working on this project has been a true pleasure. I hope this report may inspire other designers to use their skills for a good cause and put some beauty back into the world. I am looking forward to the journey ahead.

All the best,
Liam van Dijk

Executive summary

Discovering the context

Heart and vascular diseases stand as the primary cause of reduced healthy life years and diminished quality of life, resulting in approximately 640 hospitalizations in the Netherlands daily (Zorginstituut Nederland, 2023). Among these conditions, coronary heart diseases and strokes often require surgical interventions like bypass surgeries or heart transplants. To address anxiety and rebuild trust post-operation, cardiac patients are urged to participate in cardiac rehabilitation (CR) programs, which are vital for recovery. CardioVitaal offers a 3-4 month program comprising FIT-sessions focusing on physical activity and PEP-sessions addressing psycho-education and lifestyle modification, guided by physiotherapists and lifestyle coaches. Commencing with a thorough intake interview and personalized goal-setting, the CR program spans a three-month trajectory. Ongoing support is extended through the Vital10 application, empowering patients to maintain sustainable health behavior changes.

Through literature reviews, in-depth interviews with both cardiac patients (N=3) and health science and lifestyle coaching experts (N=2), three distinct patient types were identified: Type A (slow strugglers), Type B (health hunters), and Type C (physical pursuers). Each type exhibits unique characteristics and shows low to high level motivations regarding physical activity engagement respectively, influencing their post-rehabilitation journey differently. Despite initial momentum gained during the CR program, a concerning decline in motivation post-program completion is observed. Various barriers encountered by patients at intrapersonal, interpersonal, environmental, and governmental levels can potentially cause relapse. Understanding and addressing these barriers is essential for promoting sustained lifestyle changes among cardiac patients. Hence, continual support and reinforcement become pivotal. Health crafting theory might offer a promising solution, emphasizing the transformation of physical activities into rewarding experiences. It suggests that individuals can modify facilitators and barriers to enhance their alignment with health-related activities. Health crafting is an iterative process that involves recognizing needs disparity, proactively addressing it through crafting efforts, assessing progress, and achieving optimal functioning within the targeted identity domain (e.g. physical activity).

Defining the vision

Patient type B, representing the largest portion of cardiac patients, was selected as the primary focus of this project due to its receptive attitude. The design approach aimed to transform physical activity into a personally fulfilling experience, leveraging health crafting theory to empower patients to discern what brings them joy in exercise. Accordingly, the mission statement was to “Design a crafting tool that enhances cardiac patients’ maintenance self-efficacy, transforming physical activities into deeply rewarding personalized experiences. By fostering a deeper understanding of their capabilities and preferences, patients can smoothly transition from supervised rehabilitation to sustaining physical activity at home.” Derived from this, a set of guiding principles for the design was formulated, namely: being supportive, positive, explorative, and introspective. These principles aided in comprehending the envisioned interaction. They stemmed from a deep understanding of patients’ needs, leveraged the potential of health crafting theory, and built upon CardioVitaal’s expertise.

Developing the concept

The theoretical framework of crafting theory was translated to a practical user journey through ideation and co-creative sessions with cardiac patients (N=5). The prelimenary concept took shape as a comprehensive crafting passport, integrating all facets of crafting theory into a roadmap, logbook, and identity page. This concept helped define the four core stages of the envisioned crafting interaction:

1. Identifying: Pinpointing personal values, interests, and facilitators, empowers self-perception and enables patients to align their values with activity choices for a better person-activity fit.
2. Exploring: Encouraging exploration allows patients to experiment with diverse activities and discover new facilitators, broadening horizons and fostering sustained engagement.
3. Action Planning: Aligning goal-driven actions with specific cues enhances behavior enactment and can help facilitate health behavior changes.
4. Reflecting: Empowering patients to evaluate past experiences is essential for gaining comprehensive insights and progressing through the crafting process.

The collaborative development process resulted in a preference for a digital application, selected for its supportive & personalized features. A user interface (UI) was designed to facilitate engagement and embody the crafting journey. Through extensive prototype testing sessions with cardiac patients (N=5) and an evaluation with CardioVitaal's lifestyle coach (N=1), the UI was optimized to further enhance the user-friendliness and clarity of the application.

Delivering the solution

Through collaboration with cardiac patients, a Vital10 crafting app was developed to help transform exercise into a more personally rewarding and fulfilling experience. The home screen serves as a central hub, providing an intuitive overview of past experiences, user progression, and tailored activity recommendations. Users can delve deeper into activities, gaining insights into physical endeavors, enhancing self-awareness, and drawing inspiration from practical tips. To establish a routine, an action planning flow guides users in setting concrete plans with personalized tips. Upon completing an activity, a reflection flow prompts users to reflect on their past experiences, fostering mindfulness and reinforcing their commitment to their rehabilitation journey. The app synthesizes users' past experiences and feedback into new concrete insights and recommendations, empowering them to implement more fitting crafting efforts and refine their exercise routines.

A structured approach to evolve the existing Vital10 app into a fully realized crafting tool was set up. By leveraging the infrastructure of the Vital10 app, this approach aims to minimize costs and expedite deployment. The plan proceeds through four phases, each introducing iterative enhancements and novel functionalities to optimize the patient-centric crafting experience. Initially, the focus lies on integrating a minimalistic crafting module into the Vital10 app, followed by personalizing the user experience with algorithms for tailored suggestions. Subsequent phases explore expanding the crafting experience to address additional health factors and integrating health metrics and artificial intelligence for advanced analysis and personalized guidance. Ultimately, this enables CardioVitaal to provide cardiac patients with a virtual companion that supports patients in sustaining physical activities beyond the confines of the CR program.

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1.1 Project overview

Problem

Globally, cardiovascular diseases (CVDs) claim approximately 17.9 million lives annually, standing as the primary cause of death (World Health Organization, 2019). By 2040, an estimated 1.4 million individuals in the Netherlands are expected to experience a CVD - a notable increase of over half a million compared to the current figures (NOS, 2015). CVDs encompass various heart and blood vessel disorders, such as coronary and rheumatic heart disease, cerebrovascular disease, and related conditions. Key behavioral risk factors such as unhealthy diet, physical inactivity, tobacco use, and excessive alcohol consumption contribute significantly to heart disease and stroke, often manifesting in elevated blood pressure, increased blood glucose, higher blood lipids, and issues related to overweight and obesity (World Health Organization, 2019).

People who have suffered a cardiac event are highly recommended to engage in a cardiac rehabilitation program. These programs provide a 50% reduced risk of recurring heart issues and a 35% decreased chance of mortality in subsequent years (CardioVitaal, n.d.a). Increasing patients' health literacy and stimulating them to engage in physical activity helps reduce the risks associated with glucose intolerance, obesity, elevated cholesterol, and high blood pressure (RadboudUMC, 2021). Guidance from healthcare professionals like physiotherapists and lifestyle coaches motivates patients to engage in health-oriented activities.

However, a critical challenge arises post-rehabilitation, where the influence of external guidance diminishes, potentially leading patients back to their previous (unhealthy) habits (E. Doornebal, personal communication, 2023) (M. Slooten, personal communication, 2023). This transitional phase underscores the need for sustainable interventions that bridge the gap between formal rehabilitation programs and independent, long-term maintenance of health behavior changes. Developing strategies to empower individuals with the knowledge, tools, and ongoing support to sustain a healthy lifestyle post-rehabilitation is imperative in addressing this multifaceted health challenge.

Goal

Cultivating a sustainable and healthful lifestyle goes beyond merely conforming to external influences; it hinges on the pivotal cultivation of internal motivation, as highlighted by Liu et al. (2023). Understanding the profound importance of intrinsic motivation, originating from within an individual, becomes instrumental in maintaining a healthy way of life.

Boosting intrinsic motivation can be achieved through the process of 'crafting,' which involves altering activity conditions for a more rewarding experience (Tims et al., 2012). By modifying the environment, the health-related activity or oneself, people can increase the person-activity fit, making it easier to maintain long-term health behavior changes (Liu et al., 2023). For instance, individuals aiming to find more reward in an activity like walking, may choose to listen to a podcast or explore new outdoor environments (environmental level). They might opt to extend their walking route, integrate jogging intervals (activity level), or incorporate breathing exercises and enhance their sleep patterns to boost energy levels (self-level). Through these personalized adjustments, the principles of crafting make it easier for individuals to derive gratification from health-related activities, consequently nurturing intrinsic motivation and sustaining positive health behaviors on the long term (Liu et al., 2023).

Despite the insightful nature of crafting theory, it remains largely theoretical and conceptual in its current framework. To harness the full potential of "crafting" as a tool for cardiac patients, there arises a critical imperative to bridge the gap between theoretical understanding and practical application. The challenge at hand involves translating this theoretical knowledge into a user-friendly tool that actively supports individuals in maintaining health behavior changes over an extended period of time. This transition from theory to application is essential to empower cardiac patients with actionable strategies that resonate with their daily lives, facilitating lasting engagement with impactful health behavior changes.

Stakeholders

This project revolves around a patient-centric approach, prioritizing holistic care and successful recovery for cardiac patients. At its core are various healthcare experts - amongst which cardiologists, physiotherapists, dietitians and lifestyle coaches - playing pivotal roles in patient care. This expertise is embodied within CardioVitaal, the involved company, which offers a personalized cardiac rehabilitation program. Through CardioVitaal, patients receive tailored care and guidance, aiming to restore health, bolster confidence, and enhance overall quality of life during their recovery journey.

Cardiac Patients

This project involves cardiac patients, referring to individuals who suffered a heart attack, or had heart surgeries or procedures like angioplasty, received devices such as ICDs/Pacemakers, are managing angina, heart rhythm issues, heart failure, or facing significant fear of heart problems impacting their daily lives (CardioVitaal, n.d.b).

This project aims for a substantial impact by focusing on the predominant client base of CardioVitaal, primarily individuals aged 50 - 75 years, who have encountered a cardiac event (M. Slooten, personal communication, 2023). It is important to note that individuals are labeled as 'cardiac patients,' indicating a history of heart disease or a previous cardiac event. However, these individuals are no longer receiving hospital treatment but have successfully completed the cardiac surgery and are currently re-integrating into their daily lives.

CardioVitaal

CardioVitaal, situated across seven distinct locations in the Netherlands, offers heart patients a personalized cardiac rehabilitation program aimed at rebuilding confidence in their bodies. This project aligns with CardioVitaal's mission to empower cardiac patients in their rehabilitation journey, fostering confidence in their bodies for a healthier lifestyle. To strengthen CardioVitaal's offering, the crafting tool was purposefully conceptualized to hold promise for extensive scalability - potentially expanding the company's clientele to encompass various cardiac patient types or facilitating the maintenance of different types of health behavior changes.

Vital10

Patients that enroll in CardioVitaal's cardiac rehabilitation program are given access to a personalized digital portal, powered by Vital10 and securely accessed through MyVital10. The platform functions as a health portal facilitating secure communication between individuals, healthcare professionals, and/or eCoaches. MyVital10 enables healthcare professionals to easily monitor patients' situations by tracking various metrics such as blood pressure, weight, steps, sugar levels, stress levels, fruit and vegetable intake, hydration and smoking habits, as well as sleep quality. Through this, relevant healthcare professionals can offer feedback and guidance. The application is accessible on both Android and iOS phones as well as through computers and tablets. (CardioVitaal, n.d.c)

Approach

This project progressed through the Double Diamond method (Design Council, n.d.), encompassing four key phases: Discover, Define, Develop, and Deliver.

Discover

The project initiation involved an extensive exploration of the cardiac landscape, encompassing literature reviews on cardiac rehabilitation, motivational drivers, and an in-depth investigation into the theoretical framework of crafting. This foundational research was complemented by the application of various research methodologies, including conducting semi-structured interviews with cardiac patients, engaging in expert discussions with healthcare professionals, and collaborating with behavioral science PhD candidates actively involved in the same field of study. These diverse approaches ensured a comprehensive understanding of the subject matter.

Define

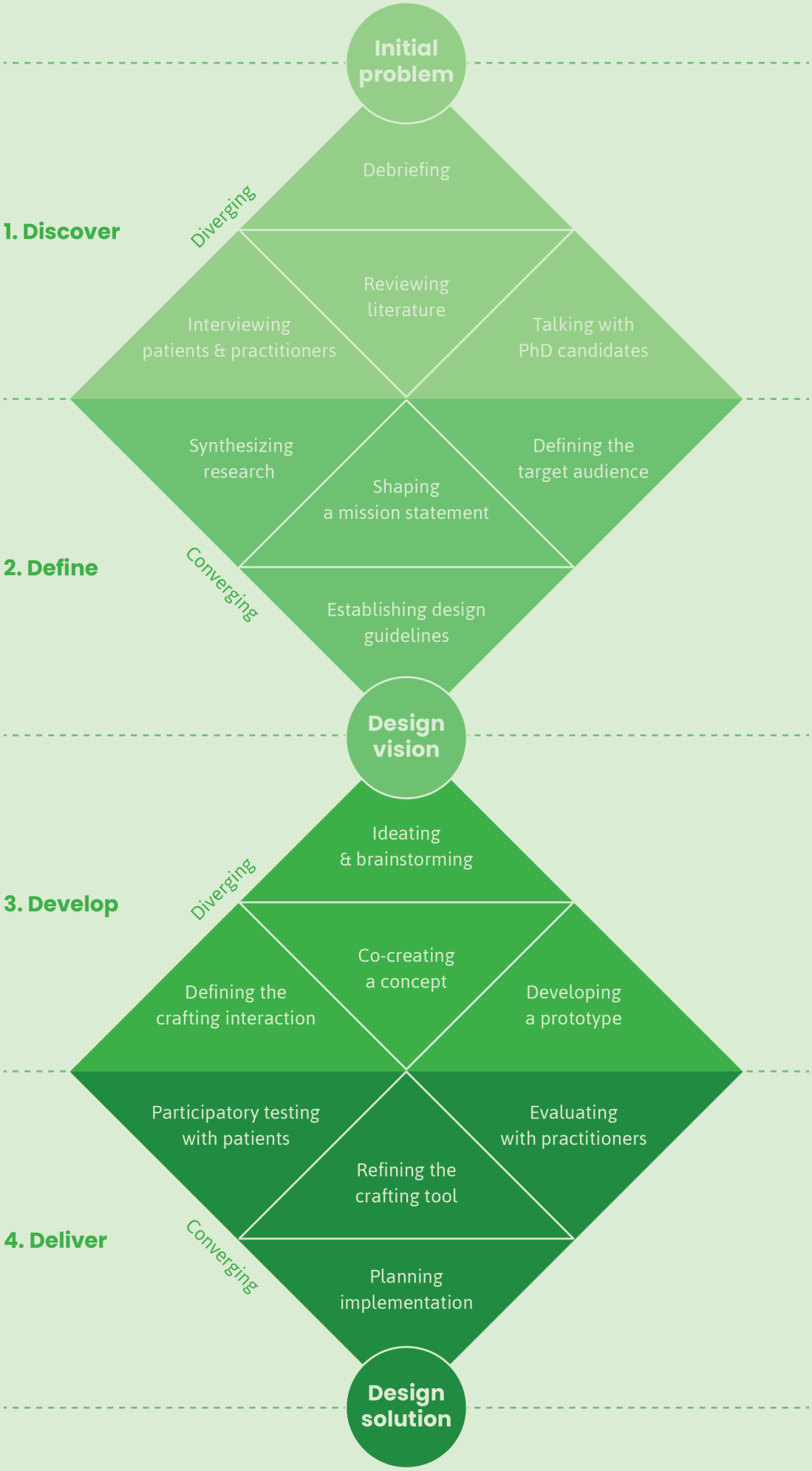
Distinct patient types were delineated from previous interviews and literature reviews to define a relevant target audience. Insights gathered from previous research activities were synthesized to establish a mission statement and a coherent design vision that resonates with the identified target audience's needs and motivations. The triangulation of findings from interviews, literature reviews, and expert discussions ensured a robust foundation for defining the project's scope and objective. This culminated in the formulation of a set of design guidelines.

Develop

With a clear mission statement and several design guidelines in place, brainstorming sessions and additional interviews were undertaken to explore diverse design pathways. Subsequently, the theoretical framework of health crafting was translated into a designed crafting interaction, which was discussed with the target audience. Based on these co-creative sessions, the crafting interaction was converted into a practical crafting tool and a functional prototype. Feedback from an evaluation session with healthcare professionals and participatory design sessions with cardiac patients played a vital role in optimizing this prototype.

Deliver

The project's deliverable encompasses an optimized and finalized crafting tool that could be implemented by CardioVitaal. This tool aims to cater to the needs of patients and healthcare professionals alike. Its objective is to improve the cardiac rehabilitation experience, encourage long-term adherence to physical activity, and drive better health outcomes for cardiac patients who have completed CardioVitaal's cardiac rehabilitation program. An implementation plan was proposed to outline strategies for leveraging and enhancing the suggested crafting tool.


Initial problem
1. Discover
Diverging
Debriefing
Reviewing literature
Interviewing patients & practitioners
Talking with PhD candidates
2. Define
Converging
Synthesizing research
Shaping a mission statement
Defining the target audience
Establishing design guidelines
Design vision
3. Develop
Diverging
Ideating & brainstorming
Co-creating a concept
Defining the crafting interaction
Developing a prototype
4. Deliver
Converging
Participatory testing with patients
Refining the crafting tool
Evaluating with practitioners
Planning implementation
Design solution

2.1 Cardiac rehabilitation

A healthcare professional's perspective

Heart and vascular diseases stand as the leading cause of reduced healthy life years and diminished quality of life among all illnesses. Each day, approximately 640 individuals are hospitalized in the Netherlands due to heart or vascular diseases. Among those seeking emergency care, nine percent report symptoms related to cardiovascular issues. This statistic accounts for around 1.7 million people in the country. (Zorginstituut Nederland, 2023)

The prevalent cardiovascular diseases (CVD) include coronary heart diseases and strokes. Coronary heart diseases develop from abnormalities or damage in the coronary arteries, with heart attacks (caused by sudden blockages in a coronary artery due to a blood clot or constriction) and angina pectoris (resulting from temporary reduced blood flow to the heart due to artery constrictions) being the two prominent forms. (Voedingscentrum, n.d.)

In certain cases, cardiovascular diseases necessitate surgical interventions such as bypass surgeries, valve replacements, or even heart transplants to restore or enhance heart function. A heart operation is a significant medical procedure performed to address various heart-related conditions. These surgeries demand meticulous preparation, expert execution, and intensive post-operative care to promote recovery and minimize complications. Following a heart operation, it is crucial to engage in a structured cardiac rehabilitation program. Participation in these programs yields significant benefits, including a noteworthy reduction in total mortality ranging from 13% to 24% over 1 to 3 years, along with a 31% decrease in re-hospitalizations within a year, and enhancements in physical function and quality of life (Ades et al., 2017). Moreover, substantial improvements are observed after just 12 weeks in various health markers such as body mass index (BMI), triglycerides, low-density lipoprotein cholesterol, total cholesterol, hemoglobin A1c, systolic and diastolic blood pressure, depression, hostility, exercise levels, and functional capacity (Silberman et al., 2010).

Cardiac rehabilitation (CR) programs

CR programs are a crucial treatment for individual patients with various types of cardiovascular diseases. They are supervised multi-faceted programs aiding patients in regaining strength, mobility, and adapting lifestyle habits to facilitate optimal recovery and enhance overall quality of life. Patients engage in tailored physical activities to boost fitness and cardiovascular health. Education on healthy living covers nutrition, medication adherence, and smoking cessation strategies. Counseling supports stress management and mental well-being. A collaborative team of healthcare professionals, exercise specialists, nutritionists, physical therapists, and counselors ensures comprehensive care throughout individuals' cardiac rehabilitation journey. Certain programs take place in a hospital or rehab center, while others can be conducted at home. The initiation of cardiac rehabilitation may occur during the patient's hospital stay or immediately following discharge. Typically, these programs span around three months, though their duration can vary from two to eight months. (Centers for Disease Control and Prevention, 2022)

CardioVitaal's CR program

CardioVitaal offers a 3-4 month cardiac rehabilitation program, consisting of guided sessions such as tailored physical training sessions (FIT-sessions), coaching sessions, and informative educational sessions (PEP-sessions). Expert interviews with both a physiotherapist (N=1) and a lifestyle coach (N=1) were conducted to get a better understanding of the offered program.

Initiation of the Program

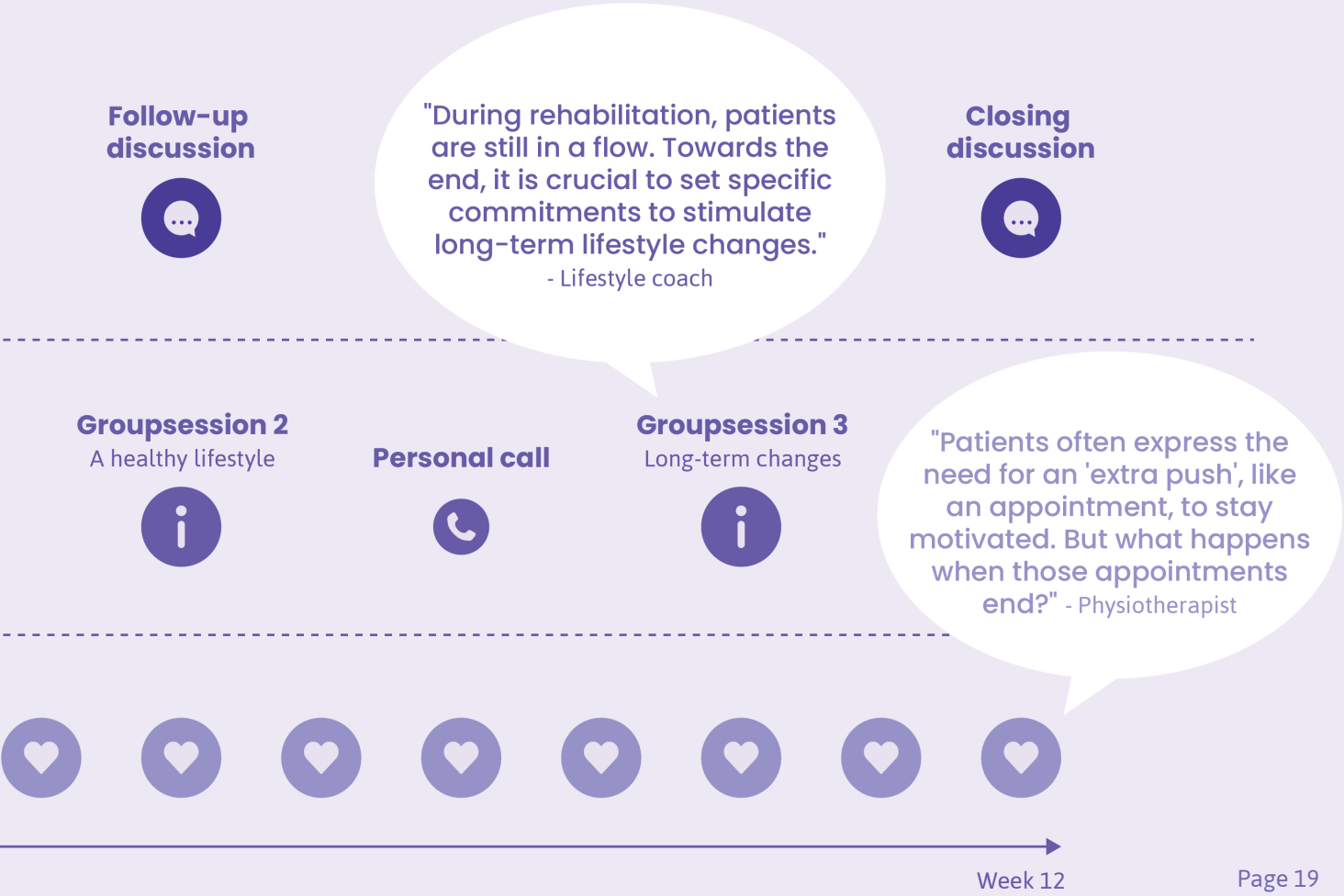
The CardioVitaal CR rehabilitation program starts with a comprehensive intake interview, informed by an online survey in the Vital10-app completed by the patient. During the interview, the patient's current health and lifestyle status are assessed, covering key topics such as emotions, lifestyle factors (including physical activity, smoking, alcohol consumption, nutrition, stress management, relaxation, and sleep), work and social life. This evaluation allows the healthcare professionals to gain valuable insights into patients' individual circumstances and aspirations in their journey to recovery. After defining personalized patient goals, an approximately three-

month trajectory is launched. While this initial three-month period lays a robust foundation, the program's length can be adjusted for patients based on their unique requirements. Throughout this program, patients receive guidance from various healthcare professionals, including cardiologists, physiotherapists, dietitians, psychologists, and lifestyle coaches. The CR program is comprised of two components: FIT and PEP.

FIT-sessions

The "FIT"-sessions primarily focus on physical activity. Under the guidance of physiotherapists and exercise-therapists, patients engage in activities that promote cardiovascular health. For most patients, this entails a total of twelve one-hour on-site sessions guided by a physiotherapist. The activities mainly focus on cardio exercising, including walking, running, and cycling. The program's flexible nature ensures that patients can choose activities they enjoy, making it more likely for them to continue their exercise routine in the long term. All activities help patients overcome barriers such as feelings of anxiety or uncertainty about returning to physical activity. (M. Slooten, personal communication, 2023).

The timeline presents CardioVitaal's CR programme. Quotes stem from semi-structured interviews with healthcare professionals at CardioVitaal (N=2).



PEP-Sessions

The "PEP"-sessions address psycho-education and information dissemination. Previously, this program was aimed at people who explicitly enrolled. Nowadays, all cardiac patients participating in the rehabilitation program are automatically registered for the PEP-sessions. Here, patients receive valuable insights into cardiology and healthy lifestyle choices. The program's lifestyle coaches play a pivotal role in helping patients understand how to translate this information into their daily lives. By empowering patients with the knowledge and skills to make healthy choices, CardioVitaal equips them for sustainable, long-term change.

The PEP-program comprises individual coaching sessions and group sessions. There are a total of three group sessions. The initial session delves into cardiovascular diseases and prevalent risk factors. The subsequent group meeting focuses on lifestyle modification, habit formation, and goal-setting via an action plan. The third session progresses further, offering practical tasks and exercises to facilitate sustained, long-term lifestyle changes. Strategies encompass incremental steps, linking challenges to daily routines, self-rewards, and leveraging friends and family as supportive allies. After each group session, patients receive the information digitally. Along with this information, they also receive a set of exercises that enable them to reflect on their own situation and progress.

In addition to the group sessions, the lifestyle coach personally reaches out to the patients. During these conversations, the lifestyle coach endeavors to think along with the patient and translate theoretical concepts into the patient's own environment, enabling the effective application of theory to actively pursue a healthy lifestyle. (E. Doornebal, personal communication, 2023.)

Completion of the program

Upon program completion, patients are invited to complete a post-program online survey, similar to the initial intake interview questionnaire. This survey is used during an evaluation meeting with healthcare professionals in which patients reflect on their personal goals. After the formal program concludes, patients continue to have access to the Vital10 application. This platform acts as a lifeline, offering a convenient means for patients to stay connected with their healthcare professionals and maintain their health and well-being. Patients can reach out with questions, seek guidance, or simply receive ongoing encouragement and motivation. (M. Slooten, personal communication, 2023).

2.2 Patient types

Cardiac patients encompass a diverse spectrum of individuals, each facing unique challenges and requiring tailored care to manage their conditions effectively. CardioVitaal supports a diverse range of patients through its CR program, catering to active young individuals with chronic heart conditions to inactive elderly individuals affected by cardiac events due to an unhealthy lifestyle. Understanding the various types of cardiac patients is crucial for healthcare professionals to provide precise and personalized treatment strategies. This project centers on the predominant client base of CardioVitaal, primarily individuals aged 50 - 75 years.

Through in-depth interviews with cardiac patients (N=8) and conversations with experts in health sciences and lifestyle coaching (N=2), three distinct patient types were defined. Each interview, lasting approximately one hour, was individually conducted, allowing participants to share personal experiences freely. These semi-structured interviews explored personal goals and motivations, health crafting theory, and potential solution spaces. Notes were taken during the interviews, and key quotes were extracted before being grouped into clusters to uncover common motives. From this process emerged distinct patient types, serving as fictional portrayals grounded in real-life interviews. These profiles streamlined data analysis, providing insights into the varied perspectives of patients.

The identified patient types were compared with existing literature and discussed with behavioral science PhD candidates at the Department of Health, Medical, and Neuropsychology (N=2). Klompstra et al. (2021) highlighted similar patient profiles in their study on heart failure patients' exercise motivation and self-belief. It is important to note that the established patient types do not represent a definitive framework encompassing all cardiac patients. Other classifications (based on different personal characteristics) exist. The proposed patient types are formulated to help guide and frame this project.

Type A: slow strugglers (or nonintenders)

This patient type heavily relies on external sources of motivation to initiate a health behavior change. They approach physical activity with a pessimistic outlook, struggling to kick-start any movement and necessitating a slow step-by-step approach, taking small steps toward embracing a new lifestyle. Their disposition reflects stubbornness and hesitancy, accompanied by a notable lack of personal drive. Consequently, external incentives and encouragement play a pivotal role in stimulating their involvement in physical activities Without such motivators, their engagement in exercise remains significantly challenged.

The motivation level to stay physically active after completing the CR program is very low. This patient type constitutes approximately 25% of the cardiac patients (Klompstra et al., 2021).

“Sometimes you already know, this won’t amount to anything. My advice will probably fizzle out after our call.”

The quote was taken from an expert interview.

Type B: health hunters (or intenders)

This person embraces physical activity with an open-minded approach, valuing guided support to initiate and sustain their exercise routines. While acknowledging the significance of physical activity, it has not yet become a habitual practice or captured their interest significantly. Taking gradual steps forward, they express a keen interest in deepening their understanding of personal health, aiming to enhance their comprehension and competence in this domain.

The motivation level to stay physically active after completing the CR program is moderate. This patient type constitutes approximately 50% of the cardiac patients (Klompstra et al., 2021).

“If running could be made more enjoyable, perhaps with a game-like element, it would be much easier for me to engage in.”

The quote was taken from a patient interview.

Type C: physical pursuers (or actors)

This patient type is already accustomed to engaging in physical activities. They feel no need to set explicit goals as they rely on personal feelings as a guide. Physical activity is already an ingrained part of their daily routine. Their main focus lies in rebuilding trust in their body, emphasizing their capabilities.

The motivation level to stay physically active after completing the CR program is moderate to high. This patient type constitutes approximately 25% of the cardiac patients (Klompstra et al., 2021).

“I do everything on a bike. It’s just who I am; I don’t even consider other options.”

The quote was taken from a patient interview.

2.3 Postoperative period

A patient's perspective

Cardiac surgery profoundly impacts individuals' lives, triggering both physical and psychological challenges. Prior to surgery, patients could manage full-time work, sports activities, and household tasks. However, in the post-surgery phase, many face the need to restructure their lives, either temporarily or permanently. This adjustment often leads to discomfort, fears, and uncertainties. (Maia et al., 2020). In a study by Theobald et al. (2004), nearly half of a sample of 30 patients considered heart surgery a huge personal shock, struggling with making life adjustments afterward.

To combat anxiety and rebuild trust in both their bodies and personal lives, patients are encouraged to participate in a CR program. Psychosocial factors influencing participation and completion of CR programs include motivation, mood states, and social support. Among these, motivation consistently emerges as a strong predictor of both starting and sustaining engagement in a CR program (Myers, 2003).

Motivation levels

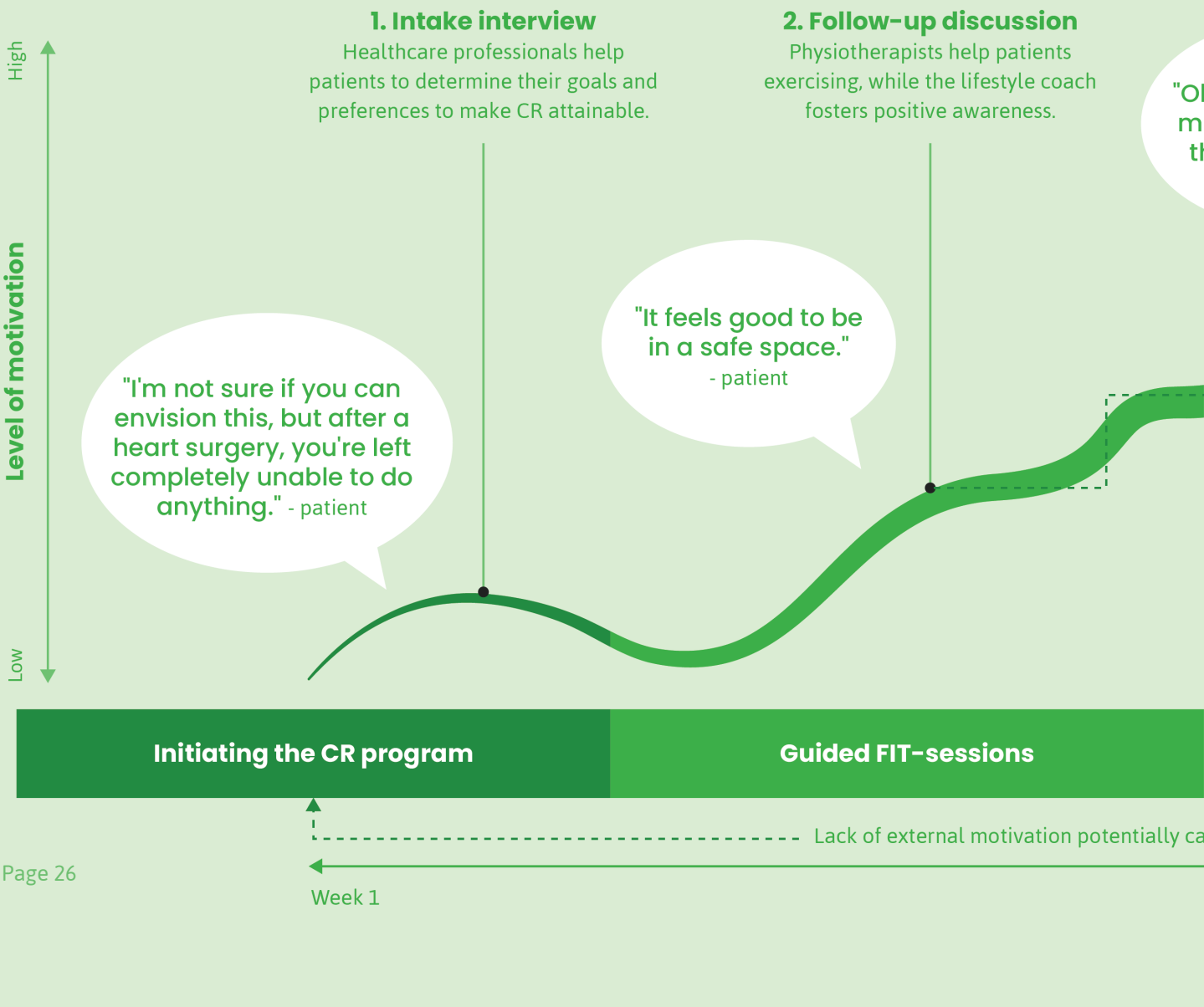
Throughout their rehabilitation journey, patients are urged to embrace pivotal health behavior changes acknowledged for their substantial influence on both physical and mental well-being (Glanz et al., 2015). These changes encompass a diverse array of activities, spanning nutrition, exercise, and mental wellness. As patients endeavor to integrate these new health behaviors, three distinct types of motivation emerge: amotivation, extrinsic motivation, and intrinsic motivation (Russell & Bray, 2009).

- Amotivation is marked by the belief that actions hold no sway over outcomes. Those feeling amotivated perceive external forces dictating their behaviors, lacking the drive to enact meaningful changes. (Deci & Ryan, 1985)
- Extrinsic motivation involves engaging in an activity for reasons external to the activity itself (e.g rewards and recognition). External motivators, such as healthcare professionals, play a big role in CR programs to stimulate patients and make progress.
- Intrinsic motivation occurs when individuals engage in an activity because they find it inherently enjoyable, interesting, or personally fulfilling. They do it for the sheer satisfaction and pleasure they derive from the activity itself, without the need for external incentives or rewards. Studies, centered around physical education programmes, have proven that intrinsic motivation is directly linked to staying involved in exercise (Goudas et al., 1995) (Theodorakis et al., 1993).

CardioVitaal's CR programme - a motivational journey

Both extrinsic and intrinsic motivation are instrumental in upholding progress within CardioVitaal's CR program. Healthcare professionals serve as external catalysts, guiding patients toward optimizing their lifestyle and rebuilding trust in their physical capabilities. Setting and checking in on goals helps to stimulate patients' motivation; clear and concrete objectives foster a robust commitment to action and significantly bolster perseverance (Locke & Latham, 2002). Reflecting on personal growth triggers a positive self-awareness that aids patients in sustaining their progress. Throughout, this project multiple series of semi-structured interviews were conducted with Dutch cardiac patients (N=8). During these interviews, all patients expressed a restoration of trust in their bodies and an enhanced perception of their self-capacity.

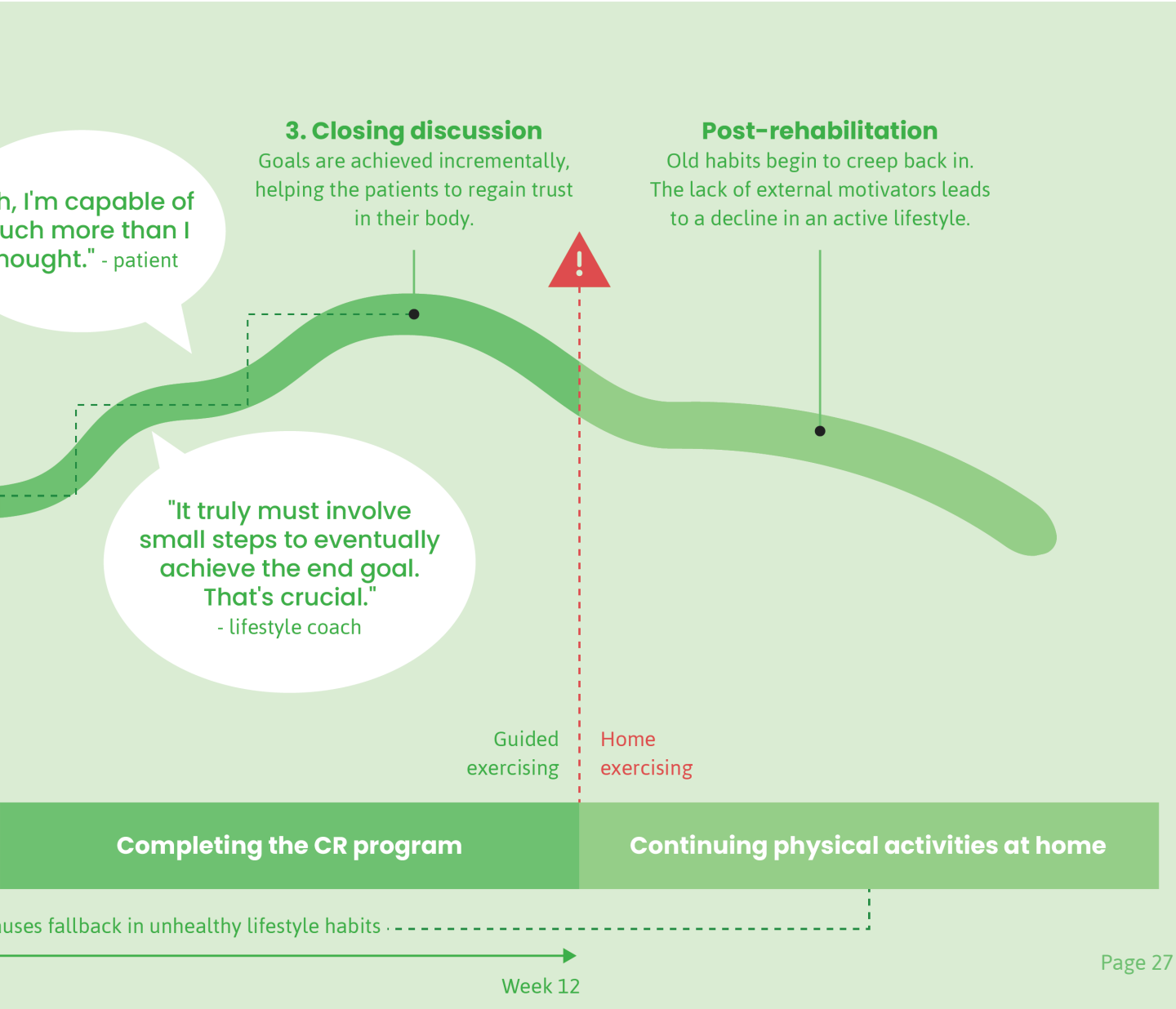
However, despite the initial momentum gained during the CR program, a concerning decline in motivation often emerges after completion. Schlicht et al.'s (2003) literature review on the participation and dropout rates in CR programs highlighted a disheartening



trend: within six months, over half of previously active individuals reverted to inactivity. Particularly alarming was the high dropout rate among those most in need of guided exercise programs for their health (Pahmeier, 1994). Adherence to exercise recommendations remains notably low, standing at a mere 39%, contrasting sharply with higher adherence rates in self-management activities such as diet (83%) or medication (exceeding 90%) (Klompstra et al., 2021).

Van Elderen & Dusseldorp's (2001) study on heart rehabilitation in Dutch hospitals unveiled a pattern where many patients sustained an active lifestyle for three months but regressed within three to twelve months. An explanation could be that multiple long-term goals may lead to priority or feasibility issues for individuals. When patients are faced with numerous objectives, exercise behavior might be deprioritized. Therefore, it becomes imperative to facilitate a seamless shift from participating in supervised physical activities at a secure on-site facility to independently pursuing such activities within one's home environment.

The timeline depicts patients motivation level during their rehabilitation journey. It was based on literature studies (Van Elderen & Dusseldorp, 2001) and semi-structured interviews with cardiac patients (N=8) and healthcare professionals (N=2) at CardioVitaal.



Barriers for physical activities

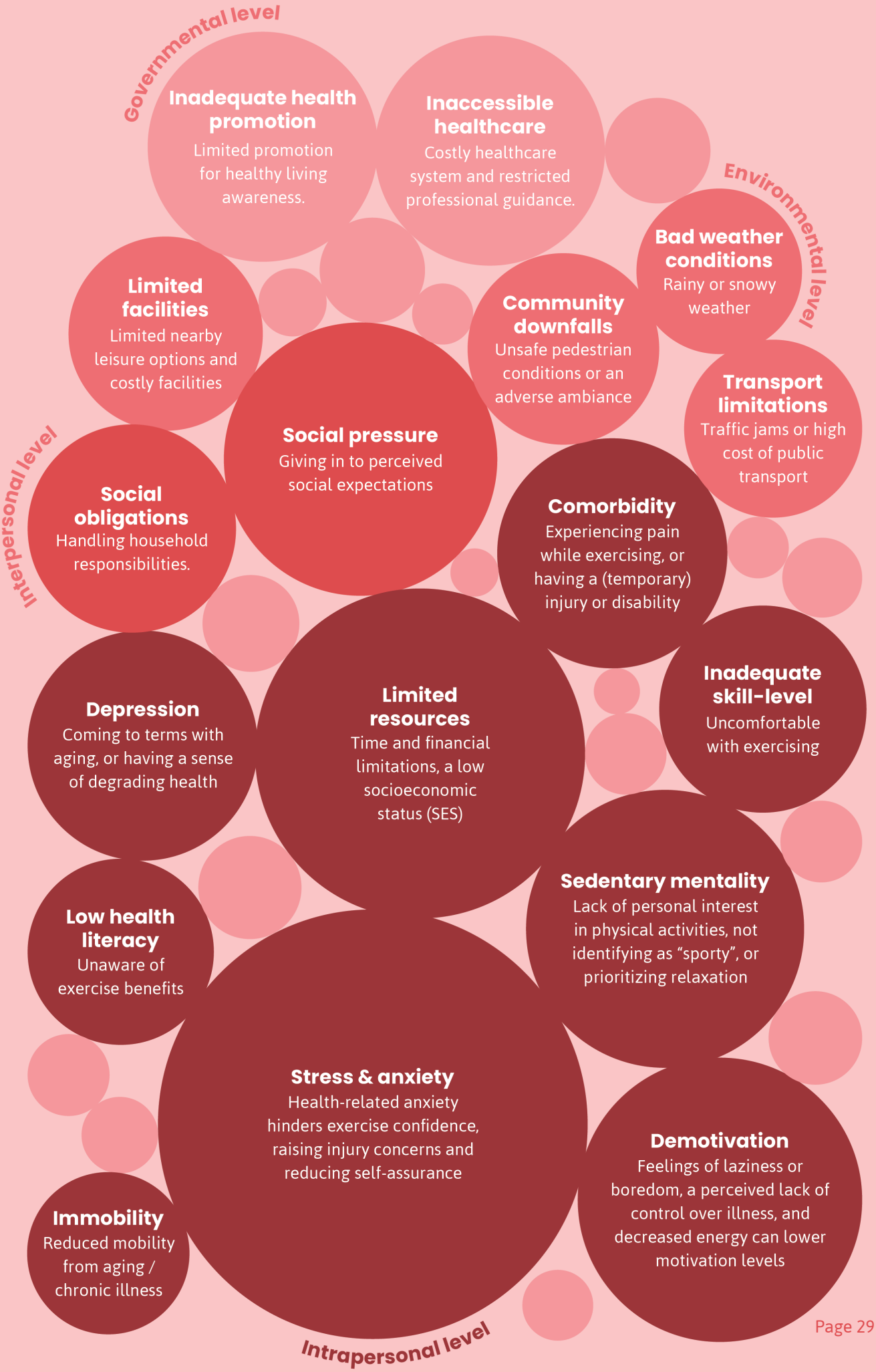
A crucial determinant in ensuring the continued engagement in physical activity beyond the duration of a structured program is the perceived self-efficacy of patients (McAuley et al., 1993). Self-efficacy is defined as an individual's belief in their capability to exercise control over challenging situations and effectively manage their own functioning (Luszczynska et al., 2005). As individuals navigate the intricate process of behavior change, they are confronted with various tasks that require mastery. In this context, three distinct self-efficacy beliefs play a pivotal role: initiation self-efficacy, maintenance self-efficacy, and recovery self-efficacy (Schwarzer et al., 2016).

- Action self-efficacy (also known as task self-efficacy) relates to the initial phase where motivation develops but action has not yet started. High action self-efficacy fosters optimism, envisioning success and employing diverse strategies, prompting patients to initiate behavior. This type of self-efficacy is largely bolstered during the CR program, as patients are educated about potential health risks and benefits, emphasizing the importance of physical activity and fostering belief in their capability to engage in it. Through guidance from both a lifestyle coach and physiotherapists, patients cultivate the intention and confidence to become more physically active.
- Maintenance self-efficacy (also known as coping self-efficacy) embodies confidence in overcoming barriers during the maintenance phase. When confronted with unexpected challenges in sustaining a new behavior, individuals with high maintenance self-efficacy respond confidently, employing better strategies and persistent efforts to surmount obstacles.
- Recovery self-efficacy focuses on bouncing back after setbacks. It involves believing in one's ability to regain control, minimize harm, and resume progress after experiencing failure or setbacks.

To evaluate the barriers that affect maintenance-self efficacy among Dutch cardiac patients, insights were derived from an extensive literature review on barriers encountered by Western cardiac patients in their efforts to sustain a healthy lifestyle. Databases were systematically searched for articles using keywords such as 'cardiac patients,' 'CVD,' 'physical activity,' 'exercise,' 'barriers,' and 'obstacles.' These findings were classified within an ecological model, encompassing intrapersonal, interpersonal, environmental, and governmental levels (Bauman et al., 2014);

- Intrapersonal level: These barriers manifest within the individual patient, encapsulating factors such as mindset, physical capabilities, and personal values and beliefs. These intrinsic shape an individual's approach and receptiveness to physical activity.
- Interpersonal level: These barriers stem from social connections, imposing societal expectations on individuals. This level delves into the intricate dynamics of interpersonal relationships, cultural norms, and community influences, emphasizing the importance of broader social contexts.
- Environmental level: These barriers represent contextual challenges, often resistant to change but partially amenable. Physical surroundings, infrastructure, and access to recreational spaces can significantly impact an individual's ability to engage in regular physical activity.
- Governmental level: These are intertwined with national policies and governance. They represent challenges emanating from existing government policies, which may either facilitate or impede widespread physical activity initiatives.

The figure depicts barriers that cardiac patients face when continuing physical activities in their home environment. It was based on literature studies (Gadowski et al., 2021) (Nielsen et al., 2017) (Fraser et al., 2022) (Sweeting et al., 2016) (Amandels et. al, 2008) (RIVM, 2016) (Thomas et al., 2004) (Fleury et al., 2004) (Murray et al., 2012) and confirmed in semi-structured interviews with cardiac patients (N=8) and healthcare professionals (N=2) at CardioVitaal.


Governmental level
Inadequate health promotion
Limited promotion for healthy living awareness.
Inaccessible healthcare
Costly healthcare system and restricted professional guidance.
Environmental level
Bad weather conditions
Rainy or snowy weather
Limited facilities
Limited nearby leisure options and costly facilities
Community downfalls
Unsafe pedestrian conditions or an adverse ambiance
Transport limitations
Traffic jams or high cost of public transport
Social pressure
Giving in to perceived social expectations
Interpersonal level
Social obligations
Handling household responsibilities.
Comorbidity
Experiencing pain while exercising, or having a (temporary) injury or disability
Depression
Coming to terms with aging, or having a sense of degrading health
Limited resources
Time and financial limitations, a low socioeconomic status (SES)
Inadequate skill-level
Uncomfortable with exercising
Sedentary mentality
Lack of personal interest in physical activities, not identifying as "sporty", or prioritizing relaxation
Low health literacy
Unaware of exercise benefits
Stress & anxiety
Health-related anxiety hinders exercise confidence, raising injury concerns and reducing self-assurance
Demotivation
Feelings of laziness or boredom, a perceived lack of control over illness, and decreased energy can lower motivation levels
Immobility
Reduced mobility from aging / chronic illness
Intrapersonal level

2.4 Overcoming barriers

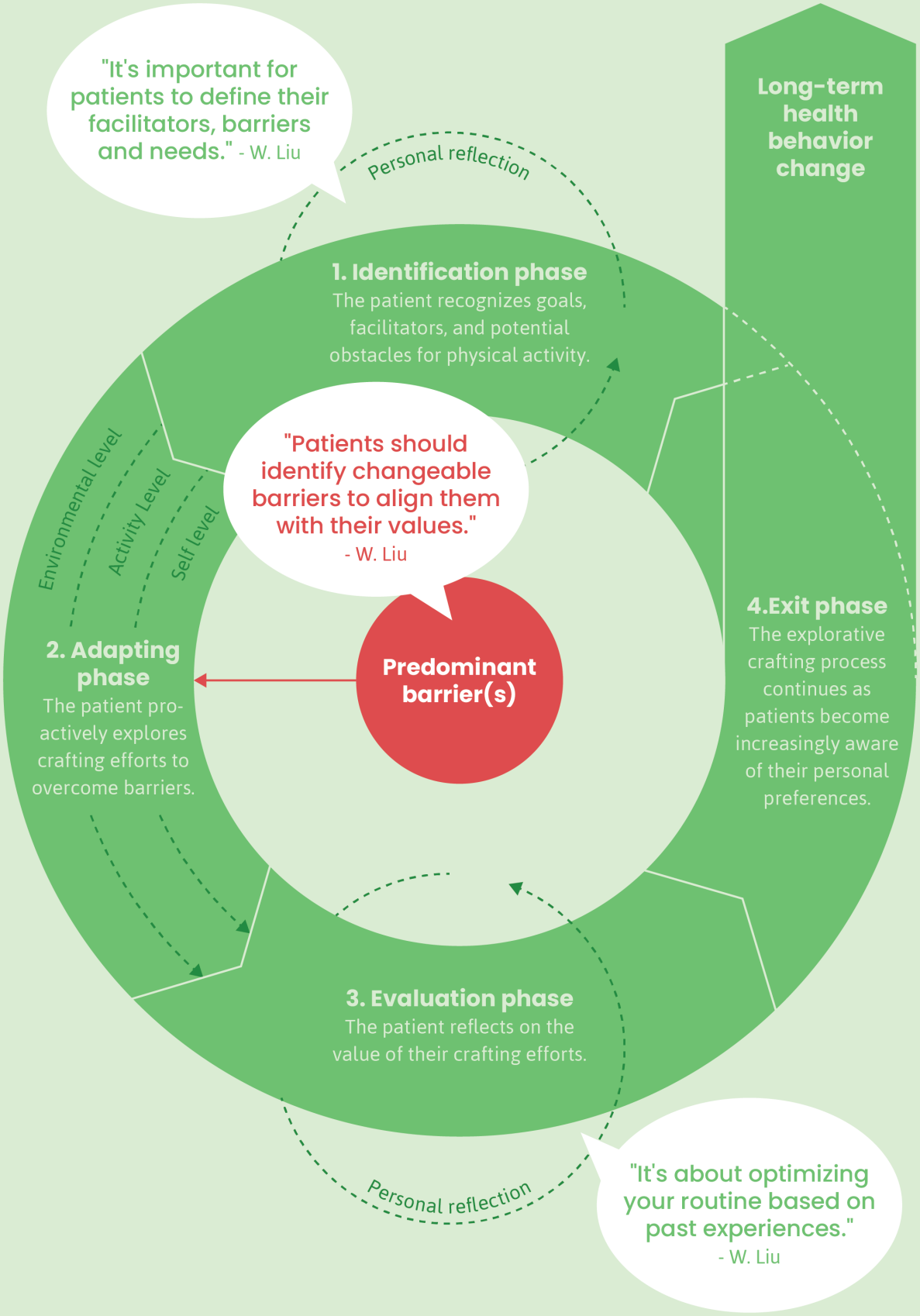
After completing the CR program, the intention of cardiac patients to embrace physical activity evolves over time. Intentions are stated to serve as powerful predictors of light physical activity three months post-myocardial infarction (Bennett et al., 1999).

Initially, post-program, patients exhibit heightened intention to maintain CR-informed health behaviors. They grasp the significance of a healthy lifestyle through awareness of health risks and benefits. Yet, as time elapses, sustaining this intention encounters hurdles. Conflicting goals and identified barriers impact initial enthusiasm; for instance, choosing between social outings and exercise sessions. Individuals grapple with prioritizing long-term rewards versus short-term gains, leading to fluctuations in their commitment to physical activity. Ensuring continual support, reinforcement, and sustained interventions becomes pivotal for maintaining this intention long-term. Crafting theory can offer a solution as it helps to transform physical activities into rewarding experiences (Liu, 2023).

Crafting theory

The term "crafting" initially referred to employees' proactive adjustments in customizing their work to align better with their personal needs (Wrzesniewski and Dutton, 2001). This theory extends beyond the workplace, showing adaptability across various life domains (de Bloom et al., 2020). Wei Liu (2023), a Postdoc at the Faculty of Industrial Design Engineering at the Delft University of Technology, explored applying this theory to enhance individual well-being by crafting a healthier lifestyle. It posits that individuals can modify facilitators and barriers to enhance the alignment between themselves and health-related activities. By understanding their personal needs and identifying and modifying these facilitators and barriers, individuals can create a more rewarding experience. For instance, individuals can make physical activities more enjoyable by increasing challenges (= facilitators), striking a better skill-challenge balance, and experiencing greater happiness. They can also reduce cues for unhealthy living (= barriers) to ease self-regulation.

The diagram depicts the iterative process of health crafting. It was based on literature studies (De Bloom et al., 2020) (Liu, 2023) and an expert interview with W. Liu; the author of the health crafting theory framework.


"It's important for patients to define their facilitators, barriers and needs." - W. Liu
Personal reflection
Long-term health behavior change
1. Identification phase
The patient recognizes goals, facilitators, and potential obstacles for physical activity.
"Patients should identify changeable barriers to align them with their values." - W. Liu
Environmental level
Activity Level
Self level
2. Adapting phase
The patient pro-actively explores crafting efforts to overcome barriers.
Predominant barrier(s)
4.Exit phase
The explorative crafting process continues as patients become increasingly aware of their personal preferences.
3. Evaluation phase
The patient reflects on the value of their crafting efforts.
Personal reflection
"It's about optimizing your routine based on past experiences." - W. Liu

Health crafting aims to delineate three distinct levels of crafting efforts: those directed at the environment, the activity itself, and one's own self (Liu, 2023);

- On the environmental level, individuals can modify facilitators and barriers to enhance their health behavior experience. Facilitators promote engagement, while barriers hinder motivation (Bakker & Demerouti, 2017). For instance, keeping healthy food at home and reducing cues for unhealthy eating can enhance dietary habits.
- On the activity level, individuals can alter approaches to make health activities more enjoyable. This includes finding a better skill-challenge balance, making activities more fun, and selecting the right conditions, such as cycling with a tailwind (Ehrari et al., 2020).
- On the self level, individuals can manage personal states, like energy and positivity, to boost engagement and enjoyment (Ryan et al., 2008). This can entail getting adequate sleep, practicing self-regulation skills, and building self-efficacy (Grembowski et al., 1993; Mulkana & Hailey, 2001).

The crafting process can be described as a test-operate-test-exit sequence (Miller, Galanter, & Pribram, 1960, cited in De Bloom, 2020):

1. Identification phase: The process initiates as an individual recognizes a disparity in their needs, where their current level of need satisfaction falls short of the desired ideal
2. Adapting phase: The individual proactively takes steps to address this discrepancy through one or a series of crafting efforts
3. Evaluation phase: The individual critically assesses their progress within the process, reflecting on the effectiveness of their efforts
4. Exit phase: The process continues until the individual's psychological needs are fulfilled, enabling optimal functioning within the targeted identity domain

During the initial testing phase, individuals are expected to be conscious of their needs disparity before embarking on crafting endeavors. Nevertheless, it's worth noting that unconscious needs disparities may still serve as motivating factors for crafting, as the broader issue of how explicit and implicit motives interplay remains a largely open question (Sheldon, 2011). These crafting motives are derived from needs discrepancy, which can be categorized in two types of needs:

- Approach needs are focused on growth, enrichment, and the creation of new resources (e.g. learning new skills and feeling socially connected). These needs require approach-focused crafting efforts to add different aspects to (non)work roles to satisfy psychological needs.
- Avoidance needs focus on the avoidance of negative outcomes and restoring homeostatic balance (e.g. providing safety and reducing stress). These needs require avoidance-focused crafting efforts to diminish different undesirable aspects to (non)work roles to satisfy psychological needs.

During the operating phase, both individual factors (e.g. age, gender, personality, etc.) and contextual factors (culture, social environment, etc.) can influence the crafting process. These factors can either directly affect the salience of needs and the extent of perceived needs discrepancy, or they can indirectly influence the strength of the relationships between needs discrepancy and the exertion of crafting efforts. In general, the contextual factors that play the most significant role are those that either encourage or hinder autonomy support, as they directly affect an individual's capacity to sustain motivation and enhance their performance to meet their psychological needs.

The retesting phase represents a dynamic feedback loop that interconnects needs fulfillment with needs disparities, implying that prior crafting experiences possess the potential to mold future crafting endeavors. When viewed from a between-person perspective, previous successful crafting experiences can serve as wellsprings of motivation, prompting individuals to employ crafting strategies across diverse identity domains. Conversely, when viewed from a within-person standpoint, a cybernetic paradigm becomes apparent, where sustained crafting within a specific identity domain may decline as unmet needs gradually find resolution. As the gap between perception and the desired goal narrows, motivation for further crafting diminishes accordingly.

Section 3

DEFINING THE VISION

3.1 Target audience

The identified patient types A, B, and C correspond to distinct stages of change based on motivational readiness: nonintenders (lacking motivation to change or engage in the goal behavior), intenders (committed to adopting the goal behavior but struggling with maintenance), and actors (already practicing the goal behavior) as delineated by Lippke (2015). Accordingly, interventions tailored to each patient type should target specific forms of self-efficacy to optimize outcomes:

- Starting with patient type A, characterized by a lack of motivation to change or engage in the goal behavior, the focus lies on cultivating the seed of intention to initiate change. This group may struggle with maintaining an active lifestyle post-rehabilitation due to the absence of external motivators. Therefore, interventions tailored to patient type A should prioritize bolstering their task self-efficacy, instilling a sense of capability and purpose in undertaking the necessary steps toward change.
- Moving on to patient type B, who are committed to adopting the goal behavior but may face barriers such as confidence issues and time constraints, the emphasis shifts towards sustaining engagement and overcoming challenges. This group strives to remain active post-rehabilitation but may find consistent involvement challenging. Here, interventions play a crucial role in nurturing and amplifying their maintenance self-efficacy, empowering them to navigate obstacles and persist in their pursuit of a healthier lifestyle.
- Patient type C represents individuals who effortlessly sustain physical activity post-rehabilitation, naturally gravitating towards healthy alternatives. While they may exhibit a strong inclination towards maintaining their newfound habits, interventions can still play a supportive role in reinforcing their recovery self-efficacy. By bolstering their belief in their ability to overcome past obstacles and regain their former lifestyle, interventions can serve to further solidify their commitment to long-term health and well-being.

Considering their receptive and motivated attitude, an intervention for Patient type B appeared to be the most beneficial and lucrative. Furthermore, Patient type B represents the largest portion of cardiac patients (Klompstra et al., 2021). Consequently, Patient type B was selected as the primary focus of this project to maximize the impact and effectiveness of the crafting tool.

3.2 Design vision

Shifting from a means to an end

CardioVitaal's CR program aims to equip patients with the tools to independently maintain an active and healthy lifestyle upon completion. However, there is an opportunity for enhancement in the process of transitioning patients' initial task self-efficacy - the confidence in making health behavior changes - into lasting maintenance self-efficacy - the instilling belief in their ability to sustain physical activity even in the face of challenges.

While patient type B initially often grasps the benefits of exercise and becomes aware of health risks during the CR program, some individuals encounter difficulties in maintaining this commitment afterward. Frequently, situational barriers and other personal goals take precedence, leading to a lapse in physical activity. To prevent relapse, the design approach centers on transforming physical activity into a personally fulfilling and deeply rewarding experience. Rather than emphasizing health risks or benefits, the approach centers on cultivating intrinsic motivation by directing attention to the joy of the activity itself, rather than its end goal.

Guided by the principles of health crafting theory, characterized by exploration and introspection, the design aims to empower patients to discern what brings them joy in exercise. This process facilitates self-awareness, enabling tailored activities aligned with individual preferences and needs. This personalized design approach systematically mitigates the impact of barriers, fundamentally reshaping exercise from a means to an end and becoming an inherently fulfilling pursuit.



Mission Statement

“Design a crafting tool that enhances cardiac patients’ maintenance self-efficacy, transforming physical activities into deeply rewarding personalized experiences. By fostering a deeper understanding of their capabilities and preferences, patients can smoothly transition from supervised rehabilitation to sustaining physical activity at home.”

3.3 Design guidelines

Derived from the design vision and the mission statement, a set of guiding principles for the design was formulated. These principles aid in comprehending the envisioned interaction. They stem from a deep understanding of patients' needs, leverage the potential of health crafting theory, and build upon CardioVitaal's expertise.

1.

Supportive

Enhancing CardioVitaal's CR program, the tool will nurture the transition of cardiac patients from on-site rehabilitation during the program to exercising in a home environment. By providing post-care and aiding in establishing enduring exercise habits, it will fortify CardioVitaal's supportive and personalized approach. While autonomy and a self-initiated bottom-up approach in decision-making are crucial during the crafting process, ensuring a sense of security and support is paramount to facilitate a smooth transition.

2.

Optimistic

Cultivating a positive and optimistic mindset, the tool aims to boost the confidence of cardiac patients in embracing and maintaining a healthy lifestyle. In the face of inevitable barriers associated with adapting to a new way of life, the tool accentuates the gratifying aspects of physical activities. Rather than directly confronting obstacles, the emphasis is on downplaying their significance and showcasing the personal fulfillment derived from engaging in physical activities.

3.

Explorative

Promoting the adoption of new physical activities or the refinement of existing ones, the tool will actively nurture a culture of exploration among cardiac patients. Through experimentation, individuals are exposed to novel experiences that uncover unmet needs and preferences, which may otherwise go unnoticed. This process not only encourages patients to broaden their horizons but also allows for a more more personalized experience and effective approach to cardiac patients care.

4.

Introspective

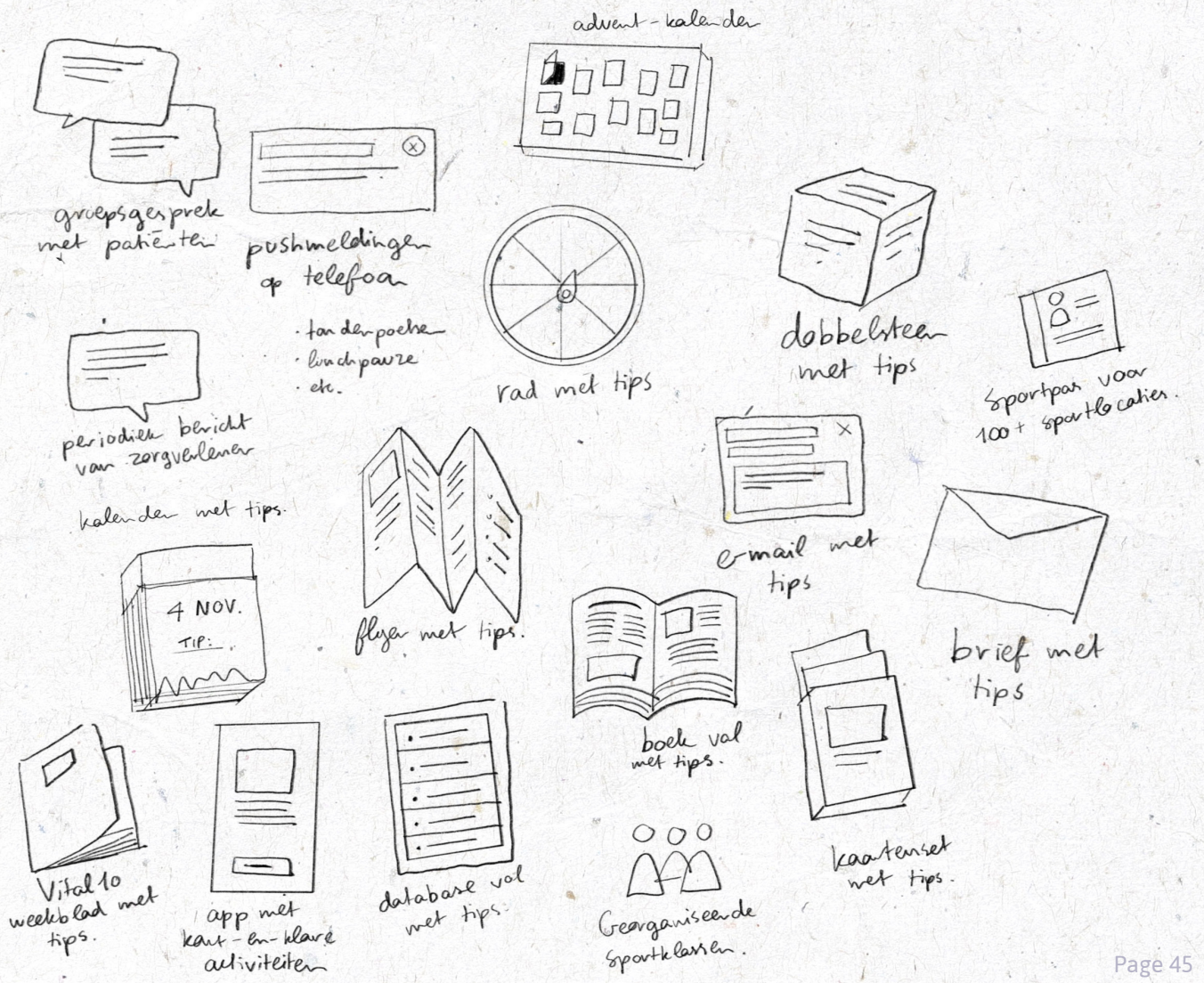
Nurturing self-awareness in patients, the tool will empower them to discern personal value and enjoyment in physical activities. It is the subtle, gratifying moments - such as listening to music or relishing nature - that enhance the overall appreciation of these activities. Through prompting self-reflection, the tool will help to reveal individual values, enabling patients to pinpoint what resonates most with them. Consequently, it facilitates a shift in focus from mere movement (initially for health or risk reduction) to embracing the sheer joy derived from movement itself, thereby making the act of moving the ultimate goal.

4.1 Co-creative sessions

A patient's perspective

Throughout the preceding phases, numerous small ideas were brainstormed and cultivated over time. The design guidelines served as invaluable resources, providing clear directives on the crafting tool's requirements, thereby informing the ideation process. The focal point of these ideas was centered on shaping the desired interaction to not only initiate but also effectively guide the patient through the crafting process, ensuring a seamless and engaging experience. This chapter delves into the conceptualization of the crafting tool, bridging the gap between theory and practice by transforming the theoretical framework of health crafting into a practical user journey.

The image shows some of the early sketches, exploring how to stimulate initiaton of physical activities.

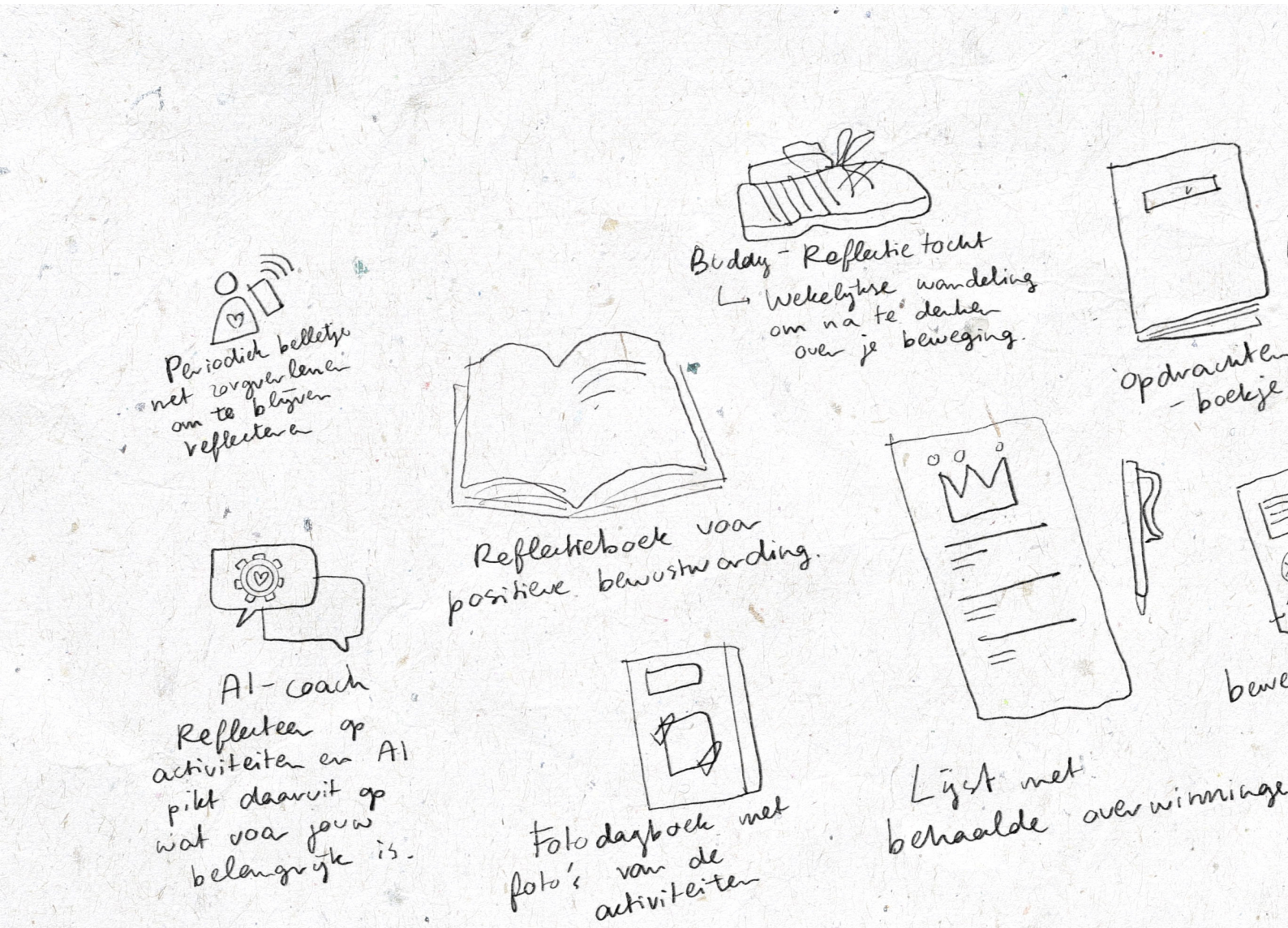


Setting up a structure

Creating an effective structure for the crafting tool is paramount to enhancing the patient experience in cardiac rehabilitation. Currently, CardioVitaal's lifestyle coach provides patients with online course materials in the form of digital PDF files following each PEP group sessions. While patients (N=5) acknowledge reading the information and pondering over it, they find completing the assignments challenging and not particularly rewarding. An effective and iterative crafting interaction can be transformative, offering patients continual progression through the process and immediate application of newfound insights.

To construct a promising structure, enabling patients to define specific tasks for engagement and prompting reflective practices becomes imperative. By doing so, the crafting tool steers patients towards deeper self-awareness and understanding of personal preferences. This structured approach should facilitate a seamless feedback loop, enabling patients to continually evolve their experiences and enhance self-knowledge iteratively. It should not only motivate patients to participate in activities but also encourage thoughtful reflection to uncover novel insights.

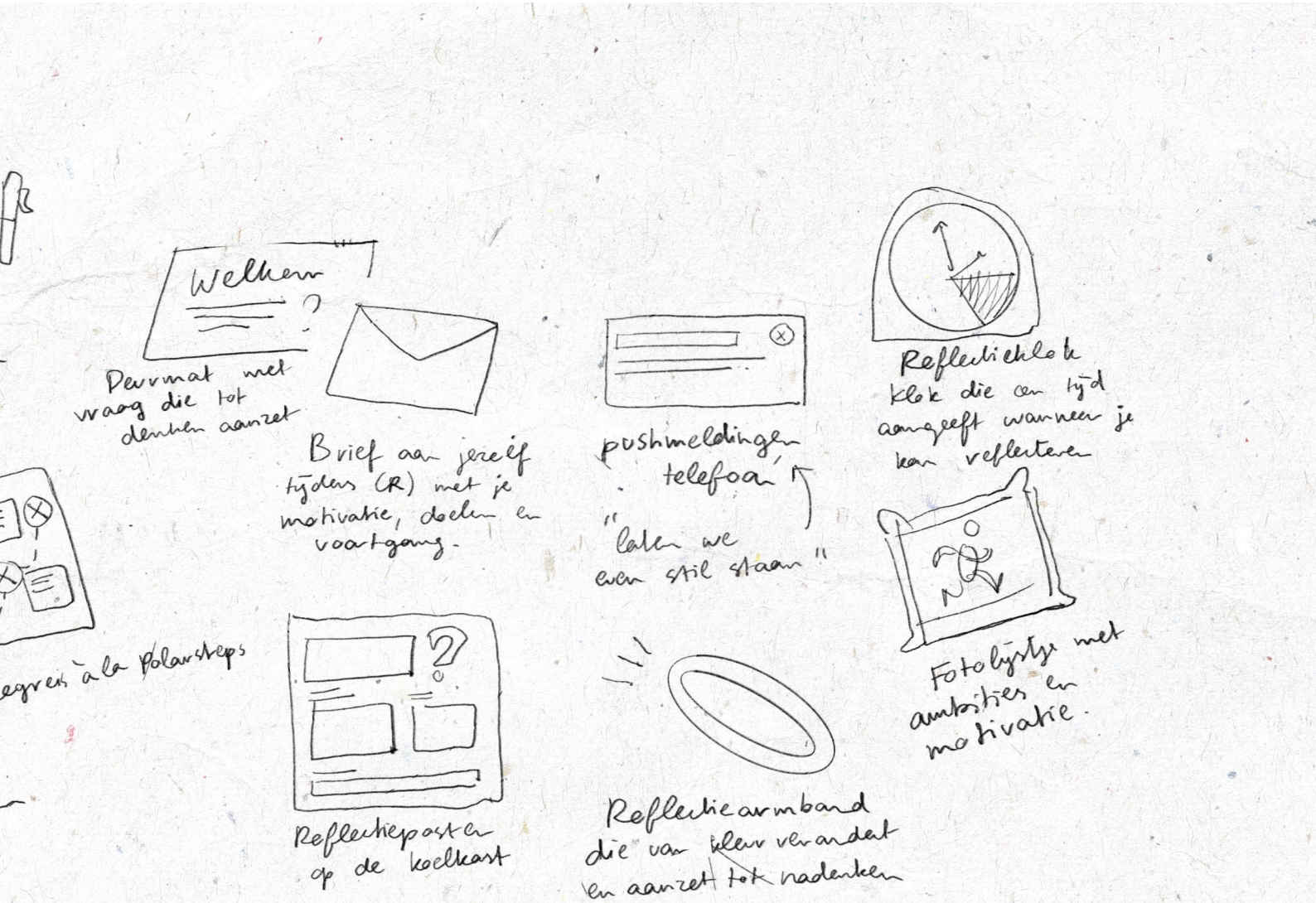
Achieving the full potential of health crafting theory necessitates striking a delicate balance between



guidance and autonomy. While the tool can compensate for the reduced involvement of healthcare professionals post-rehabilitation and serve as a motivational catalyst, it must also prioritize granting patients the autonomy to shape their cardiac rehabilitation journey. Upholding a bottom-up approach to crafting empowers patients to navigate their unique paths, finding equilibrium between independent engagement in activities aligned with their preferences and seeking guidance when necessary.

Therefore, the crafting tool should offer a clear and adaptable structure, accommodating diverse user pathways and preferences. It should serve as a supportive framework, encouraging patients to take ownership of their rehabilitation journey while providing valuable resources and guidance as needed. This balanced approach fosters empowerment, self-discovery, and ultimately, improved outcomes in cardiac rehabilitation.

The image shows some of the early sketches, exploring how to enable users to plan & reflect.



A structured crafting interaction

The generated ideas played a pivotal role in shaping the preliminary concept for the crafting interaction, taking the abstract form of a comprehensive crafting passport. This crafting passport seamlessly integrates various facets of crafting theory through different interventions, namely: a roadmap, a logbook, and an identity page.

- The roadmap embodies the essence of the explorative nature inherent in crafting theory. Functioning as a task-setting component, the roadmap represents and structurizes the user's journey. It encourages patients to embark on a path of exploration, facilitating the discovery of new activities and the derivation of fresh insights into their personal preferences. It acts as a dynamic guide, prompting patients to engage in a diverse range of activities to enrich their crafting experience.
- Dedicated to the introspective facet of crafting theory, the logbook empowers patients to actively reflect on their past crafting efforts. By providing a designated space for patients to articulate their thoughts and experiences, the logbook becomes a valuable repository of self-reflection. This introspective tool not only enhances self-awareness but also serves as a mechanism for tracking personal growth and development throughout their crafting journey.
- The crafting passport's identity page underscores the personal character inherent in crafting theory. This section acts as a mirror, making patients acutely aware of their individual preferences in relation to physical activities. It enables patients to fine-tune and optimize their subsequent crafting efforts. This affirmative approach fosters a deeper connection with one's personal journey, promoting a sense of self-empowerment and ownership over the crafting process.

The crafting passport helped to define four core phases of the designed crafting interaction; identifiying, exploring, action planning and reflecting. These phases were discussed during one-hour one-on-one conversations with patients (N=5) who completed CardioVitaal's CR-program at least three months prior to the initiation of this project. The different phases of the crafting interaction were discussed. Patients were involved in the design process through sketches and design proposals. Small exercises, such as writing a plan and reflection, aided in gaining insights into patients' preferences and behaviors.

Based on the conversations, participants could be assigned to the different patient types as follows:

- Participant 2.1: Female (67) - Patient type B
- Participant 2.2: Female (56) - Patient type B
- Participant 2.3: Female (56) - Patient type B
- Participant 2.4: Male (59) - Patient type A
- Participant 2.5: Male (68) - Patient type C

Although the crafting tool was aimed at patient type B, inputs from all different patient types was deemed relevant as it allowed for a more broad view on the crafting process. This chapter covers insights gained during these conversations, categorized by the different phases of the crafting process.


BEWEEG
PASPOORT
MIJN REIS
Jouw eigen beweeg-reis in kaart gebracht
LOGBOEK
Reflecteer op je activiteit en geef aan wat jou anderweg hielp.
DIT BEN JIJ
Waardes die voor jouw belangrijk zijn bij bewegen.
+
concrete tips en een strategie die voor jou werkt

Step 1: identifying

The crafting interaction initiates with the identification of personal values, interests, and concrete facilitators, which they have already acknowledged. What types of activities resonate with the individual? Are they inclined towards morning or evening activities? This foundational phase serves as a catalyst for individuals to develop and refine their self-perception, fostering a profound sense of self-empowerment and ownership over the crafting process. As individuals delve deeper into understanding their intrinsic motivations and aspirations, they gain invaluable insights into how to effectively and positively engage in physical activities tailored to their unique preferences and needs. It cultivates a stronger alignment between personal values and activity choices, ultimately leading to an improved person-activity fit. By nurturing this harmonious relationship, individuals are empowered to foster a more enriching and sustainable engagement with physical activities over the long term, promoting overall well-being and vitality (Liu, 2023).

The items in the list on the right side resulted from one-on-one conversations with patients (N=5). They were synthesized through the clustering of insights gathered from all participants.

"Why not begin by questioning what truly brings you joy? That's key for making the interaction meaningful."

The quote was taken from a patient conversation.

Initiation

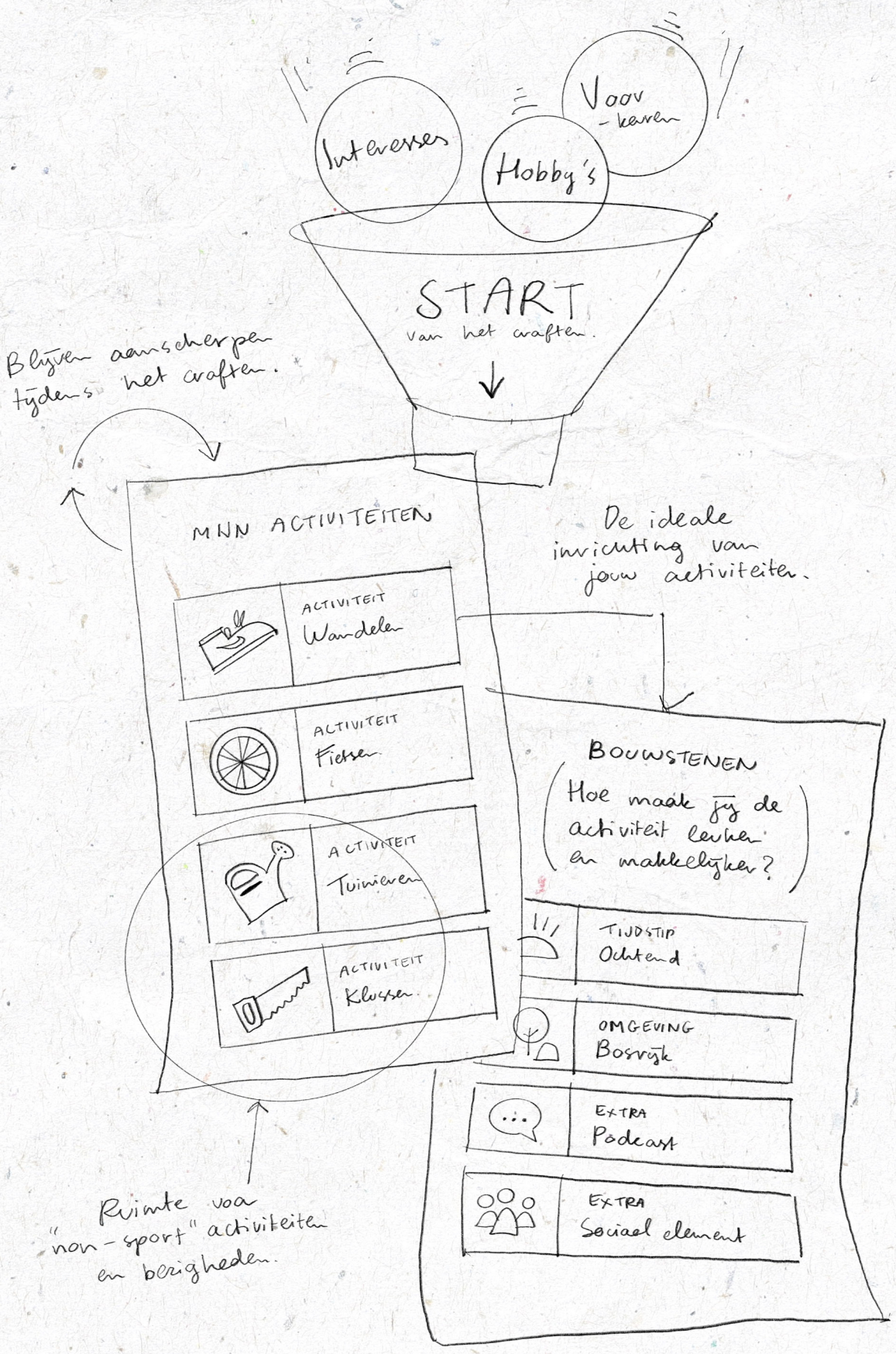
Patients often possess an innate understanding of the physical activities and facilitators they prefer. Encouraging patients to introspect about their current or past interests and self-enjoyment can serve as a foundation for initiating the crafting process.

Contextual understanding

Facilitators might differ inbetween activities. For example, someone might enjoy listening to a podcast during a leisurely walk, while opting for music during a more intense running session. Hence, expressing facilitators within their relevant context proves beneficial.

Transparency

Creating awareness of barriers should not necessarily be viewed negatively, but can also be enlighting. By consciously identifying what works and what does not, users gain a more comprehensive understanding of their personal needs.


Interesses
Hobby's
Voor - keuren
START
van het crafter.
Blijven aanscherpen tijdens het crafter.
MIJN ACTIVITEITEN
ACTIVITEIT
Wandelen
ACTIVITEIT
Fietsen
ACTIVITEIT
Tuinieren
ACTIVITEIT
Klussen
De ideale inrichting van jouw activiteiten.
BOUWSTENEN
(Hoe maak jij de activiteit leuker en makkelijker?)
TIJDSTIP
Ochtend
OMGEVING
Bosrijk
EXTRA
Podcast
EXTRA
Sociaal element
Ruimte voor "non-sport" activiteiten en bezigheden.

Step 2: exploring

To get a better understanding of potential barriers and new facilitators, it is important to generate room for exploration. By encouraging patients to immerse themselves in diverse activities and igniting their imagination, they are afforded the opportunity not only to experiment with various sports and physical exercises but also to explore a wide array of within-level facilitators. These may include facilitators such as listening to music, exercising with others, or discovering new settings, all of which contribute to nurturing a tailored and personalized approach. This exploration not only broadens their horizons but also empowers them to discover what truly resonates with their individual preferences and needs, allowing them to further expand their self-awareness.

The items in the list on the right side resulted from one-on-one conversations with patients (N=5). They were synthesized through the clustering of insights gathered from all participants.

Tailored recommendations

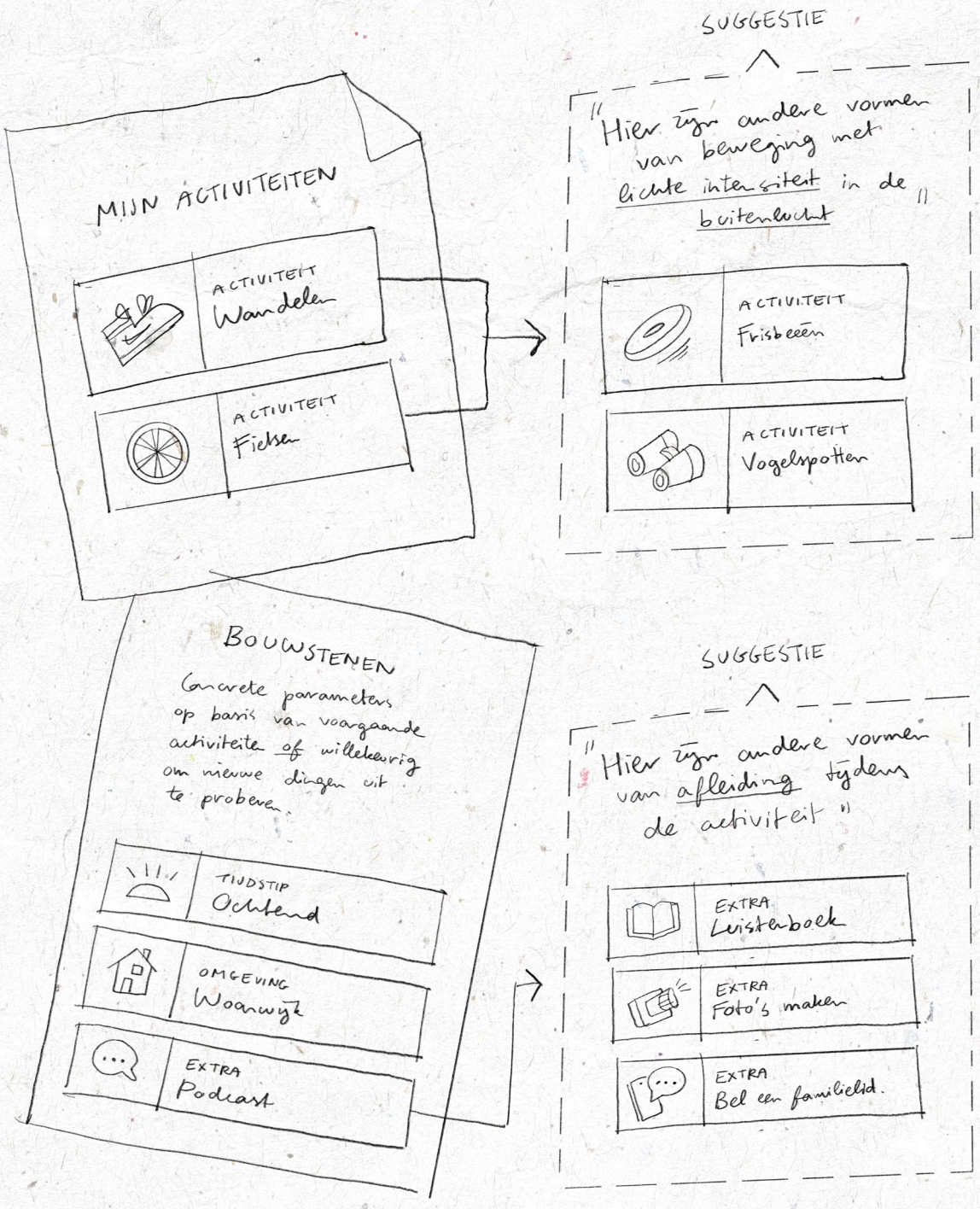
Suggestive building blocks and activities significantly elevate the perceived value of a crafting tool. Ensuring these suggestions align closely with individual preferences becomes pivotal in establishing a relevant and meaningful experience.

Non-sport activities

Activities should encompass sports alongside activities like gardening and cleaning the car. This inclusive approach expands the patient's outlook, shifting from viewing exercise solely as intense sports to more accessible activities with a low-threshold.

"Now I get it - these tailored suggestions really make me want to use the tool!"

The quote was taken from a patient conversation.


MIJN ACTIVITEITEN
ACTIVITEIT
Wandelen
ACTIVITEIT
Fietsen
SUGGESTIE
"Hier zijn andere vormen van bewegen met lichte intensiteit in de buitenlucht"
ACTIVITEIT
Frisbeeën
ACTIVITEIT
Vogelspotten
BOUWSTENEN
Concrete parameters op basis van voorgaande activiteite of willekeurig om nieuwe dingen uit te proberen.
TIJDSTIP
Ochtend
OMGEVING
Woonwijk
EXTRA
Podcast
SUGGESTIE
"Hier zijn andere vormen van afleiding tijdens de activiteit"
EXTRA
Luisterboek
EXTRA
Foto's maken
EXTRA
Bel een familielid.

Step 3: action planning

To effectively participate in physical activities, it can be advantageous to empower users to create a concrete plan. Intentions are more likely to be translated into behaviors when people anticipate detailed plans, imagine success scenarios, and develop preparatory strategies of tackling a challenging task (Schwarzer, 2016). Action planning, as outlined by Sniehotta et al. (2005), involves strategically aligning goal-driven actions with specific environmental cues, detailing the 'when,' 'where,' and 'how' of execution. An action plan (e.g. "I plan to cycle on Tuesday at 5 p.m. for an hour alongside the river without pausing") surpasses a basic behavioral intention ("I intend to cycle more often") by integrating specific situational cues and detailed actions (Schwarzer, 2016). People who form action plans are more likely to act in the intended way (Gollwitzer & Brandstatter, 1997), and they initiate the goal behaviour faster (Orbell & Sheeran, 2000) than those who do not form action plans. Action planning allows for clear definition of action modalities, easily facilitated by simple interventions. By linking instrumental acts to contextual cues, action planning serves as a catalyst for initiating desired behaviors.

The items in the list on the right side resulted from one-on-one conversations with patients (N=5). They were synthesized through the clustering of insights gathered from all participants.

"This step is the most important incentive, helping me to set agreements with myself."

The quote was taken from a patient conversation.

Structure

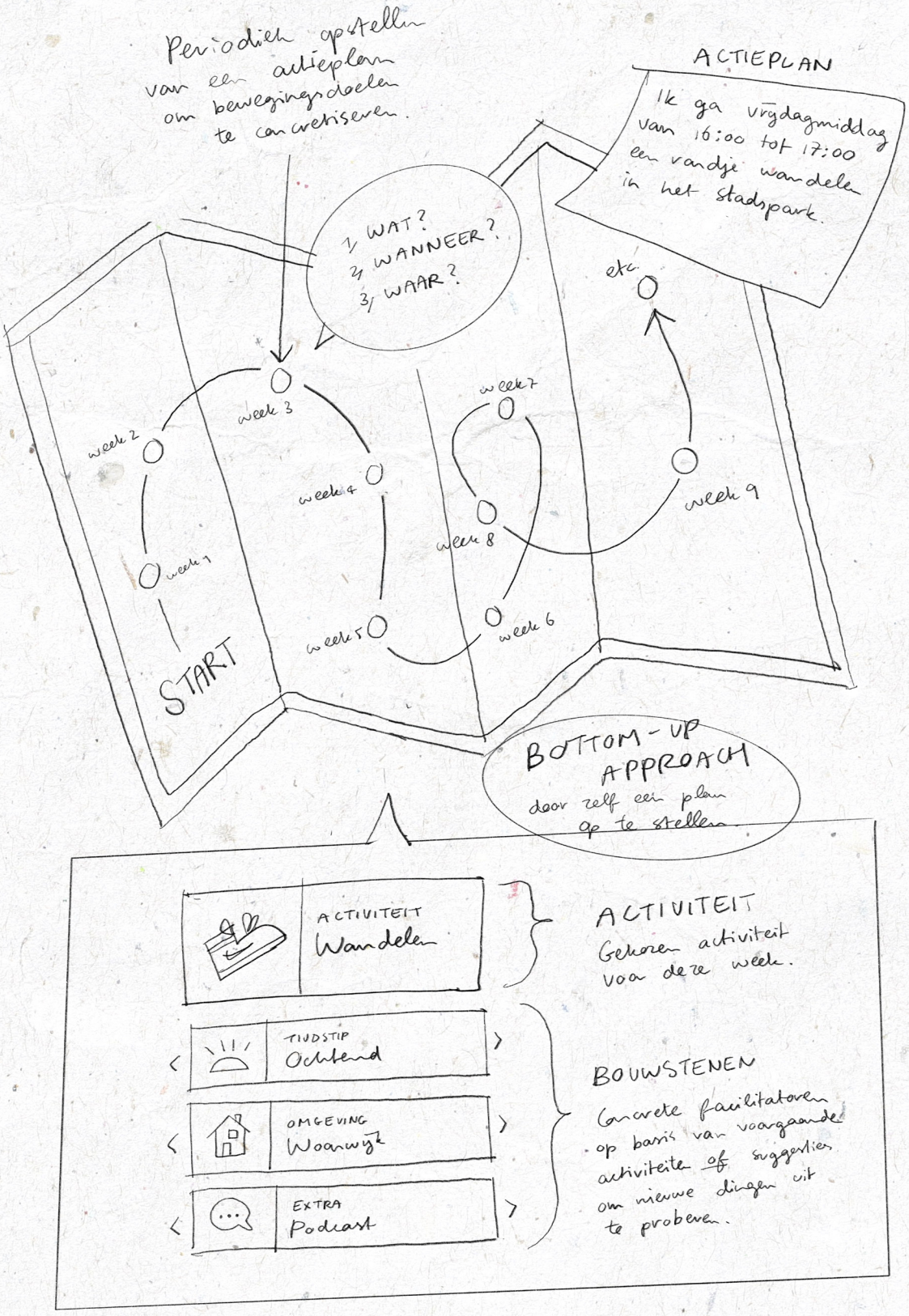
Post-operation, some cardiac patients might experience reduced focus for several months. Planning provides structure during this period. Reminders can assist patients to maintain focus and successfully follow through with their plans.

Time management

Planning in advance allocates dedicated time for exercise. Setting specific moments and locations secures time for activities, reducing the chance of missing them due to unexpected events (e.g. contiuing with work, a visit of a friend, etc.).

Simplicity

Simplifying action plan creation, leveraging past activities and identified facilitators, streamlines the process without requiring re-entry of all details. Documenting activity duration showcases the ease and practicality of exercising.


Periodiek opstellen van een actieplan om bewegingsdoelen te concretiseren.
ACTIEPLAN
Ik ga vrijdagmiddag van 16:00 tot 17:00 een rondje wandelen in het stadspark.
1/ WAT?
2/ WANNEER?
3/ WAAR?
START
week 1
week 2
week 3
week 4
week 5
week 6
week 7
week 8
week 9
etc
BOTTOM-UP APPROACH
door zelf een plan op te stellen
ACTIVITEIT
Wandelen
ACTIVITEIT
Gekozen activiteit voor deze week.
TIJDSTIP
Ochtend
OMGEVING
Woonwijk
EXTRA
Podcast
BOUWSTENEN
Concrete faciliatoren op basis van voorgaande activiteiten of suggesties om nieuwe dingen uit te proberen.

Step 4: reflecting

Reflection empowers patients to introspect on each activity undertaken, a vital step until behavior becomes habitual. This process enables individuals to evaluate their actions, ensuring they maintain course and exercise necessary self-regulation. Self-monitoring offers valuable feedback (e.g., 'I haven't exercised this week'), enabling comparison against established standards. Failure to remain aware or monitor progress may lead to self-regulation lapses (Baumeister et al., 1994). Through reflection, identifying elements that contributed to a positive experience enriches the rewards gained. Simultaneously, it acknowledges obstacles and challenges that hindered the activity's enjoyment, providing comprehensive insights.

The items in the list on the right side resulted from one-on-one conversations with patients (N=5). They were synthesized through the clustering of insights gathered from all participants.

"Remembering how I felt helps me start being active again."

The quote was taken from a patient conversation.

Flexibility

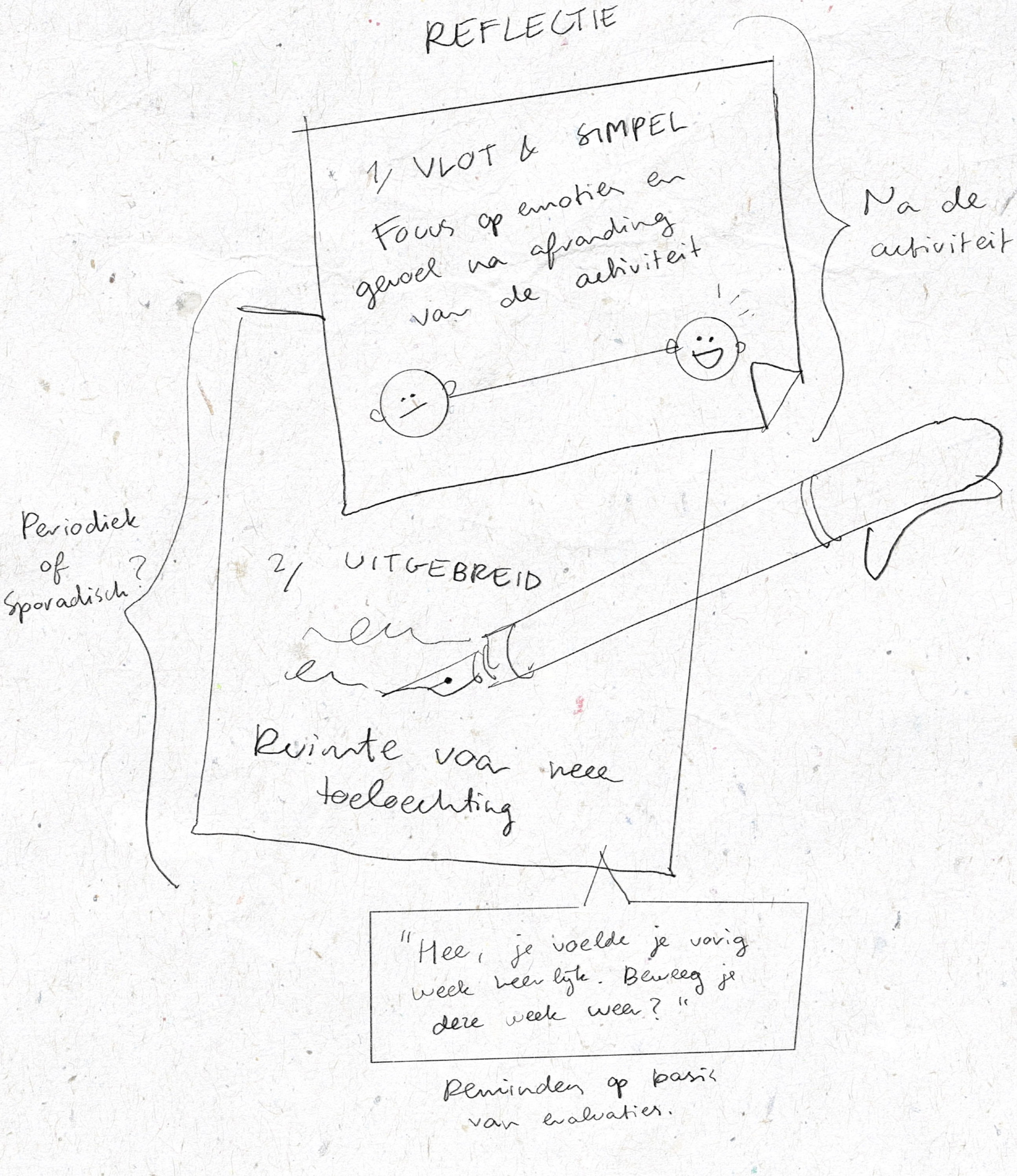
Reflections should cater to quick, concise moments post-activity (e.g. a lunch break stroll) enabling patients to easily express their feelings. For those seeking a deeper exploration, an option for more detailed and comprehensive evaluations is valuable.

Emotional Check-in

Evaluations should prioritize mood states as patients find it simple and rewarding to convey the fulfillment they experience after an activity. The crafting tool should offer a user-friendly method to express these post-activity feelings.

Encouraging momentum

Patients note that the feeling of afterglow drives motivation for future endeavors. Recalling past feelings of fulfillment through evaluations serves as a powerful tool to reignite enthusiasm for physical activities.


REFLECTIE
1/ VLOT & SIMPEL
Focus op emoties en gevoel na afronding van de activiteit
Na de activiteit
Periodiek of sporadisch?
2/ UITGEBREID
Ruimte voor meer toelichting
"Hee, je voelde je vorig week heerlijk. Beweeg je deze week weer?"
Reminders op basis van evaluaties.

4.2 Designing the crafting tool

Having collaboratively structurized a promising crafting interaction, it was now imperative to define the tangible form of this conceptual design. To accomplish this, the physical manifestation of the crafting tool was discussed during interviews and co-creation sessions with patients (N=8). These sessions resulted in the generation of two potential options:

- Option 1: A physical manifestation - e.g. a compact crafting booklet or similar format.
- Option 2: A digital application - e.g. a standalone crafting app or an additional crafting module within the existing Vital10 application.

Though most patients found it challenging to strongly prefer one option over the other, the eHealth-app format emerged as the most promising due to several compelling reasons. Firstly, patients value the support and positive encouragement an application can offer in their movement efforts (e.g. by reminding users and providing them with feedback). Secondly, personalized suggestions based on individual preferences were stated to be highly valuable. Lastly, the convenience of accessing diverse information in one place was appreciated. While a physical product emphasizes autonomy, a digital app can have a more personalized and supportive role. Engaging patients in the crafting process ensures that the app continues as a motivating force even after the completion of the CR program, compensating for the reduced presence of healthcare professionals.

Insights and feedback from the sessions were used to help transform the design direction and proposed crafting process into a clear concept.

User interface (UI)

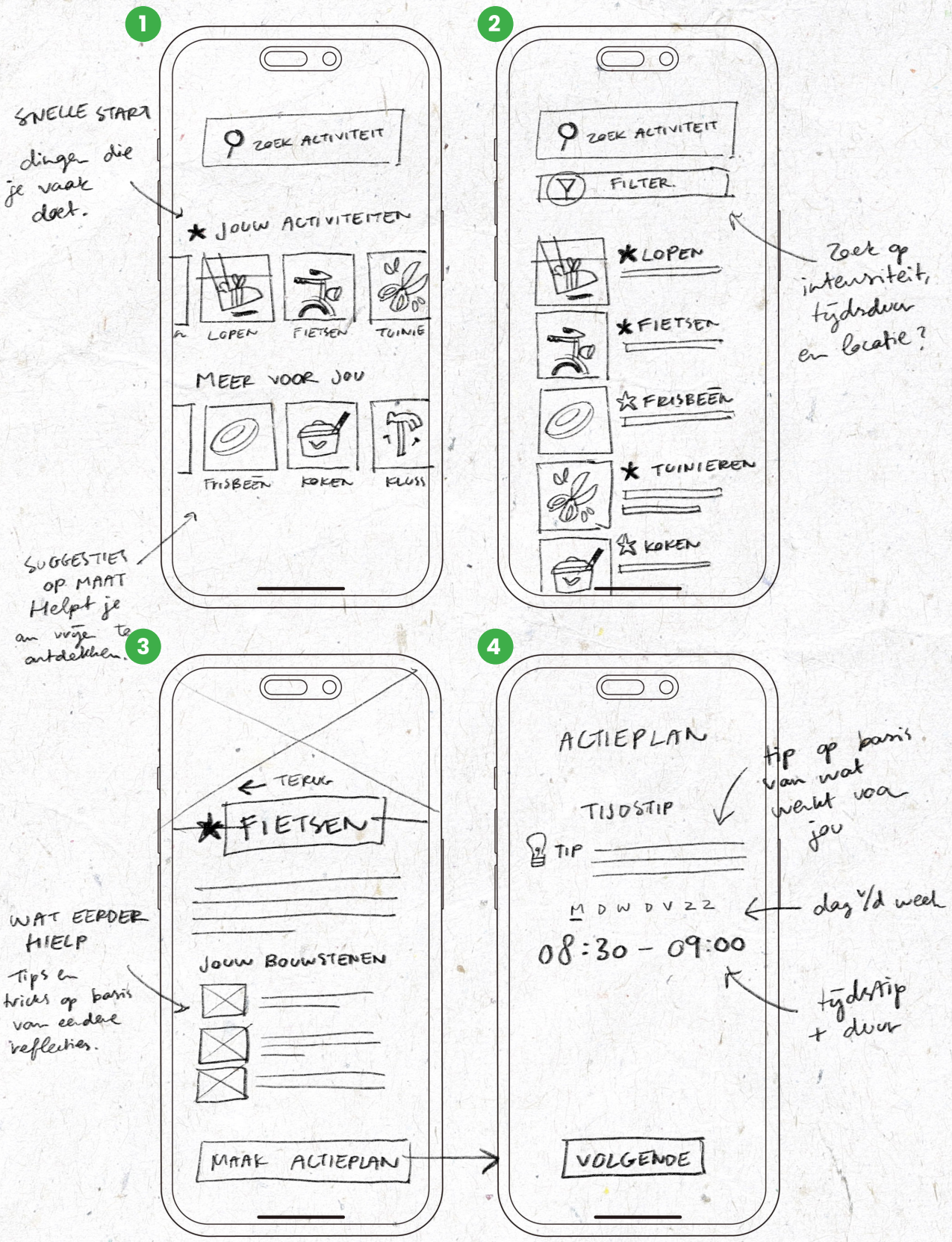
The defined crafting interaction was carefully translated into a set of rough wireframes to depict the lay-out and flow of the application. The following screens and flows were sketched out:

Home screen (1)

The home screen serves as the primary hub of the application, offering users a comprehensive glimpse into its array of functionalities. Designed with an emphasis on exploration, the interface welcomes users with intuitive navigation and prominently displays a diverse selection of potential activities. Seamlessly integrated personalized suggestions encourage users to delve into new experiences, igniting their curiosity and motivation. With just a tap, users can explore further details about each activity on dedicated activity screens.

Activity screen (3)

Within the application, the activity screen serves as an indispensable tool for users to gain deeper insights into their physical endeavors. They provide users with a comprehensive overview of their personal history with each activity, enabling them to identify trends and patterns in their behavior, and foster a deeper sense of self-awareness. Through the analysis of past performances and outcomes, users can identify what works best for them and tailor their activities to suit their preferences and needs. Whether it is adjusting the intensity of a workout or visiting new locations, users are empowered to make proactive crafting efforts that enhance their overall experience.


1
SNELLE START
dingen die je vaak doet.
ZOEK ACTIVITEIT
JOUW ACTIVITEITEN
LOPEN
FIETSEN
TUINIE
MEER VOOR JOU
FRISBEEN
KOKEN
KLUSS
SUGGESTIES OP MAAT Helpt je om vrije te ontdekken.
2
ZOEK ACTIVITEIT
FILTER
LOPEN
FIETSEN
FRISBEEN
TUINIEREN
KOKEN
Zoek op intensiteit, tijdsduur en locatie?
3
TERUG
FIETSEN
JOUW BOUWSTENEN
MAAK ACTIEPLAN
WAT EERDER HIELP
Tips en tricks op basis van eerdere reflecties.
4
ACTIEPLAN
TIJDSTIP
TIP
Tip op basis van wat werkt voor jou
M D W D V Z Z
dag v/d week
08:30 - 09:00
tijdstip + duur
VOLGENDE

Integral to this process are the practical tips offered on the activity screen. Leveraging user data and preferences, these personalized recommendations serve as invaluable guidance, enriching the enjoyment and efficacy of each activity.

Action planning flow (3-6)

the action planning flow serves as a pivotal component in fostering users' commitment to engaging in physical activities. It acts as a bridge between motivation and action, transforming abstract intentions into concrete plans. Users are seamlessly guided through each step of the planning process, ensuring a smooth and intuitive experience from start to finish. The journey begins with users selecting an activity that piques their interest, setting the stage for personalized engagement. From there, they are prompted to specify the date and location for their planned activity, adding a layer of practicality to their aspirations. This step not only adds structure to their plans but also instills a sense of accountability, as users take ownership of their commitments.

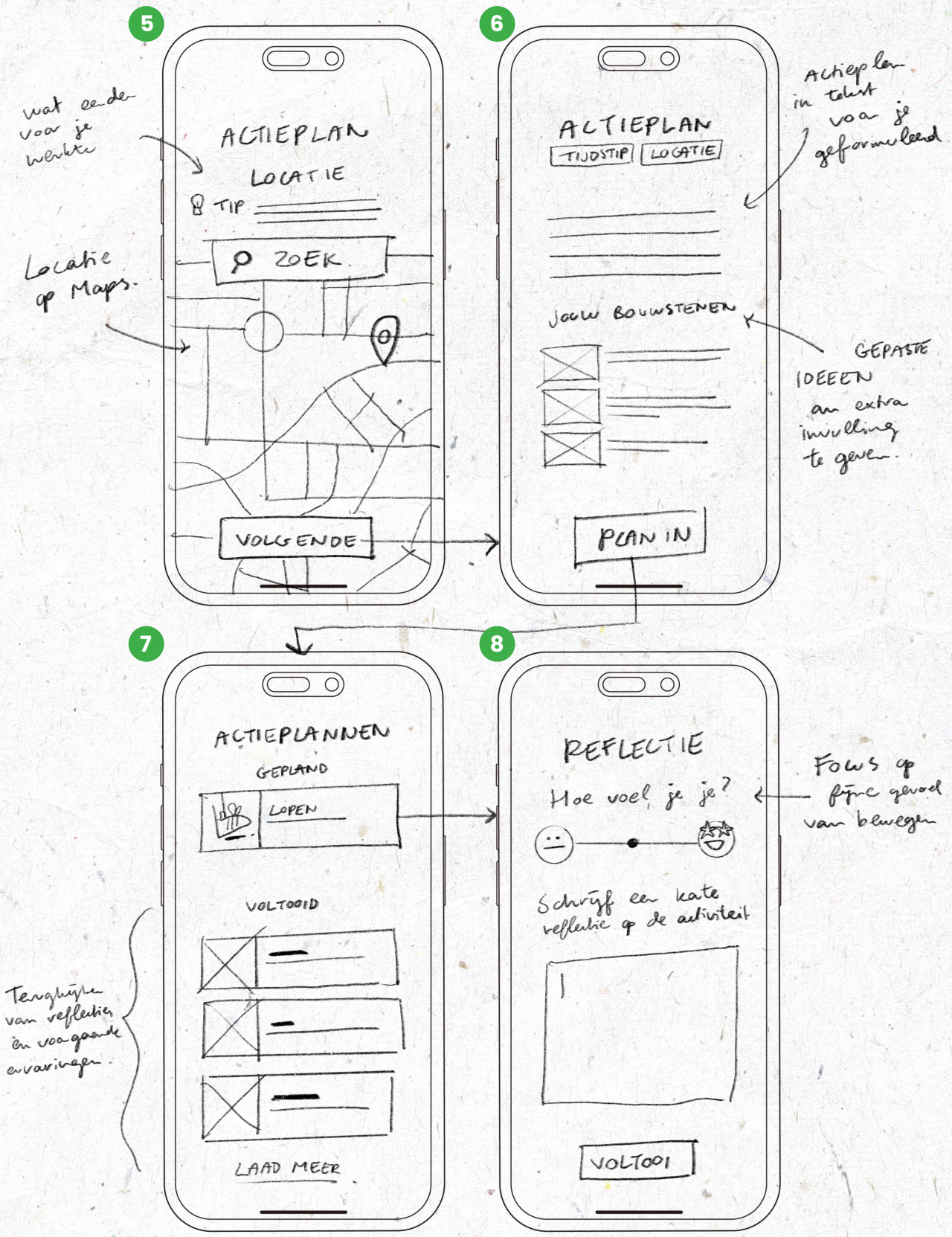
Throughout the planning flow, users are offered tailored tips and suggestions based on their personal preferences and goals. These prompts serve to enhance the relevance and effectiveness of their plans, empowering users to make informed decisions that align with their individual needs.

Upon completing the action planning flow, users are presented with a clear and concise overview of their action plan. This summary encapsulates the key details of their commitments, reinforcing the achievability of their goals. By distilling complex information into a simple and accessible format, users are empowered to visualize their path forward with clarity and determination.

Reflection screen (8)

Regular prompts for reflection are strategically integrated into the user experience, creating invaluable moments for heightened self-awareness. By prompting users to pause and contemplate their completed activities, the application fosters a sense of mindfulness, enabling users to fully appreciate the positive afterglow that accompanies their endeavors. This deliberate act of recognition lays the groundwork for a positive feedback loop, wherein each reflection serves to reinforce the user's commitment to their cardiac rehabilitation journey.

Through reflection, users gain a deeper understanding of their progress and achievements, empowering them to make informed crafting efforts moving forward. By examining the challenges they've overcome and the milestones they've reached, users are equipped with invaluable insights that inform their future actions. This process not only facilitates continuous improvement but also cultivates a sense of resilience, bolstering their confidence in their ability to overcome obstacles and achieve their goals.


5
ACTIEPLAN
LOCATIE
TIP
ZOEK
VOLGENDE
wat ee de voor je werkte
Locatie op Maps.
6
ACTIEPLAN
TIJDSTIP
LOCATIE
JOUW BOUWSTENEN
PLAN IN
Actieplan in tekst voor je geformuleerd
GEPASTE IDEEEN om extra invulling te geven.
7
ACTIEPLANNEN
GEPLAND
LOPEN
VOLTOOID
LAAD MEER
Terugblikken van reflecties en voorgaande ervaringen.
8
REFLECTIE
Hoe voel je je?
Schrijf een korte reflectie op de activiteit
VOLTOOI
Focus op fijne gevoel van bewegen

Look & feel

Utilizing the digital design tool Figma, the sketched wireframes were iteratively converted into more refined and definitive screens. The visual design was tailored to harmonize with the app's functionality, ensuring a cohesive and intuitive user experience. Delving into color schemes, typography, and visual elements, every aspect was curated to resonate with the essence of the application and cater to the nuances of the target audience.

Color palette

The color palette within the application serves as a dynamic visual narrative of the user's transformative cardiac rehabilitation journey. Initially, subdued purple tones with a touch of gray symbolize the starting point. As the user progresses, tips and suggestions are highlighted with saturated purple. This vibrant color adds a sense of dynamism and energy to the interface, signaling the user's advancement and growth within the application. Past activities and feedback are presented using vibrant green tones, reflecting growth and positive changes in health behavior. They serve as a visual representation of the user's evolving journey towards a healthier lifestyle.

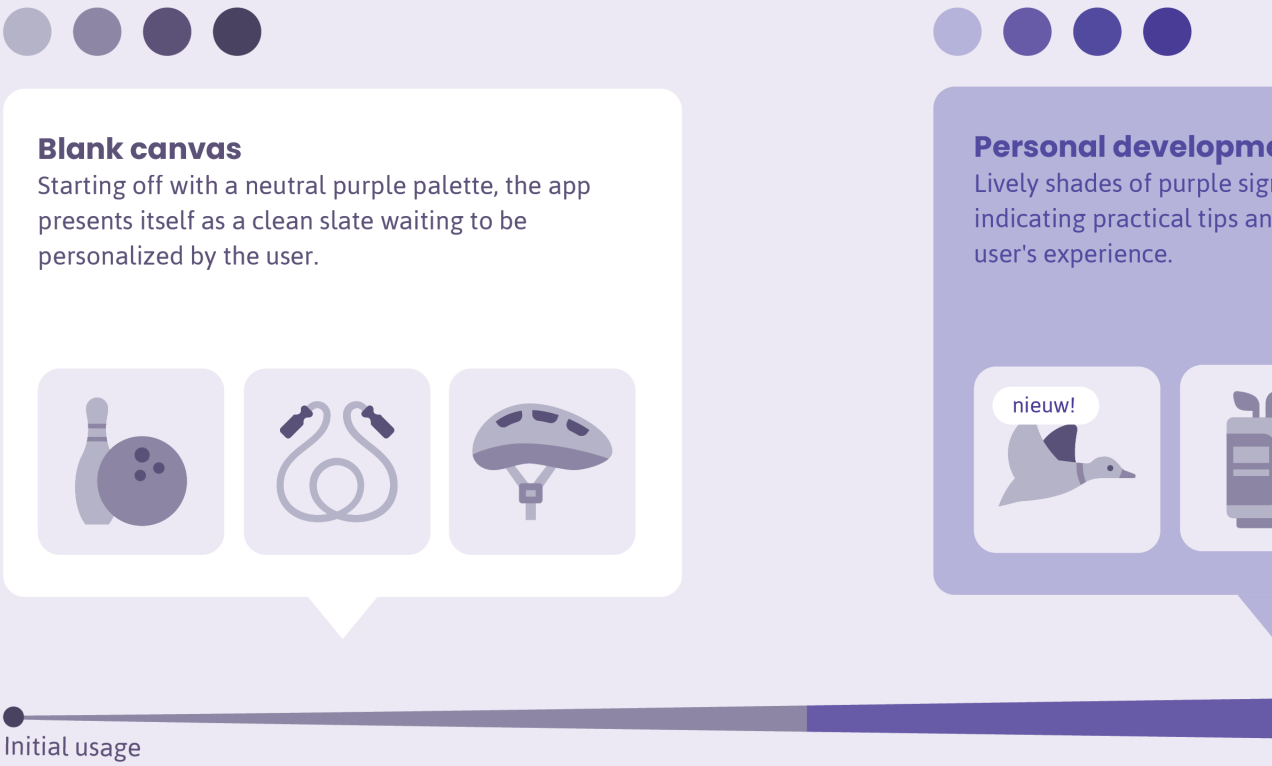
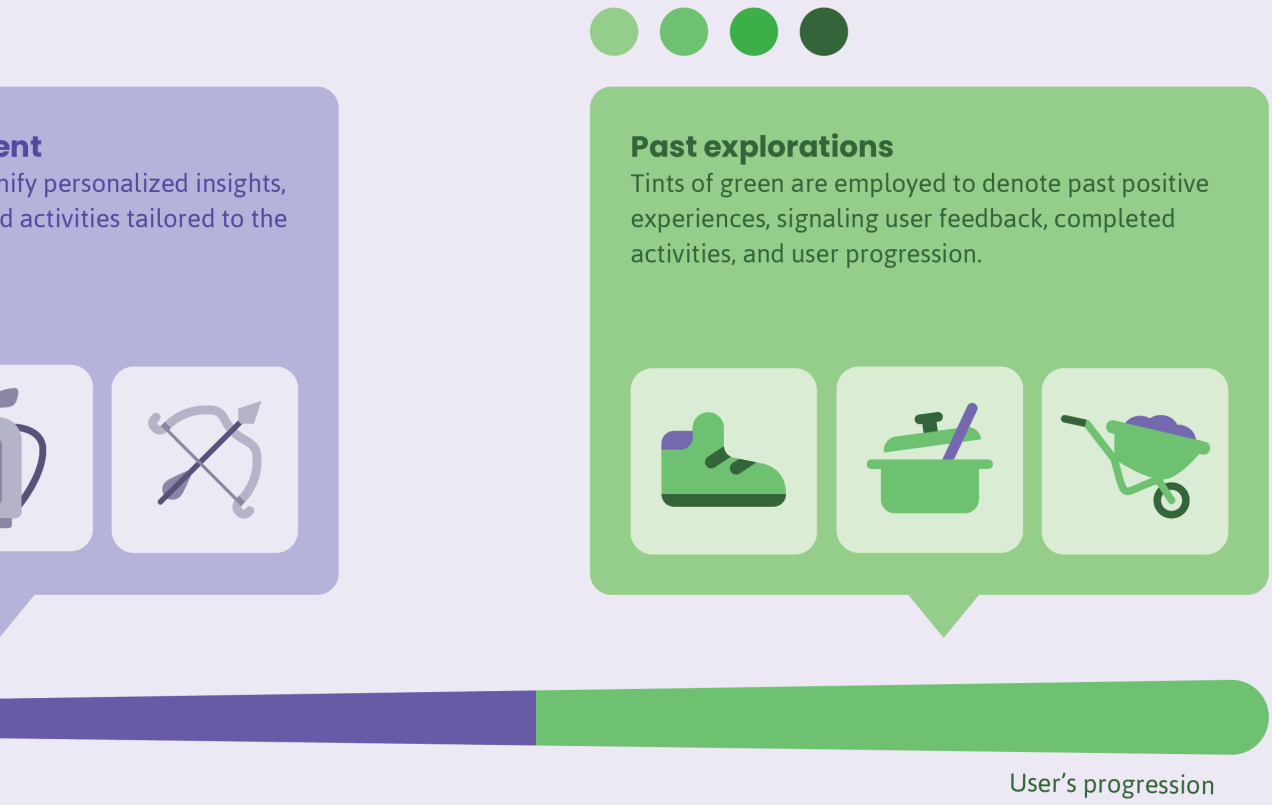


Illustration style

In terms of illustrations, a minimalistic approach was chosen. The simplicity of the illustrations ensures that the visuals are easily digestible and accessible to the target audience. These illustrations not only serve an aesthetic purpose but also play a crucial role in conveying the project's message in a visually engaging manner. Opting for illustrations over photographs allows space for imagination to flourish, fostering a sense of wonder and curiosity when exploring new activities. Moreover, the illustrations could be translated into minimalistic animations, creating an even more immersive and interactive experience.

Writing style

The application's tone of voice plays a crucial role in connecting with users. It aims to evoke feelings of stimulation and support without being perceived as demanding or forceful. The tone is designed to be spontaneous, original, and infused with humor, contributing to an engaging and approachable atmosphere that enhances the overall crafting experience.



4.3 Prototype testing

A patient's perspective

Building upon the discussed sketches and design directions, a prototype was meticulously crafted using Figma to provide patients with a tangible representation of the crafting tool. To enhance the authenticity of the prototype, the app's content, including past reflections and completed action plans, was populated to simulate the experience of a fictional user. The integration of tips and suggestions throughout the app was achieved with the usage of ChatGPT, a powerful Large Language Model (LLM) akin to the one that might be of use for the actual application.

In order to delve into the practical usage of the application, one-hour one-on-one conversations were conducted with patients (N=5) who had completed the CR program at least three months prior to the initiation of this project. These in-depth discussions served as a means to gather valuable insights into the nuances of user interaction, with participants thinking aloud to articulate their experiences. The focus was on refining the application's engagement levels and ensuring an intuitive user experience. Additionally, the various facets and screens of the application were thoroughly explored, allowing for the collection of diverse inputs and suggestions.

This chapter serves as a comprehensive presentation of the participants' feedback, organized according to the distinct screens of the application: the home screen, the activity screen, the action planning flow, and the reflection screen.

Based on the conversations, participants could be assigned to the different patient types as follows:

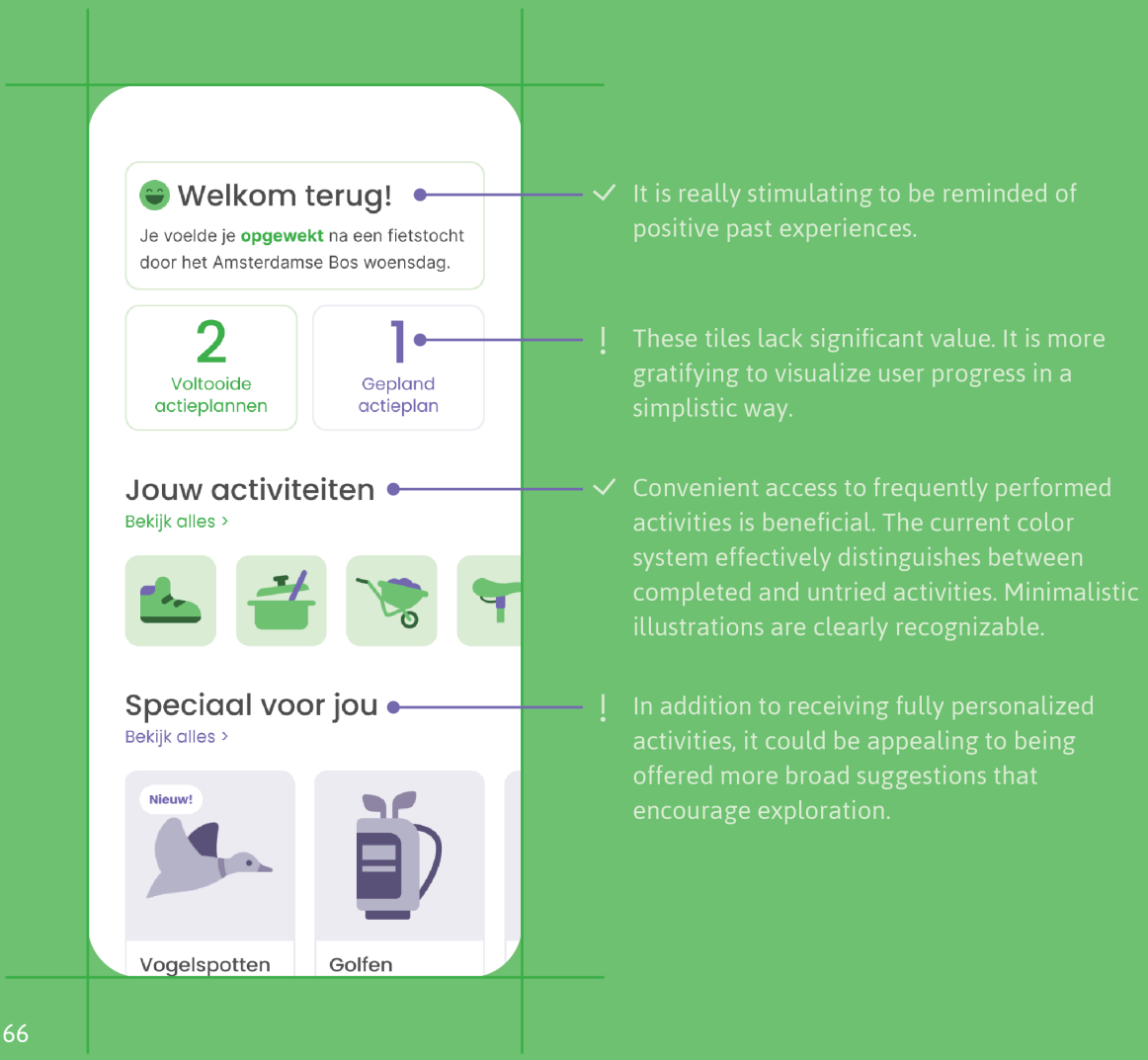
- Participant 2.1: Female (67) - Patient type B
- Participant 2.2: Female (56) - Patient type B
- Participant 1.1: Male (57) - Patient type B
- Participant 3.1: Female (63) - Patient type B
- Participant 3.2: Male (61) - Patient type B


9:41
Welkom terug!
Je voelde je opgewekt na een fietstocht door het Amsterdamse Bos woensdag.
2
Voltooide actieplannen
1
Gepland actieplan
Jouw activiteiten
Bekijk alles >
Speciaal voor jou
Bekijk alles >
Nieuw!
Vogelspotten
Golfen

Home screen

Upon opening the app, users are welcomed by a gentle reminder of their previous emotional states, setting a positive tone for reconnection. Within the app, users find intuitive tools to effortlessly monitor their progress, both in terms of completed tasks and upcoming plans, empowering them to glean valuable insights from their journey by delving into these details. The home screen serves as a focal point, presenting users with a diverse array of activities to explore, ranging from their personally selected favorites to tailor-made suggestions meticulously crafted based on individual preferences and past reflections. This curated selection not only facilitates immediate engagement but also nurtures a sense of personalization, ensuring that each user's experience is uniquely tailored to their needs and desires.

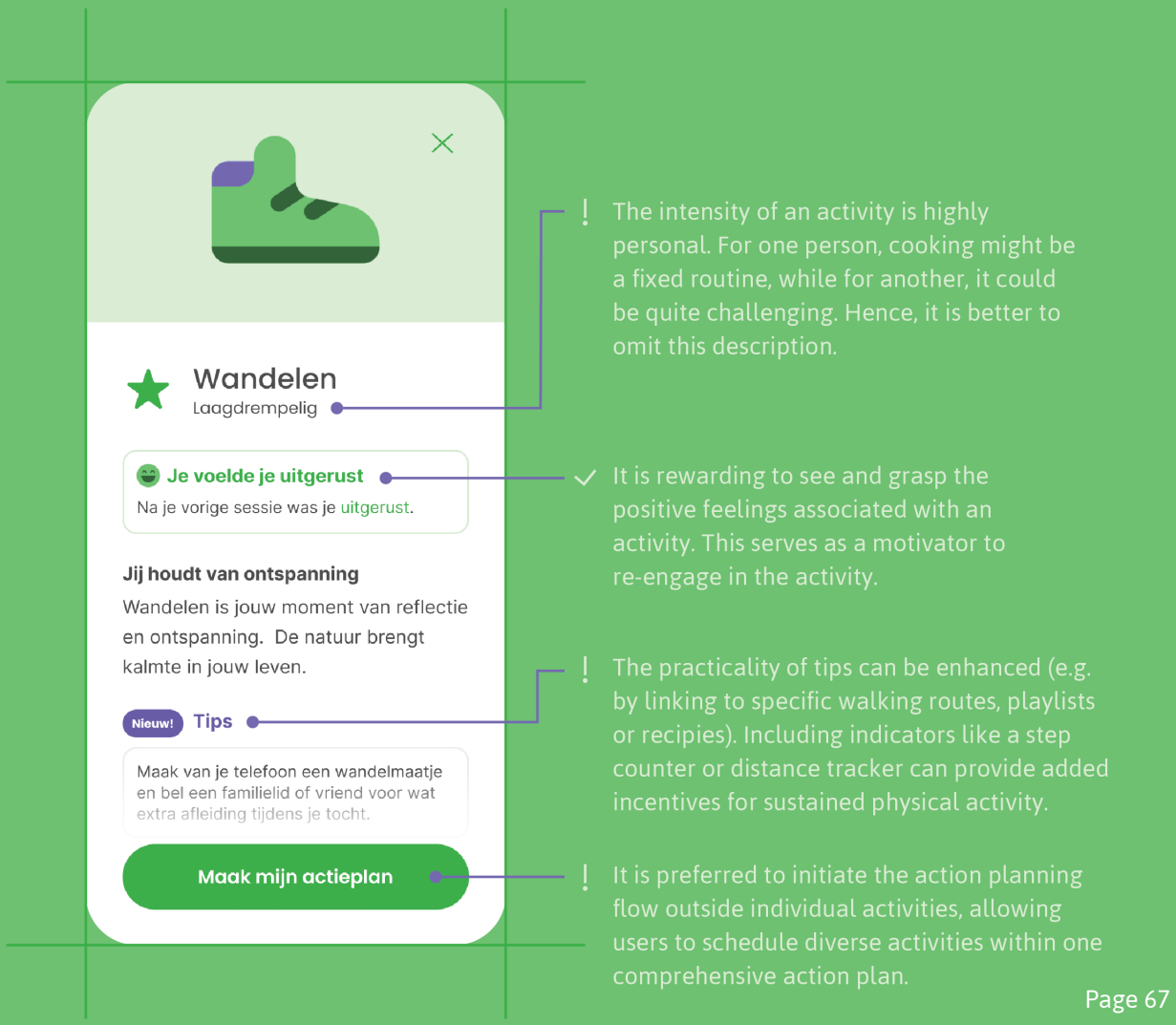
The notes in the image are based on insights gathered during one-on-one conversations with patients (N=5) and a lifestyle coach (N=1).



Activity screen

Delving deeper into specific activities, the activity screen serves as a gentle reminder to users of the mood state they experienced during their last session, enriching their engagement with the app. A concise explanation is provided, detailing why the selected activity is tailored to the user based on their reflections, while practical tips below offer suggestions to enhance the alignment between the individual and the activity for future sessions, encouraging users to explore further. These tips seamlessly integrate with the insights provided, such as recommending outdoor exploration for nature enthusiasts. Finally, users are prompted at the bottom of the page to swiftly create an action plan for their chosen activity, facilitating a seamless transition from insights to actionable plans.

The notes in the image are based on insights gathered during one-on-one conversations with patients (N=5) and a lifestyle coach (N=1).

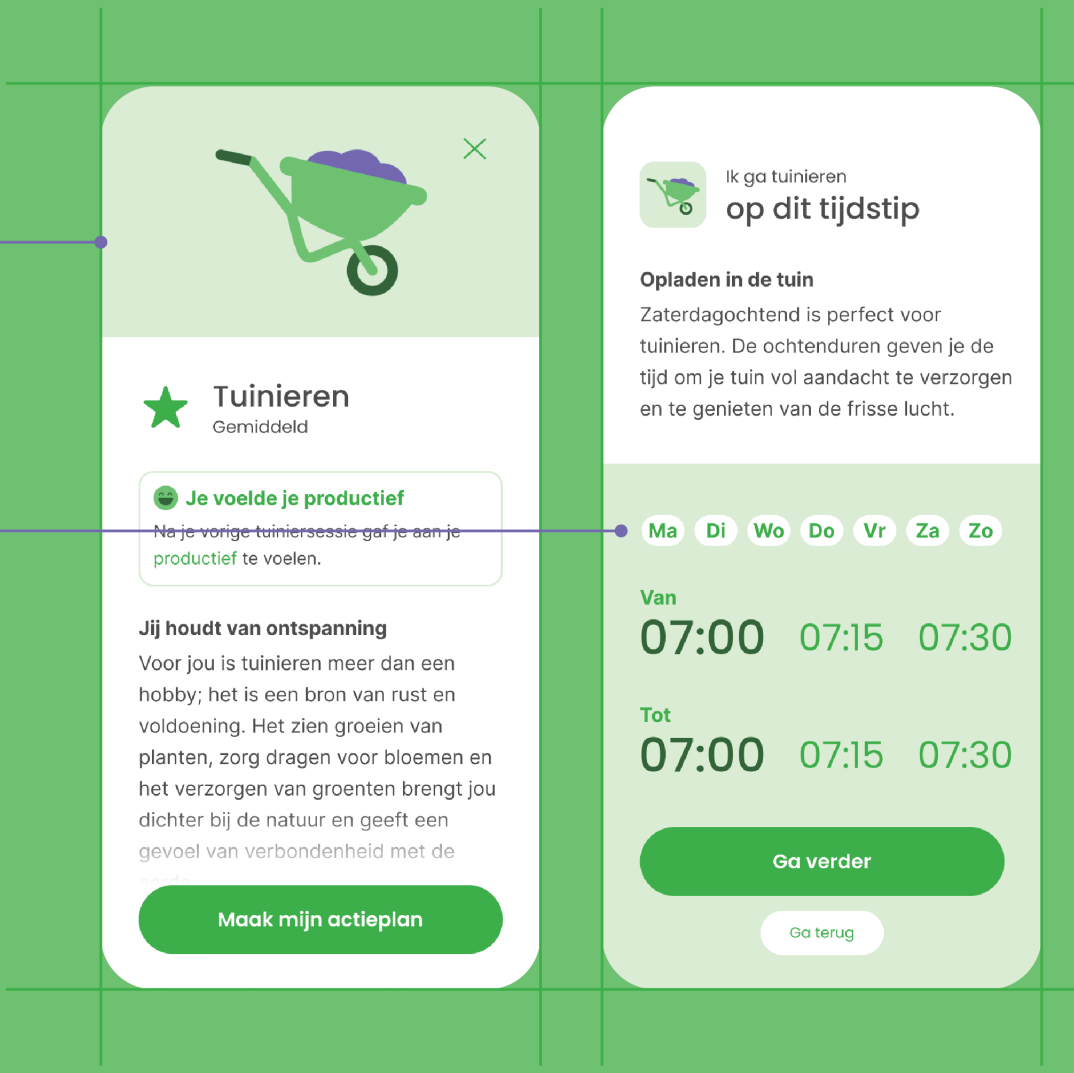


Action planning flow

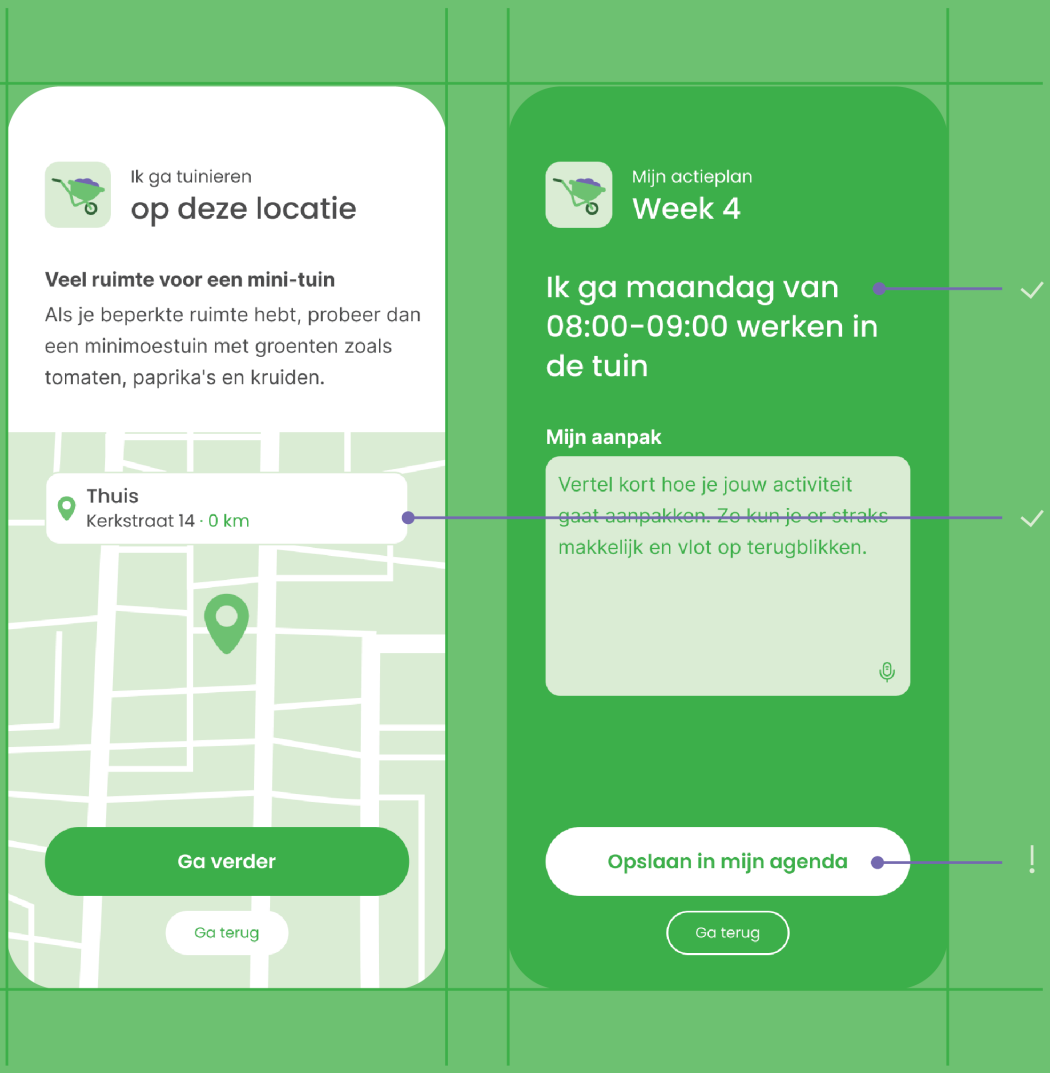
Within the action planning flow, users are gently led through a streamlined process designed to solidify their intentions to engage in an activity, making the endeavor more tangible and approachable. To commence, users are prompted to designate a specific day and time for their action plan, supplemented by a personalized tip tailored to their preferences and habits. Continuing on, users are prompted to select a location, with options catered to both outdoor adventures and location-based activities. To enhance accessibility, nearby venue suggestions are provided, ensuring users have ample choices that align with their preferences. Once again, a personalized tip is thoughtfully offered at the top of the page to further support and inspire users. Finally, as users reach the closing screen, they are presented with an overview of their crafted plan. This concise formulation promotes commitment while allowing users the flexibility to add explanations, encouraging deliberate contemplation of their approach. Whether it involves socializing, incorporating music, or following the provided tips, this thoughtful process facilitates adherence and sets the stage for meaningful post-activity reflection.

! Streamlining action plans for multiple activities in a day would be more efficient. Hence, initiating the action planning flow prior to selecting an activity proves practical.

! Setting a specific time is not desirable. Instead, only selecting the day and determining the duration of the activity would allow for a greater sense of freedom.



The notes in the image are based on insights gathered during one-on-one conversations with patients (N=5) and a lifestyle coach (N=1).



✓ This brief overview helps to stick to the intended action plan.

✓ Selecting nearby locations helps to speed up the process. For outdoor activities, it would be a nice feature to select a route.

! Saving the action plan in the user's agenda is not essential. It could be included as an option.

Reflecting screen

On the reflection screen, users are guided to select a mood state that best reflects their current feelings. Notably, sad emoticons are intentionally omitted to foster a positive user experience. Furthermore, users are encouraged to provide substantive input through either text input or verbal expression, enriching the application's adaptive capabilities. This input aids in generating nuanced insights and crafting tailored recommendations for new action plans. Emphasis is placed on regular and thoughtful reflections to gather valuable data, laying the groundwork for the application to comprehend users' evolving preferences, challenges, and successes over time. This intuitive approach allows for swift expression of immediate feelings while also providing the option for more detailed reflections when time allows. Such reflections not only facilitate prompt acknowledgment of the experienced afterglow but also promote deeper self-awareness and engagement with the application's functionalities.

The notes in the image are based on insights gathered during one-on-one conversations with patients (N=5) and a lifestyle coach (N=1).

! Immediate reflection post-activity is valuable. Beyond indicating satisfaction, incorporating intensity levels can be insightful. This facilitates connecting challenging, intense activities with the positive feelings that follow.

✓ Ranging emotion choices from neutral to utmost pride helps to promote positive feedback while still accommodating activities that may not meet expectations.

! It may be beneficial to stress the pivotal nature of reflecting and explore the possibility of associating a reward with it, amplifying its contribution to the overall success of the crafting process.

Section 5

DELIVERING THE SOLUTION

5.1 The crafting foundation

Desirability of the design

Drawing upon extensive literature reviews, insightful patient conversations, and interviews with experts in the field, a crafting tool was meticulously developed. This tool was designed to allow cardiac patients to foster a deeper understanding of their capabilities and preferences in regards to physical activities, allowing them to smoothly transition from supervised rehabilitation to sustaining physical activity at home. This chapter reconnects the crafting tool with its theoretical embedding and patient and expert insights, evaluating its desirability.

Patient-focused fit

The app emerges as a vital lifeline for Type B patients, offering steadfast support as they navigate life post-cardiac rehabilitation. While recognizing the importance of physical activity, Type B patients acknowledge that it has yet to become a habitual practice or significantly captured their interest. By encouraging users to explore new activities, set achievable action plans, and reflect on their progress, the app aims to cultivate a sense of fulfillment and accomplishment. With its personalized approach, the app tailors every interaction to meet the individual needs and preferences of users, empowering them to take charge of their health journey confidently. Patient Type B finds reassurance in CardioVitaal's adaptability to their evolving needs and preferences, ensuring that their health journey remains dynamic and engaging. Its intuitive design and ease of use seamlessly integrate healthier habits into daily life, ensuring consistent engagement and long-term adherence. From adjusting to new lifestyles to creating personalized routines, the app acts as a supportive companion every step of the way, fostering a deeper connection between patients and their well-being goals.

Company-focused fit

For CardioVitaal, extending support beyond the CR program allows the company to position itself as a beacon of continuity in patients' health journeys. As CardioVitaal seamlessly integrates the crafting process within the existing Vital10 application, the company maximizes the utility of its current technology infrastructure. By leveraging user feedback and data insights, CardioVitaal will be able to continually refine its offerings, ensuring that they remain relevant and impactful in addressing the evolving needs of patients. By leveraging the strengths of Vital10 and enhancing its own capabilities, the company ensures a more effective and impactful rehabilitation journey. This customer-centric approach not only enhances the user experience but also strengthens CardioVitaal's position as a trusted organisation in promoting cardiac health and well-being.

Crafting theory

Crafting theory emerged as a promising solution framework within the scope of this project. It suggests that individuals can adjust facilitators and barriers to better align themselves with health-related activities. By recognizing their personal needs and modifying facilitators and barriers, individuals can enhance the experience. The theoretical framework comprises four distinct phases, and the app aims to guide users through each of these phases.

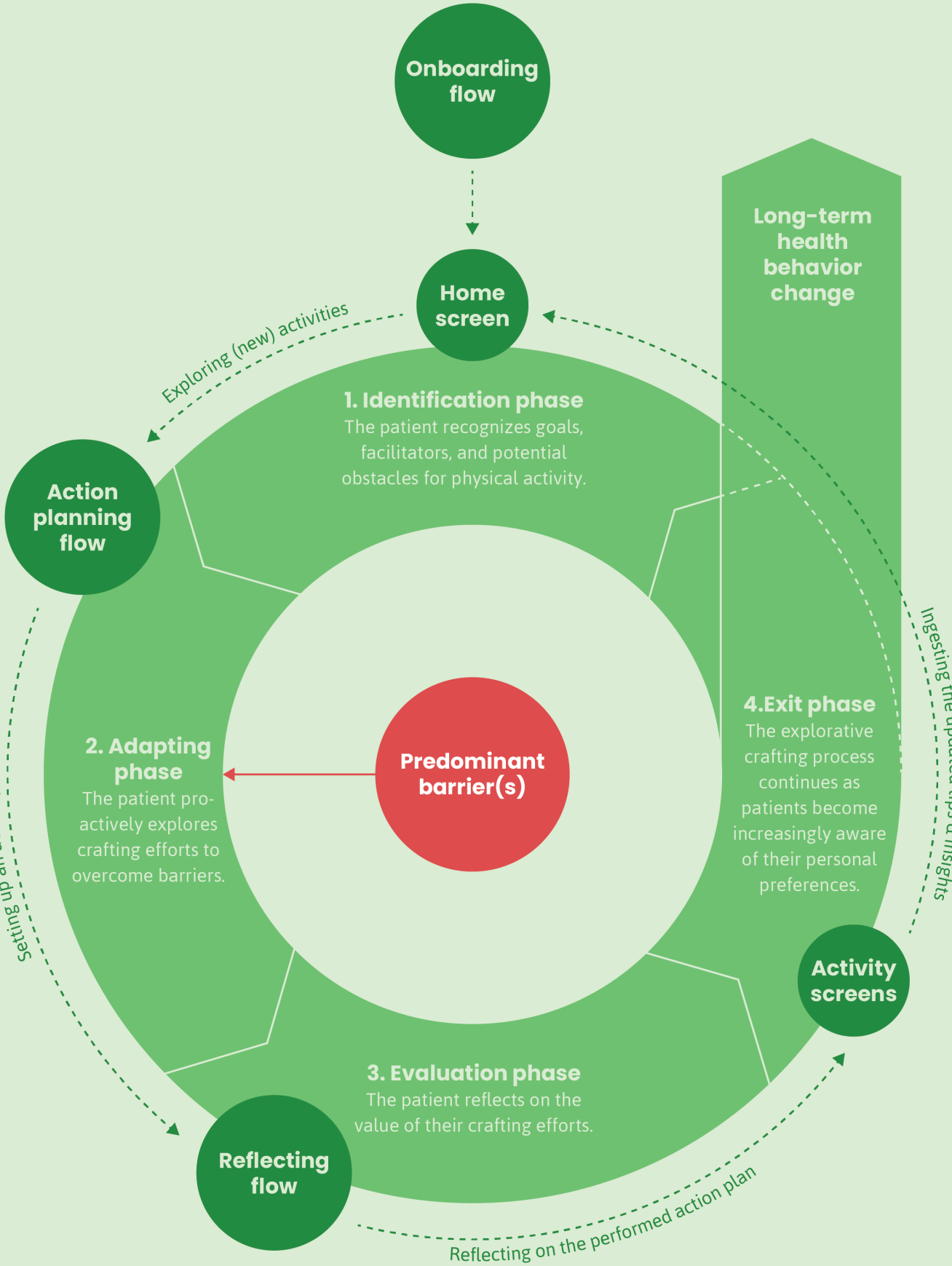
1. Identification phase: The crafting process commences with identifying discrepancies in needs. Through an onboarding flow that queries users' interests and preferences, the app helps users become aware of their personal facilitators. The home screen sets the stage for the users' preferred and suggested activities.
2. Adapting phase: This phase focuses on proactively establishing crafting efforts. The action planning flow offers structure and clarity for users. While users receive suggestions and recommendations, they maintain autonomy over their crafting journey, deciding which activities to pursue, how frequently, and the specific manner in which they engage in them. This bottom-up approach emphasizes the user's control over their personal efforts, fostering a more empowering experience.
3. Evaluation phase: Here, users reflect on past crafting efforts. The reflection flow facilitates user-friendly and straightforward feedback, as well as more in-depth reflection. As users ponder past sessions, the app assists in digesting the feedback information and translating it into clear insights and valuable suggestions.
4. Exit phase: This phase embodies the iterative nature of crafting theory until patients have established a routine they are comfortable with. Both the home screen and activity screens reflect users' progress, providing an overview of past mood states, personal preferences, and concrete tips for new crafting efforts.

The crafting process recognizes efforts at three distinct levels: environmental, activity, and self. Without explicitly mentioning these, practical tips and suggestions within the app subtly address environmental and activity levels. The self level was omitted in the application. Adding the self level could over-complexify the app, while in the mean time there are plenty of existing apps that focus on mental well-being. Besides, by already addressing environmental and activity factors, the self level is likely to be partially positively influenced.

The supportive tips and suggestions prioritize exploring new facilitators rather than dwelling on barriers. Both patients and health professionals have mentioned numerous obstacles that arise when attempting to engage in physical activities. Hence, it is important to recognize the accessibility of movement and focus on providing enlighting suggestions.

By embracing this holistic approach, the crafting tool empowers cardiac patients to take ownership of their health journey, fostering a deeper connection with their capabilities and preferences. Through personalized crafting efforts, patients can seamlessly transition from supervised rehabilitation to sustaining physical activity at home, enhancing their well-being and overall quality of life.

The diagram depicts the iterative process of health crafting (see page 31). It was based on literature studies (De Bloom et al., 2020) (Liu, 2023) and an expert interview with W. Liu; the author of the health crafting theory framework.


Onboarding flow
Home screen
Long-term health behavior change
Exploring (new) activities
1. Identification phase
The patient recognizes goals, facilitators, and potential obstacles for physical activity.
Action planning flow
Predominant barrier(s)
2. Adapting phase
The patient pro-actively explores crafting efforts to overcome barriers.
4.Exit phase
The explorative crafting process continues as patients become increasingly aware of their personal preferences.
Ingesting the updated tips & insights
Activity screens
Setting up an action plan
3. Evaluation phase
The patient reflects on the value of their crafting efforts.
Reflecting flow
Reflecting on the performed action plan

Design guidelines

Derived from the initial literature reviews and patient and expert interviews, a set of four guiding principles for the design was formulated. These principles aid in comprehending the envisioned interaction.

1.

Supportive

The primary objective of the app is to assist users in establishing and maintaining a consistent routine while providing ongoing support throughout their personal journeys. By leveraging its interactive features, the application aims to create a dynamic and empowering experience for users. Through personalized guidance and support, it seeks to address individual needs and preferences, fostering a sense of ownership and accountability in users' health and wellness endeavors. The structured approach, integrating both action planning and reflection flows, establishes a clear and user-friendly pathway. Through data-driven insights and feedback mechanisms, users can gain valuable insights into their habits and behaviors, empowering them to make informed decisions and adjustments to their routines. Ultimately, the app strives to be more than just a tool for managing health and wellness - it aims to be a trusted companion and ally in users' journeys towards betterment, offering unwavering support and encouragement every step of the way. Thoughtfully crafted tips and recommendations, conveyed in a friendly tone, create a sense of companionship. In addition, utilization of reminders can help to actively engage users, prompting consistent interaction with the app and reinforcing their commitment to self-improvement.

2.

Positive

Recognizing that users may face diverse challenges, it is crucial to foster an optimistic mindset by offering practical solutions and reachable objectives. The app, through personalized action plans, not only showcases the feasibility of embracing physical activities but also empowers users to actively shape their health behaviors. Tips and recommendations are centered around enhancing the enjoyment of exercise, highlighting fresh opportunities and unlocking untapped potential.

However, in the pursuit of progress, it's equally crucial to embrace transparency and recognize that setbacks are a natural aspect of advancement. The app should not conceal setbacks but rather acknowledge them, making patients aware that they're part of the journey. This approach enables patients to learn from setbacks, adapt their approach accordingly, and not be too discouraged by barriers.

3.

Explorative

The app acts as a catalyst, igniting users' curiosity and prompting them to explore their personal interests deeply. It fosters a culture of active exploration and discovery by offering intuitive features and personalized recommendations. The app's homescreen dynamically recommends new activities to explore, while also suggesting areas outside users' comfort zones, encouraging them to embrace new experiences. Through this, users embark on a journey of self-discovery, uncovering new passions and facilitators. Utilizing user feedback as its compass, the app tailors suggestions and recommendations to each individual's unique preferences and aspirations, providing valuable insights. Whether through curated recommendations or targeted tips, the app inspires curiosity and fuels a sense of adventure. By presenting opportunities for exploration and growth, it creates a supportive environment where users are encouraged to push boundaries and expand their horizons.

4.

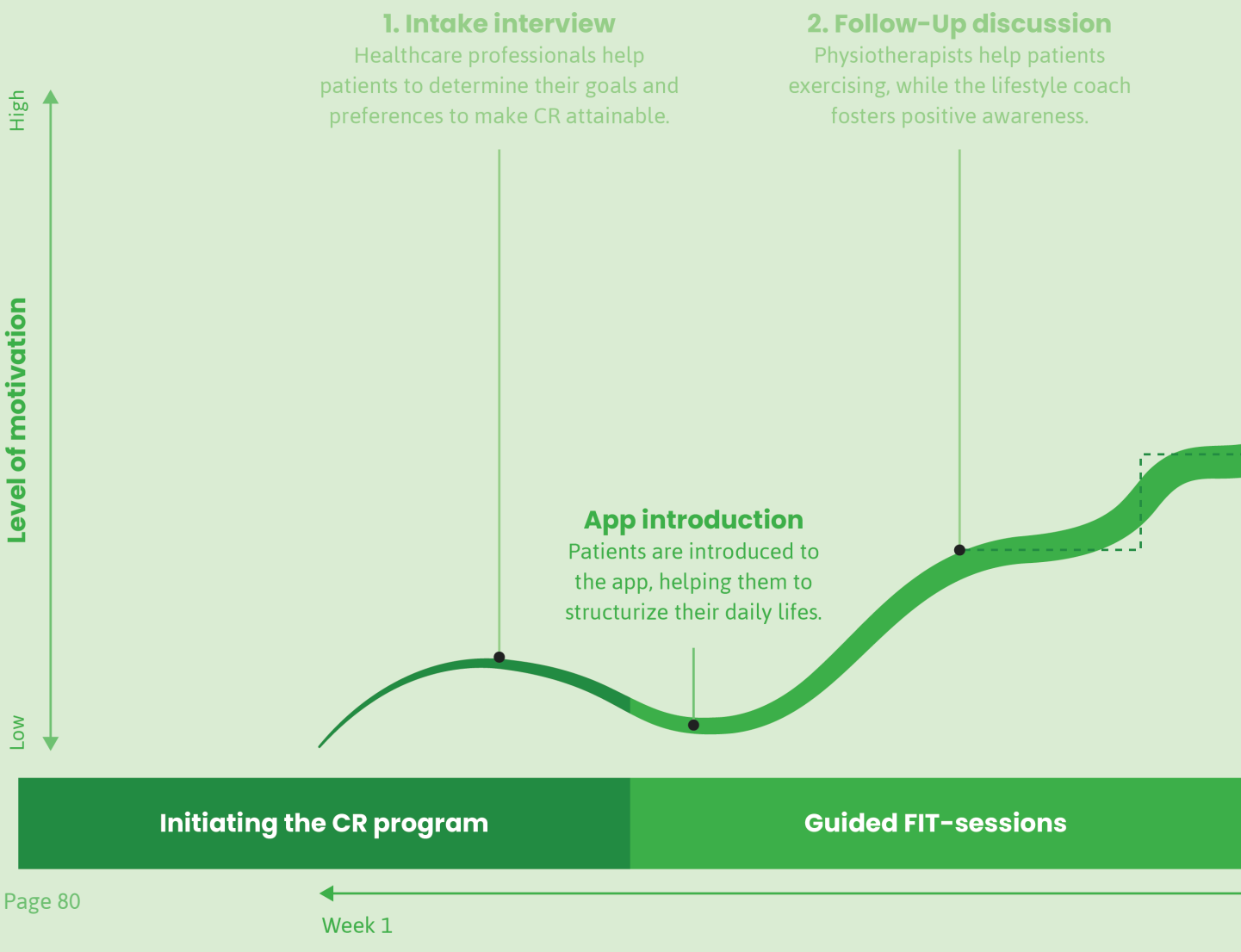
Introspective

The app encourages users to reevaluate their personal preferences and cultivate mindfulness in their physical activities. Through prompting users to reflect on their past activities by means of both simple and more extended reflection flows, the app fosters introspection. Users are consistently reminded of past experiences and the positive feelings associated with them throughout various sections of the app, effectively transforming personal feedback into internal motivators. This continuous reflection serves as a powerful tool for enhancing self-awareness and reinforcing positive behaviors, ultimately empowering users to make more informed choices and derive greater satisfaction from their physical pursuits.

CardioVitaal's CR programme - the crafting tool

Several patients (N=5) have expressed strong endorsement for the app, deeming it particularly benefitial during the initial stages of the CR program. This phase often presents challenges for patients as they struggle to re-engage in activities, grappling with low confidence in their physical abilities and a sense of distrust in their capacities. They perceive the crafting tool as a pivotal aid in implementing health behavior changes in their daily lives, thereby extending CardioVitaal's influence beyond the boundaries of the CR program.

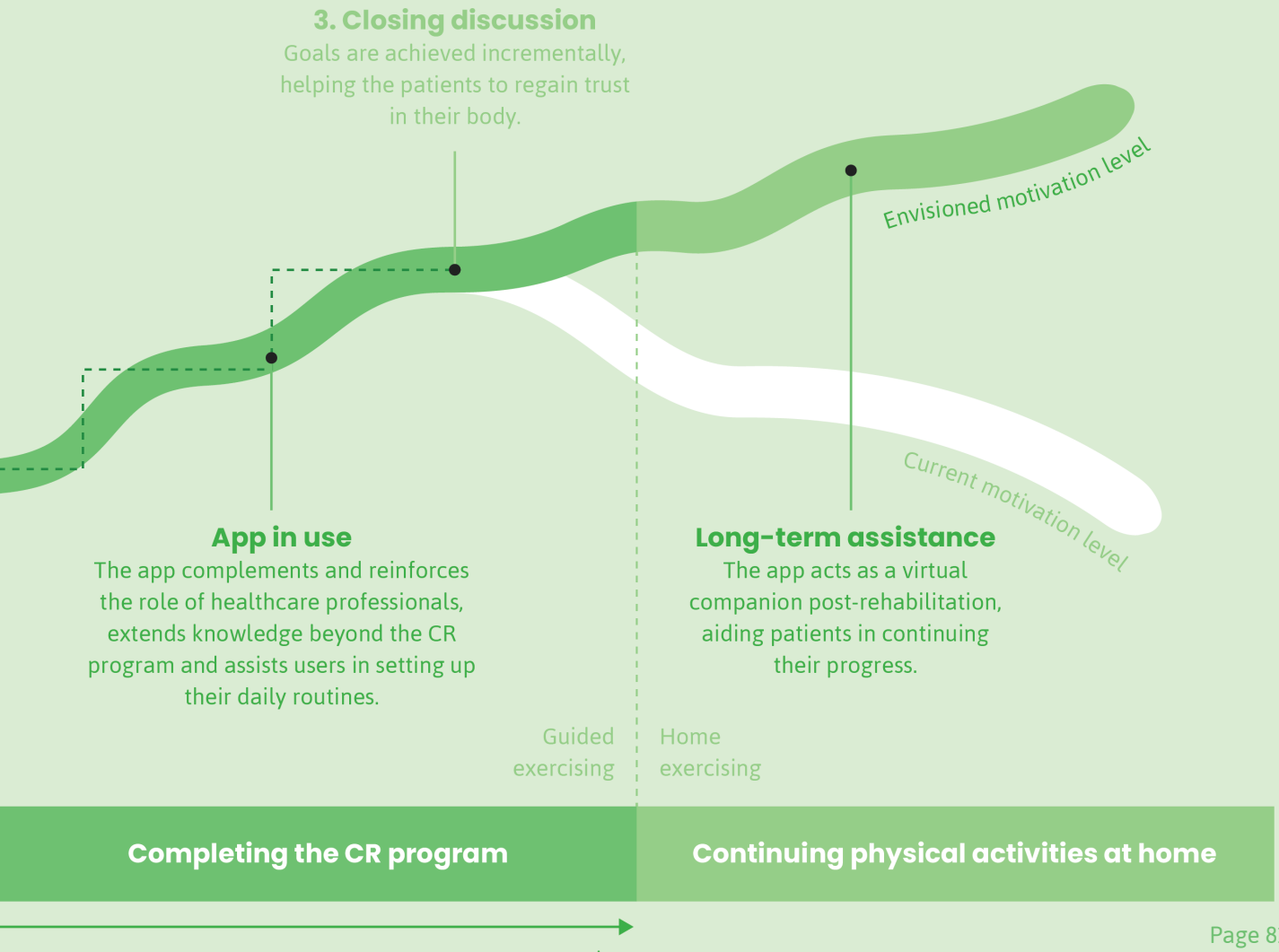
The app's user-friendly interface and enlightening features are highly valued by patients, especially those who may lack awareness of their personal preferences and encounter difficulties in establishing a consistent physical activity routine. Consequently, integrating the app into the early stages of the CR program is strongly advised. Integrating the app into the early stages of the CR program not only enhances patient engagement but also fosters a dynamic feedback loop between patients and healthcare professionals. By acting as external



motivators, healthcare professionals can leverage the app as a tool to facilitate meaningful discussions, assist in goal-setting, and empower patients to take ownership of their own recovery journey.

Moreover, the app's capacity to collect user data during these initial trajectories of the CR program opens up exciting possibilities for personalization and optimization. As patients interact with the app, it learns and adapts, tailoring its recommendations and features to suit each individual's unique needs and preferences. This personalized approach not only enhances the user experience but also fosters a deeper sense of connection and trust between patients and the app itself. In essence, the Vital10 app transcends its role as a mere application, evolving into a virtual companion that grows alongside patients, offering support and guidance long after they have completed the formal CR program.

The timeline depicts patients envisioned motivation level in comparison to their current motivation level during their rehabilitation journey (see pages 26-27). It was based on literature studies (Van Elderen & Dusseldorp, 2001) and semi-structured interviews with cardiac patients (N=8) and healtcare professionals at CardioVitaal (N=2).



5.2 The crafting tool

Feasibility of the design

The theoretical framework of crafting theory was seamlessly translated into a practical crafting tool. This conversion has resulted in the development of an intuitive and user-friendly application interface, meticulously designed to cater to the unique requirements of cardiac patients (Type B) seeking to optimize their physical activities. By dissecting the multifaceted nature of crafting, this application has been engineered to empower its users, guiding them through each stage of the crafting process effortlessly. Through the presentation of different flows and screens, the design ensures the provision of a structured and supportive environment, offering users a solid framework upon which to scaffold their rehabilitation journey. At the core of this tool's effectiveness lies its ability to encourage exploration and reignite the sense of fulfillment. By allowing users to revisit the positive mood states associated with their progress, it cultivates a sustained motivation throughout the cardiac rehabilitation process.

This chapter delves into the intricacies of the proposed crafting tool, providing an in-depth overview of its different screens and flows.


9:41
Welkom terug!
Bekijk hieronder jouw maandoverzicht.
Je voelde je voldaan na een fietstocht door het Amsterdamse Bos afgelopen woensdag.
5u gewandeld
3u gefietst
Jouw activiteiten
Bekijk alle activiteiten >
Speciaal voor jou!
Bekijk alle activiteiten >
Nieuw!
Vogelspotten
Golfen

Onboarding flow - explanation

In previous discussions, several patients have indicated a failure to recognize the advantages the current Vital10-app offers. Consequently, not everyone has consistently used the app during the CR program. To prevent this in the future, incorporating an onboarding flow is essential. User onboarding, defined as the process of enhancing the likelihood that new users successfully adopt a product, involves providing them with the necessary tools to understand how the product works and the benefits it provides (Chiappetta, 2020).

This approach ensures that patients are immediately informed about the utility of the application. It also helps establish the tone of voice of the app to captivate new users.

Screen 1: Exploring

In the initial screen, users are introduced to the explorative nature of the app. The aim is to spark curiosity and wonder. The provided examples in the text are intentionally approachable, avoiding the immediate discouragement of users by focussing on intense physical activities.

Screen 2: Action planning

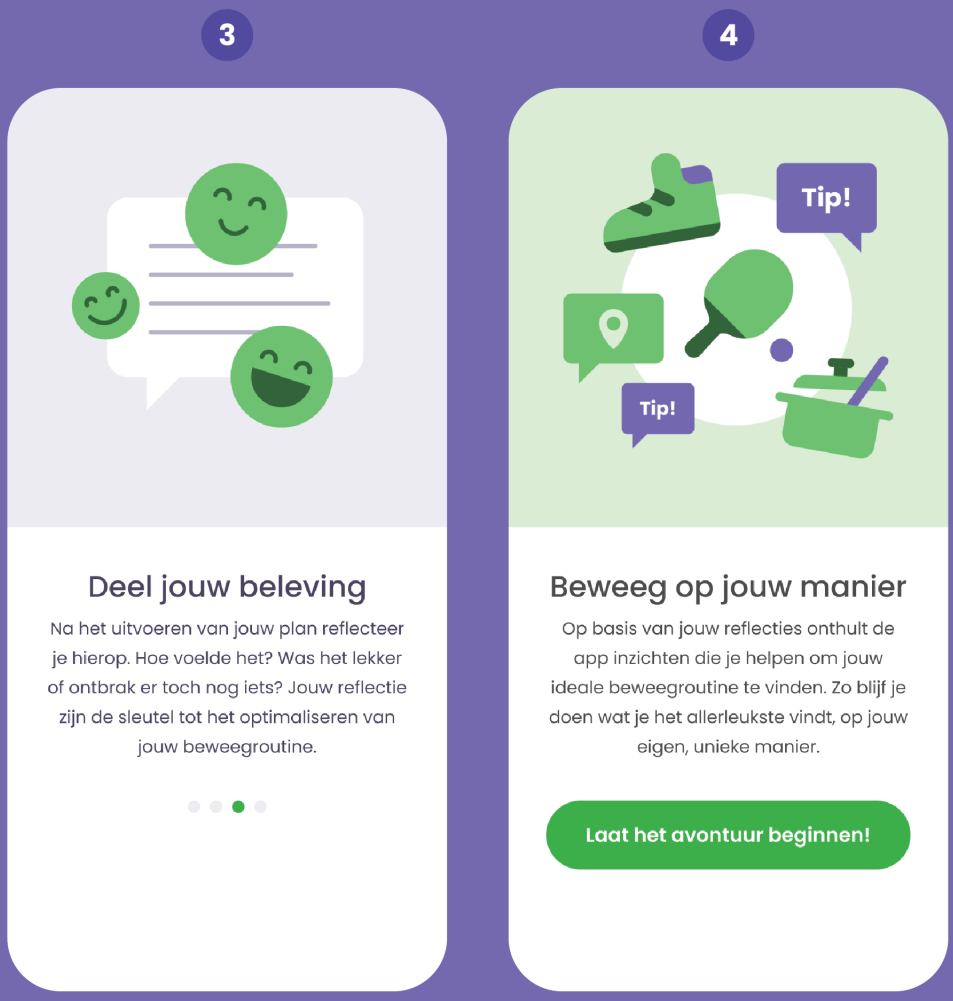
Moving on to the second screen, users are acquainted with the practical aspects of the app. The supportive quality is highlighted by showcasing the ease and simplicity of working with short and concrete action plans.

Screen 3: Reflecting

On the third screen, users are prompted to reflect on their past activities. It is crucial to communicate the benefits of consistent reflection, as this plays a pivotal role in fostering the sustained usage of the app.

Screen 4: Identifying

The final screen articulates the ultimate goal, explaining that the app offers valuable insights and tips for maintaining physical activity. This affirms the app's purpose in encouraging and supporting users on their wellness journey.

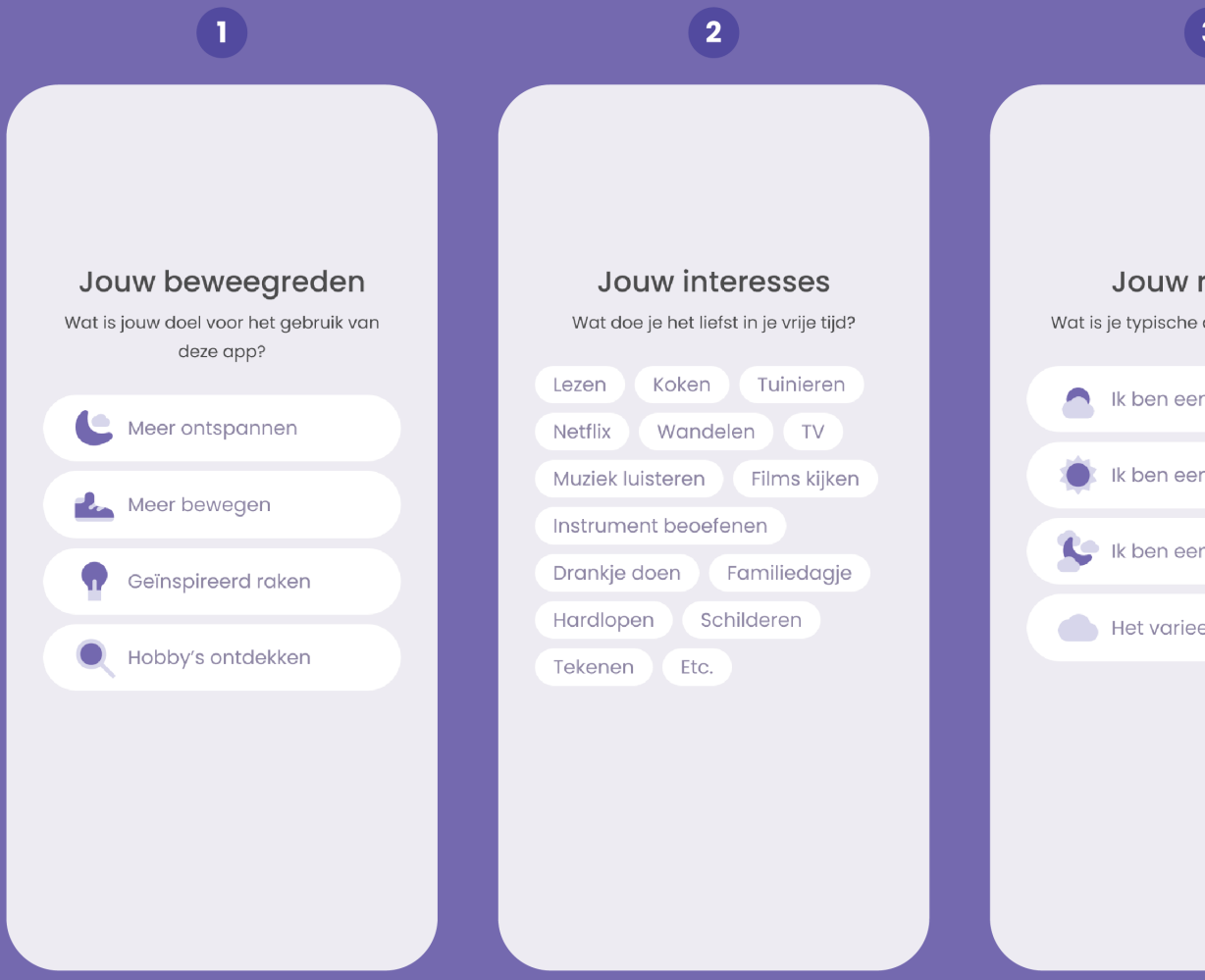


Onboarding flow - introductory questions

Understanding the overarching purpose and benefits of the app, users are guided through a series of personal questions that initiate a tailored journey, customizing the app's initial content to each user's individual preferences and needs. The intention behind this approach is to transform the initial interaction into a dynamic funnel, leading users from a general introduction to a more deeply personalized and engaging in-app experience.

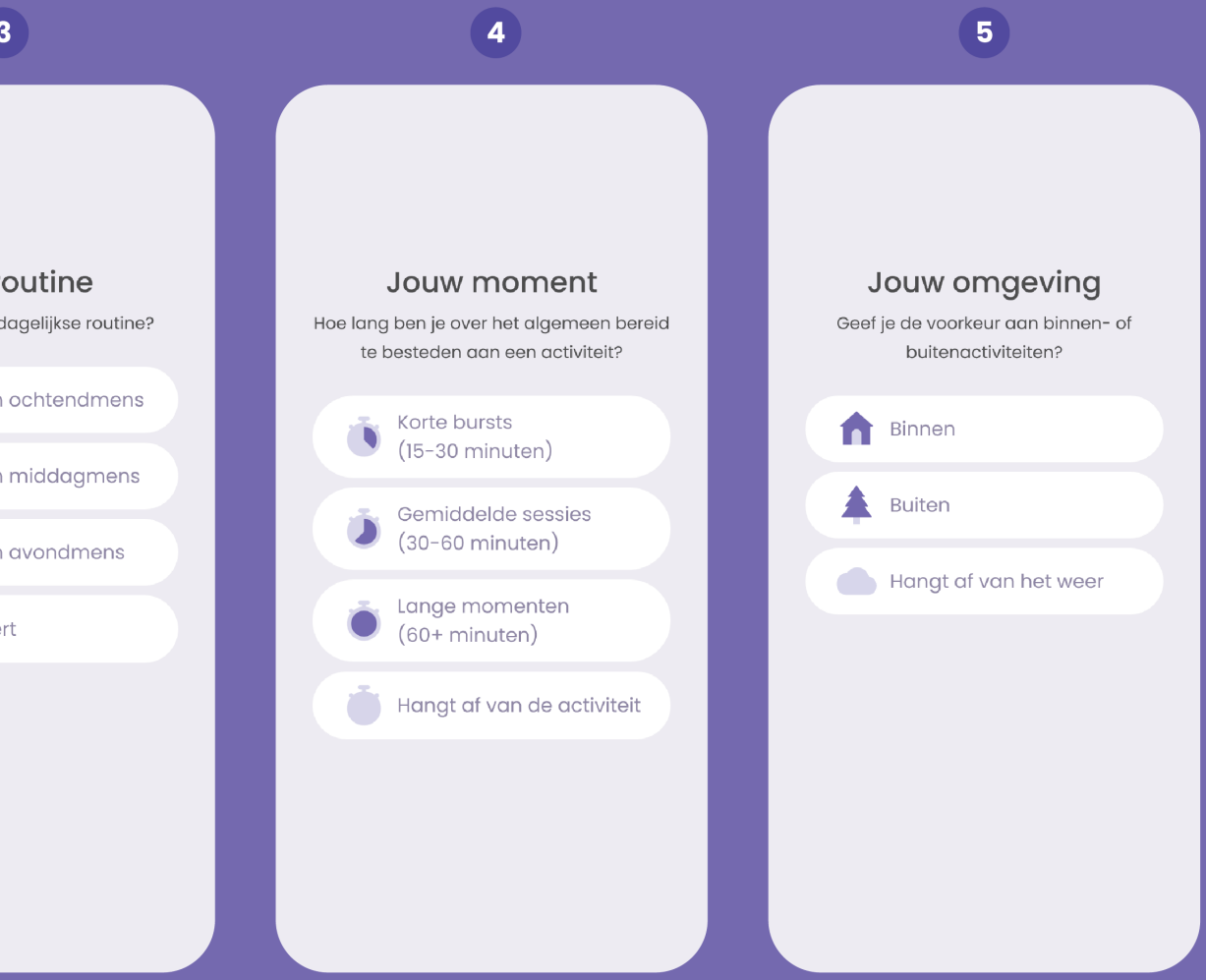
Screens 1-2: Broad questions

A noticeable gap exists between users who possess a clear awareness of the type of activity they find most enjoyable and those who are somewhat distant from any form of physical activity. Therefore, it is crucial for the app to appeal to a wide variety of types of users during the initial stages of app usage. Inquiring about users' interests and allowing for the inclusion of leisure activities beyond sports, helps to prevent discouraging users who may not have a strong affinity for sports.



Screen 3-5: Specific questions

Drawing from insights gained throughout this project, many patients were (implicitly) aware of few personal preferences and strategies that facilitated their engagement in physical activities. Consequently, it is beneficial to preemptively address these facilitators, such as identifying the optimal time of day for exercise, preferred activity duration, and the favored location for engaging in physical activities. Integrating these considerations will enhance the user experience by tailoring the app to individual preferences straight away. The designed screens provide an overview of the onboarding flow, but additional questions may be pertinent to ensure thoroughness.



Home screen

The home screen constitutes the foundation of the application and needs to be organized in a clear and structured manner. It consists of the most important features of the app, emphasizing both its explorative and introspective character. It serves as a user-friendly hub, allowing seamless and intuitive access to various facets of the application. The user should effortlessly navigate through different features directly from the home screen, enhancing overall usability.

Section 1: Past experiences

When opening the app, users are immediately reminded of the fulfillment they expressed during their previous activity. This provides a positive flow that makes it easier for users to re-engage in activities and stay motivated to maintain an active lifestyle. To further stimulate users' motivation, the app presents past month's progress in a simplistic way.

Section 2: Activities

The focus of the home screen is on the various activities users can choose from;

- Your activities: This section comprises activities previously performed by the user and designated as favorites. These activities are likely to be repeated more frequently, particularly during the initial stages of using the app, as they are familiar and resonate closely with the user.
- Suggested activities: Below, users are presented with suggested activities tailored to their personal preferences and past reflections, enhancing their engagement with the app.
- Potential activities: Users are also encouraged to venture beyond their comfort zones by exploring categories they have yet to discover. This fosters a sense of curiosity and empowers users to expand their horizons beyond the app's recommendations.

Menubar

The menubar at the bottom of the screen allows patients to quickly navigate through different screens, allowing them to search for new activities (magnifying glass-icon), visit their personal home-screen (house-icon), or view and create action plans (flag-icon)

"The app really feels like a friendly nudge, helping you establish and develop personal routines."

The quote was taken from a patient conversation.


1
Welkom terug!
Bekijk hieronder jouw maandoverzicht.
Je voelde je voldaan na een fietstocht door het Amsterdamse Bos afgelopen woensdag.
5u gewandeld
3u gefietst
2
Jouw activiteiten
Bekijk alle activiteiten ›
Speciaal voor jou!
Bekijk alle activiteiten ›
Nieuw!
Vogelspotten
Golfen
Bo
Iets voor jou?
Bekijk alle activiteiten ›
Op zoek naar
meer uitdaging?
Op zoek naar
meer competitie?
Op zoek naar
meer ontspanning?

Activity screen

Within the application, each activity is presented through an extensive activity screen, designed to offer users a holistic understanding of their personal preferences, experiences from past engagements in these activities, and actionable tips to sustain motivation and commitment.

Section 1: Type of activity

At the top of the page, the type of activity is expressed both textually and visually. The link with the illustration makes it easy for users to recognize the activity throughout the application.

Section 2: Past experiences

Right at the top, the degree of fulfillment the user felt during the last performed session is conveyed. This immediate reminder of the positive experience facilitates staying in the flow.

As feelings are only expressed for activities that are already performed in the past, new activities do not include this segment. Instead, they provide a brief explanation of why the application thinks the particular activity is valuable for the user. This helps the user to understand the potential of this new activity, making it more likely to engage in it.

Section 3: Insights for informed choices

Below, the user discovers insight into why a specific activity aligns with them. This text is generated by the application and is personally tailored to the user, based on the filled-out reflections. The more a user plans, executes, and reflects on an activity, the more detailed these insights can be mapped out.

Section 4: Practical tips

Further down, the user receives practical tips to infuse new energy into upcomming sessions. This stimulates and encourages the user to reschedule the activity. The tips seamlessly align with the insights. For example, if someone enjoys walking to connect with nature, tips might focus on exploring the outdoors and taking in the environment.

Section 5: Similar activities

Towards the bottom of the page, users are encouraged to delve deeper into similar activities, sparking their curiosity and encouraging further exploration.

“I love the playfulness conveyed in these tips.”

The quote was taken from a patient conversation.

1
2
3
4
5

Wandelen

Je voelde je zeer voldaan
Je voelde je zeer voldaan en zat lekker in je vel na je laatste sessie. Ga zo door!

Jij houdt van ontspanning
Wandelen is jouw moment van ontspanning. Wandelpaden in de natuur brengen kalmte in jouw leven. Elke stap voedt niet alleen je lichaam, maar ook je geest. Het vermindert jouw stress en geeft je frisse energie.

Nieuw! Tips

Maak van je telefoon een wandelmaatje en bel een familielid of vriend voor wat extra afleiding tijdens je tocht.

Ga op zoek naar de prachtigste paddenstoelen en leg ze vast met je camera.

Wandel naar een specifieke bestemming, zoals een museum of boekhandel. Het maakt jouw wandeling doelgericht en belonend.

Benieuwd naar iets vergelijkbaars?

Nordic Walking Ontdek >

Geocaching Ontdek >

Vogelspotten

tip! Voel je vogelvrij
Jij houdt van momenten van rust en verbondenheid met de natuur. Plan een dagje weg om van de Nederlandse natuur te genieten.

Trek de Nederlandse natuur in
Zin in wat nieuws? Trek eropuit voor een betoverende dag in de natuur, terwijl je de meest adembenemende vogelsoorten probeert te vinden!

Locaties bij jou in de buurt

Bekijk hier de mooiste vogelroutes

Action planning flow

In order to empower users in establishing a consistent routine and gearing up for physical activities, the application provides a valuable feature - the creation of a personalized action plan. This crafted action plan streamlines the initiation of physical activities and acts as a proactive measure to address and mitigate potential challenges that may arise along the health crafting journey.

Screen 1: Action plans

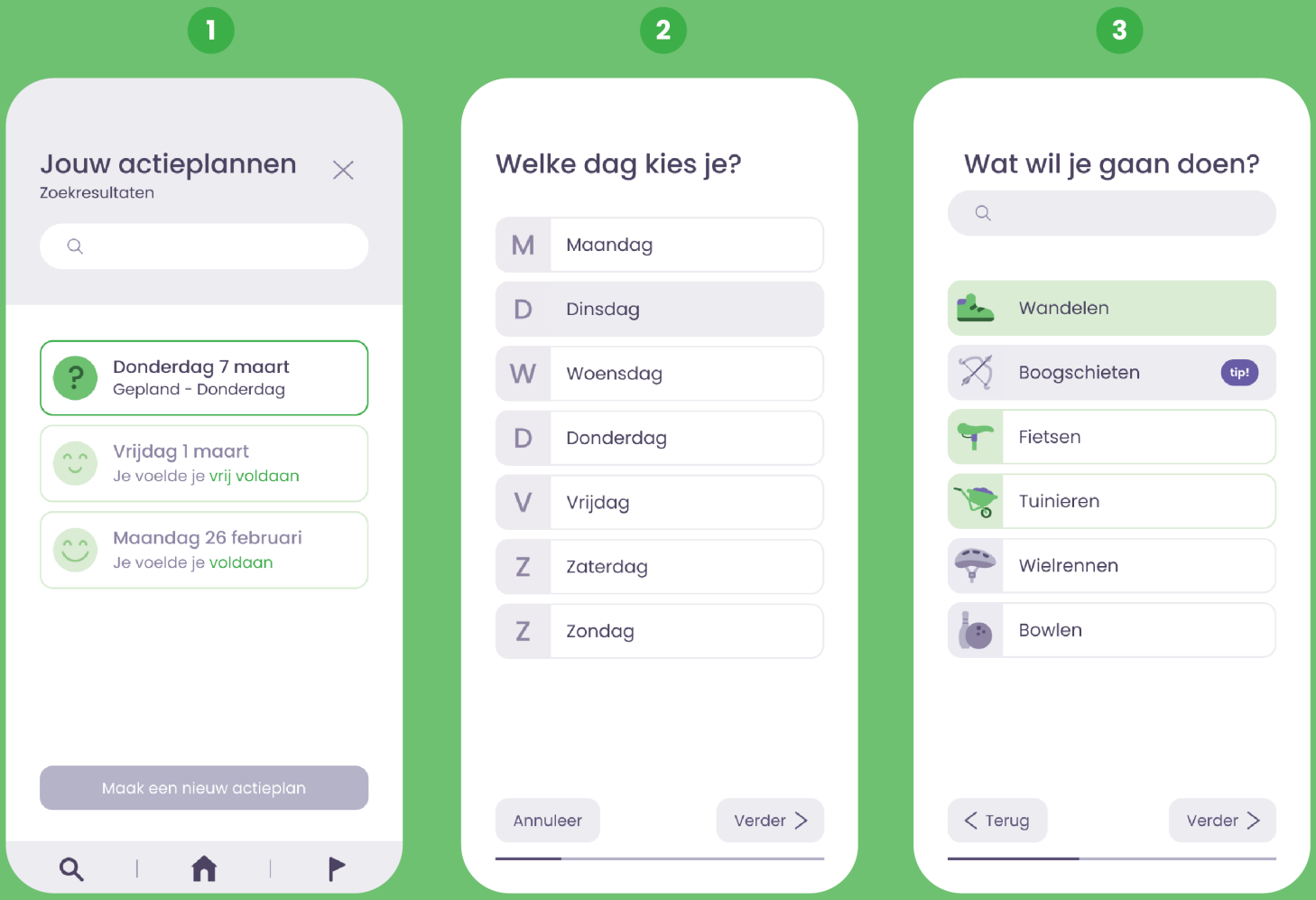
Users can easily access their historical and upcoming action plans in chronological order. Each past action plan serves as a reminder of their past experiences.

Screen 2: Day of the week

Upon initiating the action flow, users are prompted to specify one or multiple days of the week. This aids in solidifying their intentions while allowing flexibility in executing the plan at any moment of the selected day.

Screen 3: Activity

Users proceed to select one or multiple activities.



Screen 4 & 5: Activity customization

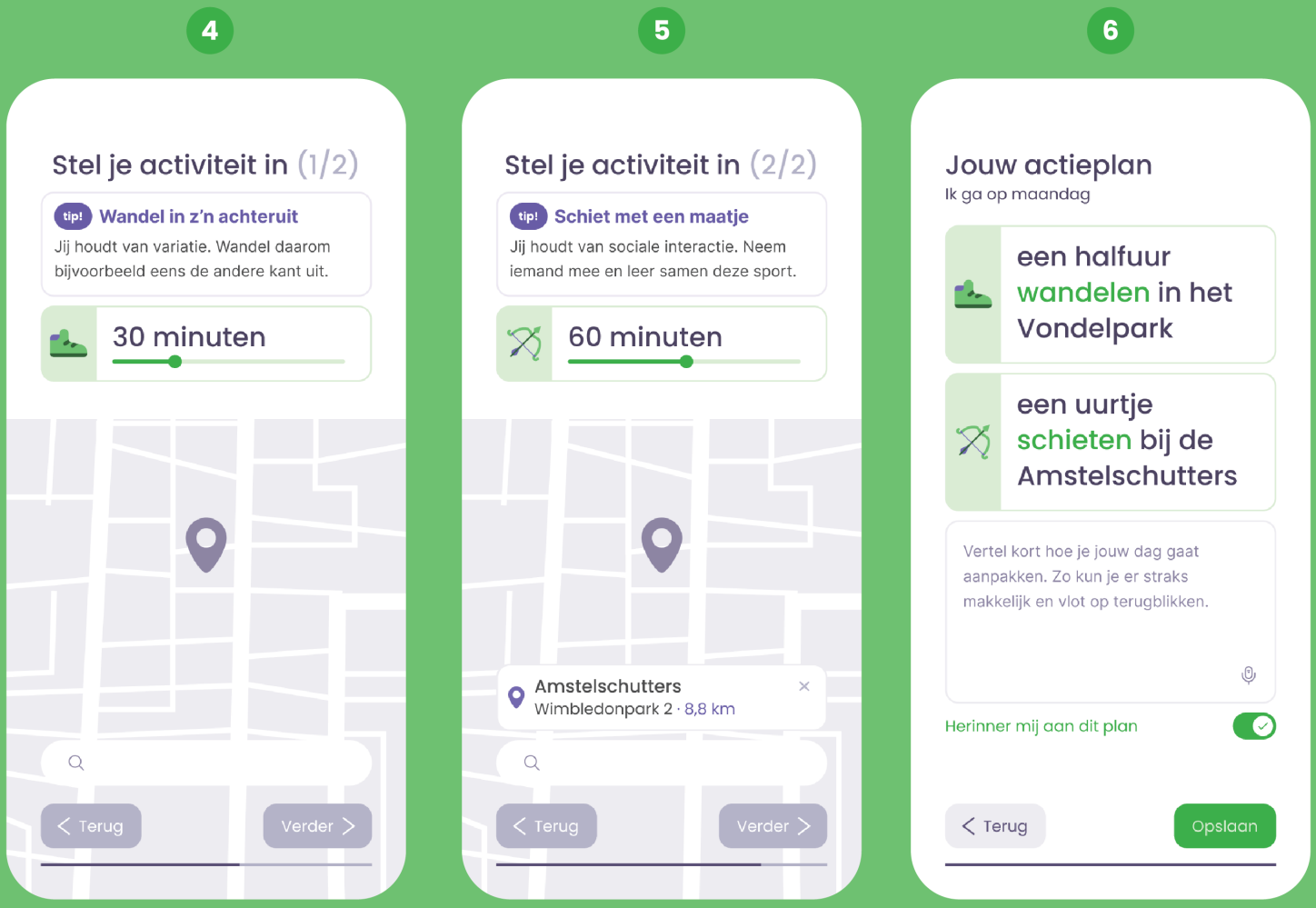
For each chosen activity, users can customize its duration and select a location from a map, opting for either home or an external venue. Additionally, for outdoor activities, they can plan a specific route. To assist users in making informed decisions, practical tips are provided for each activity.

Screen 6: Plan overview

Before confirming the action plan, users are provided with a thorough overview, showcasing the accessibility of the plan. Moreover, they have the option to input more extensive details, potentially refining their plan for enhanced focus and clarity.

"I'm realizing that planning activities doesn't seem as daunting anymore."

The quote was taken from a patient conversation.



Reflecting flow

Upon the completion of activities, users are encouraged to engage in a reflective process to capture and analyze their experiences. The reflection screen is thoughtfully crafted to accommodate both concise and detailed responses, catering to users' varying time constraints and commitment. This interactive feature holds a pivotal role within the application's functionality, emphasizing the importance of regular reflection entries to enable the application to continually refine and personalize its content.

Screen 1 & 4: Overview

Users have the flexibility to access their action plan at any time. Within this interface, they can choose the specific activity they wish to reflect upon. Additionally, users can opt for a more comprehensive reflection on the entire action plan by completing the reflection form located at the bottom of the screen or by speaking their thoughts aloud.

Screen 2: Intensity level

Borg's (1982) Rating of Perceived Exertion (RPE) scale served as the basis for designing various stages for users to select from. This scale empowers individuals to subjectively assess their exertion level during physical

activity. Simplified to four stages, it facilitates swift reflection and encourages users to avoid selecting a neutral stage. This feedback mechanism equips the app with insights into the user's preferred intensity levels and corresponding activities, enhancing customization and personalization.

Screen 3: Fulfillment level

A Visual Analog Mood Scale (Killgore, 1999) was designed to assesses the user's mood state post-physical activity, utilizing visual emoticons to represent various mood descriptors. Many patients have identified a feeling of fulfillment as a highlight of exercising and serving as a motivator to re-engage in physical activities. Therefore, fulfillment level serves as the basis for identifying four different stages, ranging from no fulfillment to feeling highly fulfilled. This feedback mechanism aids the app in pinpointing which activities elicit positive responses and are favored by the user.

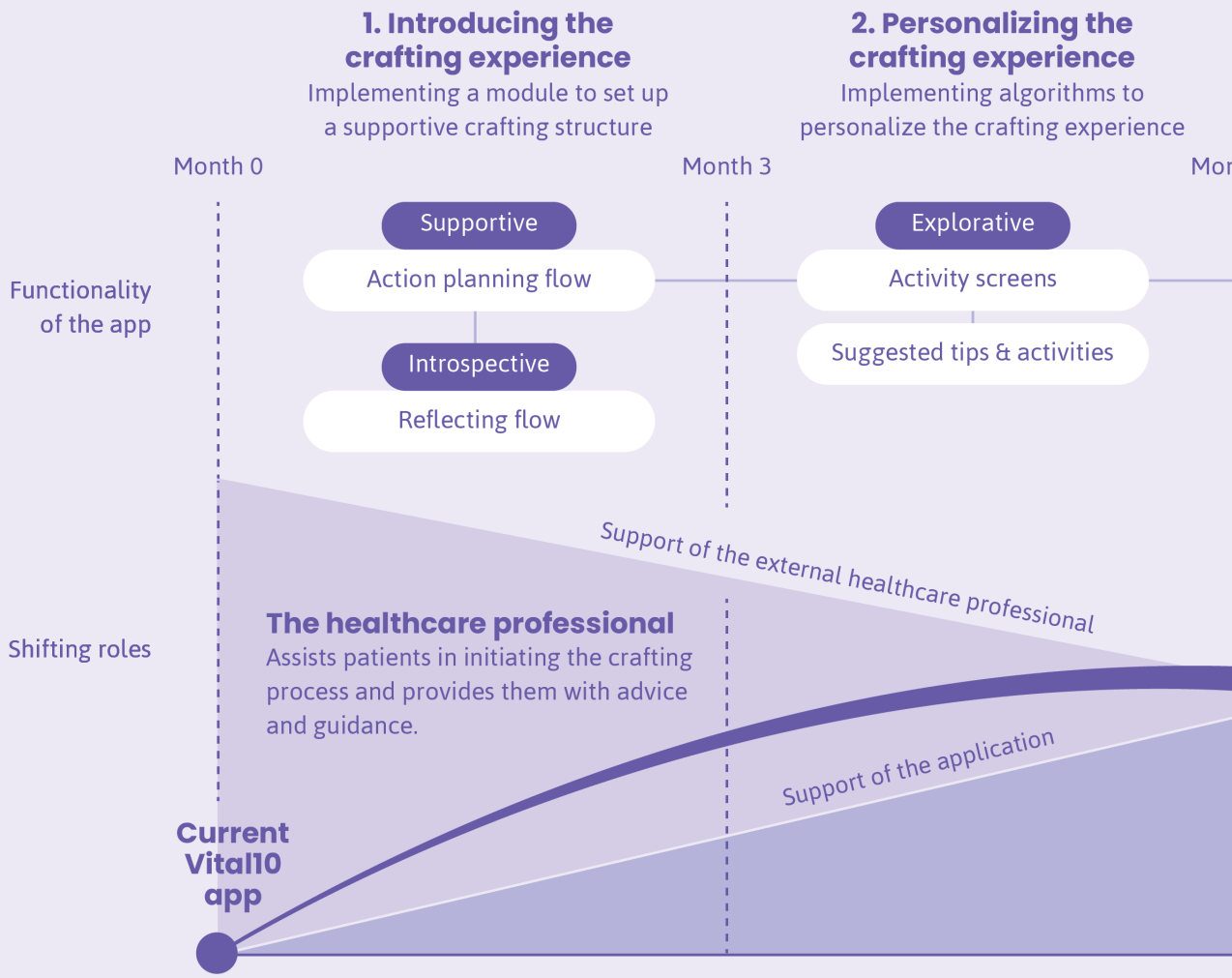
"Even when the effort is quite demanding, the mental reward can still be very gratifying."

The quote was taken from a patient conversation.

5.3 Implementation plan

Viability of the design

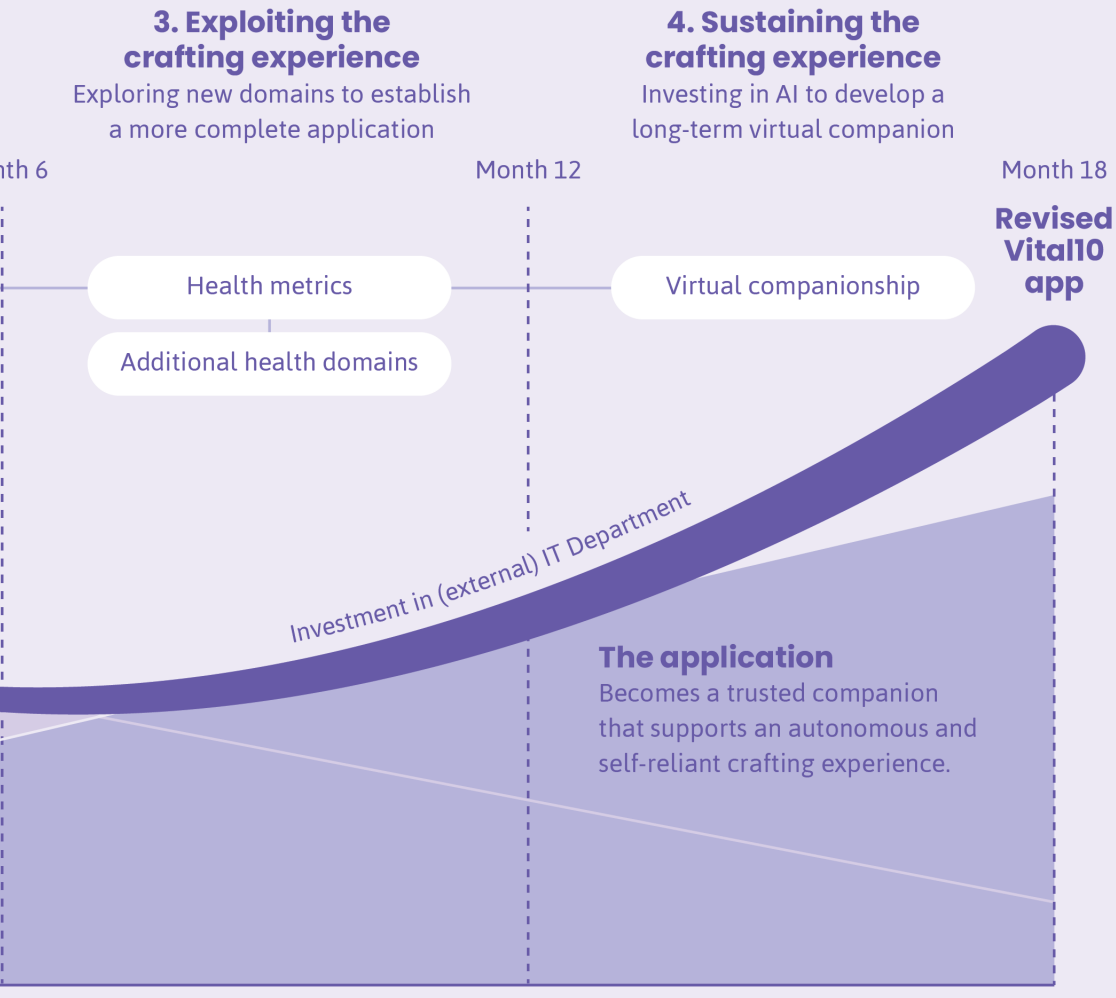
In order for CardioVitaal to seamlessly transform the current design proposal into a tangible application, a strategic implementation plan has been set up. Serving as a comprehensive roadmap, this plan outlines a structured approach for the gradual integration of the envisioned application features, aiming to evolve from the existing Vital10 app to a fully realized crafting app. Leveraging the established infrastructure of the Vital10 app, CardioVitaal can minimize development costs and expedite the deployment of new features to the market. As the implementation progresses through various phases, each stage introduces iterative enhancements and novel functionalities, thereby expanding the application's capabilities and optimizing the patient-centric crafting experience. This phased approach facilitates thorough testing and refinement at each step, mitigating potential risks and ensuring a seamless user experience throughout the development process.



Furthermore, as the application evolves, so does the role of healthcare professionals, including lifestyle coaches and physiotherapists, who initially play a pivotal role in guiding patients through the app's functionalities and aiding them in reflecting on their progress. However, as the application matures, it becomes increasingly autonomous, gradually shifting the emphasis towards self-sufficiency. Similarly, the responsibilities of the IT department undergo modifications to support the ongoing development of the application across each phase.

This chapter provides an overview of the four different phases, highlighting the key developments and adjustments made to the application's functionality, as well as the evolving roles of healthcare professionals and the IT department.

The figure illustrates CardioVitaal's implementation plan for developing the crafting tool, showcasing the evolving roles of both the application and healthcare professionals.



Phase 1: Introducing the crafting experience

The current Vital10 application allows users to set specific goals through challenges. However, feedback from patients (N=5) indicates that these challenges often lack the necessary specificity and guidance to fully feel engaged and motivated. Patients express a desire for more interactive and collaborative experiences instead. To address this feedback, integrating an additional crafting module seamlessly into the existing framework of the "Aan de slag" screen, where users can set up challenges, could be beneficial. Moreover, considering the significant costs and time involved in developing a new application, as well as the limited availability of in-house IT developers at CardioVitaal, initiating development by integrating a crafting module into the existing Vital10 application is a more feasible approach.

Timespan: ±3 months

Adding the crafting module to the Vital10 app requires time for development, iterative testing, and quality assurance to ensure that the basic functionalities work correctly and are user-friendly. It is recommended to thoroughly test the new module with a select group of users, gather feedback, and address any issues before a wider rollout.

The app

The crafting module can be configured in its simplest form to provide users with structure and streamline the crafting process. Key functionalities of the new crafting module within the Vital10 app comprise:

- Action planning flow: Allowing users to manually create a weekly action plan.
- Reflecting flow: Enabling users to reflect on their activity progress at the end of each week.

The patient

In the initial phase, patients require a clear structure to reintegrate physical activities into their daily lives and establish a routine. Action planning and reflecting processes aid in this endeavor, making it more habitual, while healthcare professionals play a pivotal role in initiating the process.

The healthcare professional

Initially, the healthcare professional plays a hands-on role in guiding patients through the application, initiating the use of the crafting module, and assisting in setting up initial action plans. They serve as a direct source of support and guidance, ensuring patients understand how to navigate the app and utilize its functionalities effectively. Integrating the crafting module with the Electronic Patient Database (EPD) enables healthcare professionals to remain actively engaged in guiding patients through the crafting process.

The IT department

The IT department is responsible for programming essential functionalities within the Vital10 app, enabling users to plan their weekly activities and reflections seamlessly. They ensure the smooth integration of the new crafting module into the Vital10 app, ensuring users have convenient access to these features. Moreover, implementing mechanisms for collecting and analyzing usage data is crucial, as it provides invaluable insights for the continuous development of the application.

Phase 2: Personalizing the crafting experience

While the basic crafting module serves as a helpful tool to provide structure and guidance during the crafting process, the primary source of support thus far has been from healthcare professionals. To foster long-term autonomy in app usage, it is essential to transition towards a more self-reliant approach, wherein the app itself becomes a trusted companion. This transition can be facilitated by incorporating relatively simple algorithms that offer more personalized suggestions:

- Content-based filtering recommends items based on similarity to the user's preferences, analyzing the content of items and comparing it to the user's interests. For instance, if a user enjoys hiking and cycling, the algorithm might suggest similar outdoor activities like jogging or rock climbing.
- Collaborative filtering suggests items based on similar users' preferences, assuming users with comparable tastes will enjoy similar tips. For example, if user A and user B have similar preferences and user A enjoys tennis, the algorithm might suggest it to user B as well.
- Rule-based systems use predefined logic to generate recommendations, considering factors such as user preferences or health goals. For instance, if a user prefers low-impact exercises, the system might suggest swimming or yoga.

By leveraging these algorithms, the application can provide users with tips and suggestions sourced from a predefined database. This proactive guidance empowers patients to explore and refine their personal preferences autonomously. As users discover activities that resonate with them, they are more likely to engage deeply with the app.

Timespan: ±3 months

Integrating various algorithms into the app and testing their functionality demands planning and time investment. Furthermore, establishing a comprehensive database containing a diverse range of activities and corresponding tips is essential. Leveraging a Language Model (LLM) can significantly expedite this process.

The patient

Now that patients have established a foundation with crafting theory, offering a more personalized experience within the app can ignite motivation for continued usage.

The app

In addition, the functionalities comprise:

- Activity screens: Allowing users to navigate through a database of predefined activities.
- Ready-Made Tips and Activities: Offering suggested tips and activities based on user progression.

The healthcare professional

As the application progresses, the healthcare professional continues to provide direct support to patients. They assist patients in interpreting data and feedback from the app, helping them understand their progress and stimulating them to make effective usage of the recommonded tips and suggestions.

The IT department

The IT department's role is crucial in integrating algorithms into the crafting module of the application. They undertake database optimization efforts to enhance the efficiency and performance of the algorithms, ensuring they operate effectively within the application's framework. This involves structuring and organizing the database to accommodate the algorithms' requirements for data storage and retrieval.

Phase 3: Exploiting the crafting experience

The crafting module has the potential for further expansion by exploring the development of a more comprehensive, revised Vital10 app. This initiative involves a thorough evaluation of the existing Vital10 app to enhance both its user experience (UX) and user interface (UI), thereby aligning it more effectively with the needs of patients. Feedback from patients (N=5) highlights a tendency to underutilize current features, coupled with difficulties in navigation, indicating clear opportunities for improvement.

When developing a new, more comprehensive app, the scope of the crafting module can be reconsidered by exploring health metrics and addressing additional health domains. While some users appreciate the app's straightforward, non-dedicated health or sports-oriented design, others, particularly patient type C with established fitness regimens, may desire more comprehensive, data-driven features. Health metrics, like step counters and blood pressure monitors, hold promise for broadening the application's appeal and motivating users throughout their progress. Furthermore, although the crafting app currently emphasizes physical activities, many patients also face challenges related to dietary habits, alcohol consumption, sleep patterns, and other health factors. Addressing these crafting domains could help define a more complete application and attract a wider range of patients.

Timespan: ±6 months

Integrating health metrics such as step counters, blood pressure monitors, etc., may require complex technical developments and integrations with external devices. Due to the sensitivity of medical data, these features must undergo thorough testing and comply with strict regulations and security standards. Furthermore, exploring other crafting domains will also entail a considerable amount of time and effort.

The patient

Patients have expressed interest in seeing the app evolve alongside them. By incorporating additional health domains and visualizing user progress through health metrics, the app can adapt to users' changing needs.

The app

In addition, the functionalities might comprise:

- Data insights: Allowing patients to track and monitor their progress through health metrics.
- New categories: Allowing users to craft in other health domains (e.g. controlling their nutrition through a more intrinsically rewarding approach)

The healthcare professional

In this stage, the role of the healthcare professional transitions towards facilitation and empowerment. They encourage patients to take a more active role in managing their rehabilitation journey by leveraging the app's wide offering. The healthcare professional empowers patients to make informed decisions about their health and well-being, guiding them in setting realistic goals and action plans.

The IT department

The IT department is tasked with evaluating and refining the Vital10 application. They actively collect and analyze user feedback to pinpoint areas for improvement in the module's usability and design. Additionally, the IT team works on implementing new features and potentially expanding the module's focus to address additional health domains.

Phase 4: Sustaining the crafting experience

As the Vital10 app increasingly becomes an integral component of CardioVitaal's CR program, the incorporation of artificial intelligence (AI) holds promise for future advancements. While more straight-forward algorithms offer valuable suggestions based on predefined rules and patterns, AI presents more sophisticated capabilities. Building on data gathered during previous phases, the AI model can be thought to analyze written feedback forms and distill actionable insights into each patient's preferences. Moreover, the refined model will extend beyond predefined tips and activities, generating a diverse array of unique suggestions finely tailored to cater to each user's individual preferences. By delving deeper into user data, this enhanced AI model will provide users with a deeper understanding of the factors influencing their engagement with various activities across various domains. Consequently, the Vital10 app can exert a substantial post-rehabilitation impact, serving as a lifelong virtual companion guiding users in sustaining a healthy lifestyle.

Timespan: ±6 months

Integrating an AI model for advanced analysis requires new algorithms, complex data analysis, and optimization of machine learning models. After implementation, the new features need to be extensively tested to ensure accuracy and effectiveness before rolling them out to users.

The app

In addition, the functionalities might comprise:

- Virtual companionship: AI can elevate the personal crafting experience by offering extensive insights and pro-active guidance.

The patient

To ensure the longevity of health behavior changes, patients can greatly benefit from the assistance of a virtual personal assistant. This digital companion serves as a constant source of support and guidance, helping individuals navigate the complexities of maintaining a healthy lifestyle post CR program completion.

The healthcare professional

As the application becomes a virtual companion that helps patients understand their personal needs, the role of the healthcare professional evolves into that of a collaborative partner and mentor. They engage in deeper discussions with patients, providing context to the insights provided by the app and offering guidance on lifestyle modifications. The healthcare professional serves as a mentor, supporting patients in tracking progress, adjusting strategies, and maintaining motivation on their rehabilitation journey.

The IT department

The IT department is responsible for selecting a relevant AI model, which they integrate into the existing infrastructure, ensuring compatibility and optimal performance. Utilizing data from previous phases, the team trains and refines he AI model's algorithms. Continuous iteration and fine-tuning based on feedback and performance metrics are integral to the process. Rigorous testing validates the model's accuracy and effectiveness in generating personalized suggestions. Compliance with privacy and security standards is paramount, with the IT department ensuring user data protection. Post-training, they oversee deployment and monitor real-world performance, providing ongoing support and maintenance for optimal user experience.

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Section 6

APPENDICES

6.1 Original project brief

This chapter presents the original graduation project brief, as approved at the initation of this project by the Delft University of Technology.

Introduction

Leading a healthy lifestyle can extend life by up to six years and delay chronic illnesses by nine years (Licher et al., 2019). However, without improvements in prevention, treatment, or support, over half the global population may face obesity within 12 years due to challenges in maintaining long-term lifestyle changes (Worldobesity, 2023). Extrinsic factors can initiate health activities but may, over time, reduce satisfaction by shifting the focus from the process to an external goal (Fishbach & Woolley, 2022; Armenta et al., 2014). Hence, to maintain a healthy lifestyle, it's crucial to foster intrinsic motivation rather than relying on extrinsic factors (Liu et al., 2023).

Boosting intrinsic motivation can be achieved through 'crafting,' which involves altering activity conditions for a more rewarding experience (Tims et al., 2012). By modifying the environment, the health-related activity or oneself, people can increase the person-activity fit, making it easier to maintain long-term health behavior changes (Liu et al., 2023). For example, in order to make taking a walk more rewarding, people can consider buying dedicated hiking boots or exploring new outdoor environments (environmental level). They can extend the walking route or integrate jogging intervals (activity level), or they can include breathing exercises and improve their sleep patterns to boost their energy (self level). When implemented effectively, crafting principles make it easier to experience these rewarding experiences and subsequently foster intrinsic motivation and sustained health behavior.

Vital10 offers a comprehensive health and vitality platform, fostering collaboration between healthcare and service providers to deliver engaging programs

and trusted products and services (Vital10, n.d.). Currently, the majority of the company's users are cardiac patients who rely on Vital10's application ("deelnemersportaal") for their rehabilitation process. The application supports patients by offering a clear training program, enabling progress tracking, and facilitating direct communication with healthcare professionals.

Problem definition

The long-term and demanding rehabilitation process can be daunting for cardiac patients, posing challenges in maintaining motivation and tracking progress within the Vital10 application. Equipping patients with crafting theory knowledge empowers them to nurture intrinsic motivation, facilitating their cardiac rehabilitation journey.

However, the current framework of crafting theory, while insightful, remains mostly theoretical and conceptual. To fully exploit the capabilities of "crafting" as a tool for individuals, there's a critical need to bridge the gap between theory and practical application. From an applied user's perspective, the challenge lies in transforming this theoretical knowledge into a user-friendly learning tool that supports individuals in maintaining health behavior changes over time.

From a business perspective, this project streamlines Vital10's support for cardiac patients during rehabilitation. In the long term, this learning tool has the potential for broader application, opening up new markets and broadening the company's customer base.

Assignment

The assignment is formulated as follows: "Design a learning tool to educate cardiac patients on the principles of crafting theory, fostering cardiac patients' intrinsic motivation to facilitate their rehabilitation journey."

The project unfolds through different focus areas (see the external plannning). I will begin with defining the crafting theory's core elements through literature reviews and an expert interview with Wei Liu. Subsequently, I will transform these elements into user-centered learning objectives (LO). For example, a LO might be: "By the end of this learning activity, I will be capable to recite the key principles of health crafting theory." The research then focuses on tailoring these LO to the specific needs of cardiac patients, incorporating insights from interviews and literature studies. Next, I will convert these LO into engaging interactive learning activities (LA), considering health education literature and market research on existing applications. With these LA as a foundation, my project advances to structuring the learning content, designing a learning tool and creating a corresponding minimum viable product. Through user testing I will aim to iteratively improve upon this concept.

Motivation & personal ambitions

This thesis is a result of Wei Liu's theoretical paper, exploring the concept of 'crafting' to maintain health behavior over the long term. The topic has captivated my interest as it presents a promising opportunity to bridge my personal passions in graphic design and promoting a healthy, sustainable lifestyle. The subject aligns perfectly with the IDE Faculty's mission of "Design for Our Future," emphasizing the importance of a healthy world as the central focus of the thesis. Within the domain of Industrial Design Engineering, the thesis will integrate three key pillars: Business (proposing a conceptual digital learning environment for Vital10's product development), Human (fostering cardiac patients' intrinsic motivation to facilitate their rehabilitation journey), and Technology (exploring the design of a interactive learning tool).

In addition to the overall learning objectives, this thesis allows me to pursue the following personal learning ambitions:

- Enhancing my expertise in visual storytelling, a vital skill for my future career. I am eager to delve deeper into graphic design, and animation while exploring how these elements can be used effectively and interactively.
- Acquiring in-depth knowledge of the psychology and strategies behind lifestyle change. This valuable information has wide-ranging applications, relevant to various aspects of life, such as work, leisure, and sports. I believe this knowledge will positively impact my own daily life, promoting personal growth and wellbeing.

6.1 Expert interviews

During the Discover-phase, interviews with both an exercise therapist (N=1) and a lifestyle coach (N=1) at CardioVitaal were conducted to gain a better understanding of CardioVitaal's CR program. This chapter covers two extensive summaries of both interviewees responses.

Exercise therapist

In the CR program, healthcare professionals place significant emphasis on understanding the patients' objectives and aspirations. The professionals investigate the patients' desired achievements, analyze their pre-incident habits, and determine their goals post-recovery. Typically commencing with a referral from a cardiologist, the program involves various healthcare professionals, including physiotherapists, exercise therapists, a dietitian, psychologist, and sometimes occupational therapists and social workers at specific locations.

A diverse range of patients with varying ages and medical conditions undergo treatment. Conditions range from more prevalent heart issues like heart attacks to ischemic heart disease and heart rhythm disorders, encompassing individuals who have undergone valve surgeries or have congenital heart ailments. Each patient presents unique preferences and requirements. For instance, not all patients participating in the exercise regimen share the same sports interests or occupational backgrounds. Hence, the approach predominantly revolves around tailoring strategies to align with the patient's objectives and setting up unique pathways for their realization. The program predominantly observes individuals aged 50 and above, although it accommodates a diverse spectrum of age groups, spanning from 18-year-olds to those in their mid-70s.

The CR program initiates with an intake interview, evaluating the patient's current lifestyle choices, including their profession, physical activity habits, dietary habits, and mental well-being. The primary goal is to establish a robust start, ensuring that

health behavior changes are sustainable in the long run. Evaluation of goals primarily occurs through questionnaires that patients complete, allowing professionals to track improvements or deteriorations in specific scores.

Progress assessment primarily transpires during evaluation dialogues with healthcare professionals, documented within the electronic patient file (EPD). Records enable professionals to refer back to previous sessions when engaging with the patient. Before the program's commencement, patients receive several questionnaires in the Vital10 app, addressing their present physical activity levels, culminating in an initial score ranging from 0-10. At the three-month mark, the same questionnaires reappear, but in an evaluative format. For instance, if a patient provides smoking-related information, the app prompts details regarding smoking quantity, duration, etc., assigning a specific score accordingly. During intake discussions, healthcare professionals can highlight low-scoring aspects, such as smoking, marked in red, and tie these observations to set goals.

Following the three-month period, professionals assess goal achievement, marking the approximate duration of the CR program. Typically, insurers allow about four months for necessary care provision, but most patients complete the program within three months. Some, particularly motivated patients, might finish sooner.

The CR program currently comprises two primary components. First, the exercise "FIT" sessions led by physiotherapists and exercise therapists, focusing on reducing patients' anxiety by allowing them to actively participate in exercises. This segment constitutes a major interaction point with patients, involving around 12 one-hour sessions in the on-site exercise room. Evaluation milestones occur during the first, midway, and final sessions in the exercise room. Patients often express comfort in working within a secure environment, overseen by guiding professionals. Despite the ability to measure various data like blood pressure, heart rate, and rhythm, some patients eventually seek alternative environments. The ultimate aim remains instilling enough confidence in patients to independently undertake similar activities elsewhere, such as in a gym.

The program strongly emphasizes physical activity, especially cardio training, known to benefit the heart and blood vessels. Patients engage in activities like walking, running, cycling, rowing, and other cardio exercises, promoting variety and enjoyment in movement.

Encouraging patients to meet the Dutch Physical Activity Guidelines forms a crucial part of the exercise program. Discussions on how to adhere to these guidelines primarily involve patient preferences and enjoyment while ensuring compliance with the guidelines' moderate-intensity recommendation.

The second component involves an informational 'PEP' program. This segment includes an introductory session on cardiology, elucidating heart functionality and the essence of a healthy lifestyle. Professionals aim to facilitate the translation of this information into patients' daily routines. The rehabilitation process involves becoming increasingly aware of lifestyle improvements, including movement, stress management, and nutrition. A lifestyle coach contributes significantly to this informational part. If needed, nutritional inquiries are directed towards the dietitian, while mental recovery questions are addressed by the psychologist. Lifestyle coaches on the other hand, examine the holistic picture and provide comprehensive advice by linking suggestions to the patient's immediate environment.

Upon the completion of the initial three months, formal post-rehabilitation support is not provided. Nevertheless, users have indefinite access to the platform even after program completion for continued interaction.

Lifestyle coach

In the CR program, there are three coaching sessions scheduled. The initial intake session typically lasts around thirty minutes, followed by two subsequent sessions set approximately four to five weeks apart. Generally, a second follow-up session is arranged after the first one, as there is often a need for it, even if patients were initially hesitant. During the follow-up sessions, the focus shifts to revisiting the topics covered in the initial session, with an emphasis on assessing the achieved results and the patient's experiences with them. Additionally, appointments for the next phase of the program are scheduled during these sessions to ensure patients continue progressing concretely. These conversations serve as an opportunity to monitor the patients' progress closely. In instances where significant developments occur with a specific patient, extra connection and engagement are fostered through chat messages sent via the portal.

The first session primarily centers around lifestyle themes, commonly referred to as the BRAVO themes, which encompass "movement," "smoking," "alcohol," and "relaxation, stress, and sleep." These themes are standard topics discussed with patients unless they express a specific request to address a particular aspect beforehand. At the onset of the CR program, patients complete a questionnaire that includes a section on lifestyle, and they set goals in another questionnaire, which are reviewed beforehand. However, many of these goals tend to be broad and lack specificity or measurability. Hence, efforts are made to refine them, making them more measurable and concrete. Often, these goals are set for the long term, but there is an emphasis on establishing achievable short-term goals in small increments—for example, committing to a daily 15-minute walk or incorporating a 15-minute walk into their workday routine. The difficulty of these goals is tailored to the patient's starting point; if they are starting from scratch, the focus is on these small steps, with gradual expansion during follow-up sessions. As patients progress through the program, they are encouraged to make concrete plans to continue exercising outside the supervised sessions. To maintain momentum and motivation, concrete agreements, such as signing up for a gym membership, are established with patients while they are still in a positive flow during rehabilitation, aiming to prevent relapses and loss of motivation.

As patients progress and achieve their goals, a genuine motivation emerges as they become increasingly aware of the benefits of their accomplishments. However, there are times when additional assistance and support are needed, which are provided by various healthcare professionals. For nutritional guidance, patients are referred to a dietitian, while psychological support is available for addressing deeper fears or past issues. These referrals are often discussed during the initial intake interview, and arrangements are sometimes made in advance, though they may also be arranged at a later stage.

During the FIT sessions, it is crucial to emphasize the benefits of movement to patients, allowing them to experience a positive feeling and articulate it themselves, thereby sustaining their motivation. Patients are guided by physiotherapists to ensure they feel supported and not overwhelmed by any lingering fears they may have.

In individual coaching sessions, the focus shifts to crafting concrete personal plans tailored to each patient's needs and preferences. It's essential to consider what activities they genuinely enjoy to ensure adherence. If a plan seems too daunting, such as requiring extensive travel to a gym, efforts are made to identify simpler and more sustainable alternatives. Taking small, manageable steps towards the end goal is emphasized, often by building upon the patient's previous exercise habits during or before the heart rehabilitation process.

Moreover, patients are frequently directed to the My Vital10 platform, where each of them has an account. Here, they can participate in challenges and establish

goals based on these challenges, such as tracking their daily activity levels. The level of self-reflection among patients correlates with their engagement with the app. If they do not utilize it, there is no mandatory reflection moment to fill in or contemplate before follow-up discussions. However, during the PEP sessions, there is encouragement for regular self-reflection. Ultimately, the initiative must come from the patients themselves. Prior to conversations, efforts are made to assess the extent to which they have initiated activities through the platform, as this information can be seen in the Electronic Patient Database (EPD). Engagement with the platform varies among patients, with some being more involved than others. Generally, it is not heavily utilized; sometimes enthusiasm sparks initial engagement, only to be forgotten later on.

Following an intake session, a confirmation message is always sent to verify that the conversation took place, and the chat function is also introduced during the discussion. Some patients are more adept with digital tools than others. Additionally, after the intake session, another chat message is consistently sent with a summary of the conversation and a date for the follow-up discussion. Responses to these messages vary. During the last or subsequent follow-up conversation, it is always emphasized that the portal remains accessible even after completing rehabilitation, allowing patients to continue reaching out via the chat function. However, it is not common for patients to seek assistance through this channel after the program concludes.

The PEP group sessions primarily serve as general gatherings aimed at fostering interaction among participants to facilitate shared learning and experiences. This environment encourages mutual support and acknowledgment among peers, which is highly valued. However, the level of interaction varies among different groups, with some exhibiting more engagement than others. Additionally, during PEP sessions, some individuals express interest in forming peer groups, while others may not share the same enthusiasm. Thus, preferences regarding group dynamics differ among individuals.

Efforts are also made to raise awareness among patients about the support available within their social circles. During PEP sessions, the importance of seeking and offering help is emphasized, recognizing that asking for assistance can be challenging for many individuals. Examples from the group are often provided to encourage mutual support and understanding.

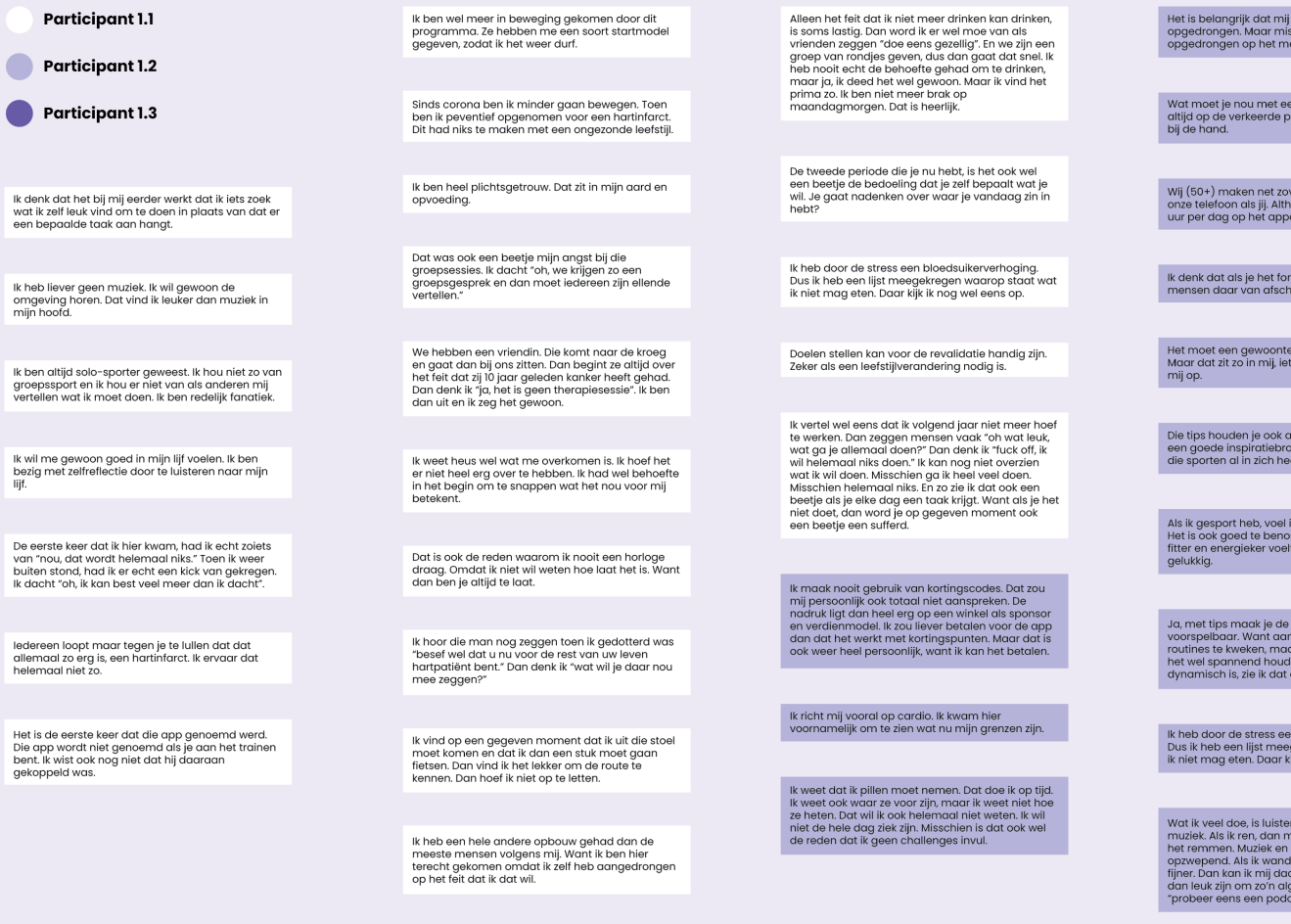
Patients receive course materials, including those from PEP sessions, along with explanations, and have the option to further engage with the material using workbooks. However, the extent to which they utilize these resources varies. Generally, there is limited utilization; while patients may engage with the theory, direct interaction with course materials is minimal. Materials are aimed at a B1 level to ensure accessibility for all, although considerations may differ based on location demographics. For instance, locations serving areas with diverse educational backgrounds may adjust material and approaches accordingly. During intake, efforts are made to anticipate patients' future needs and prevent them from feeling unsupported during independent periods. Thus, discussions aim to prompt patients to consider these aspects in advance.

6.2 Patient interviews

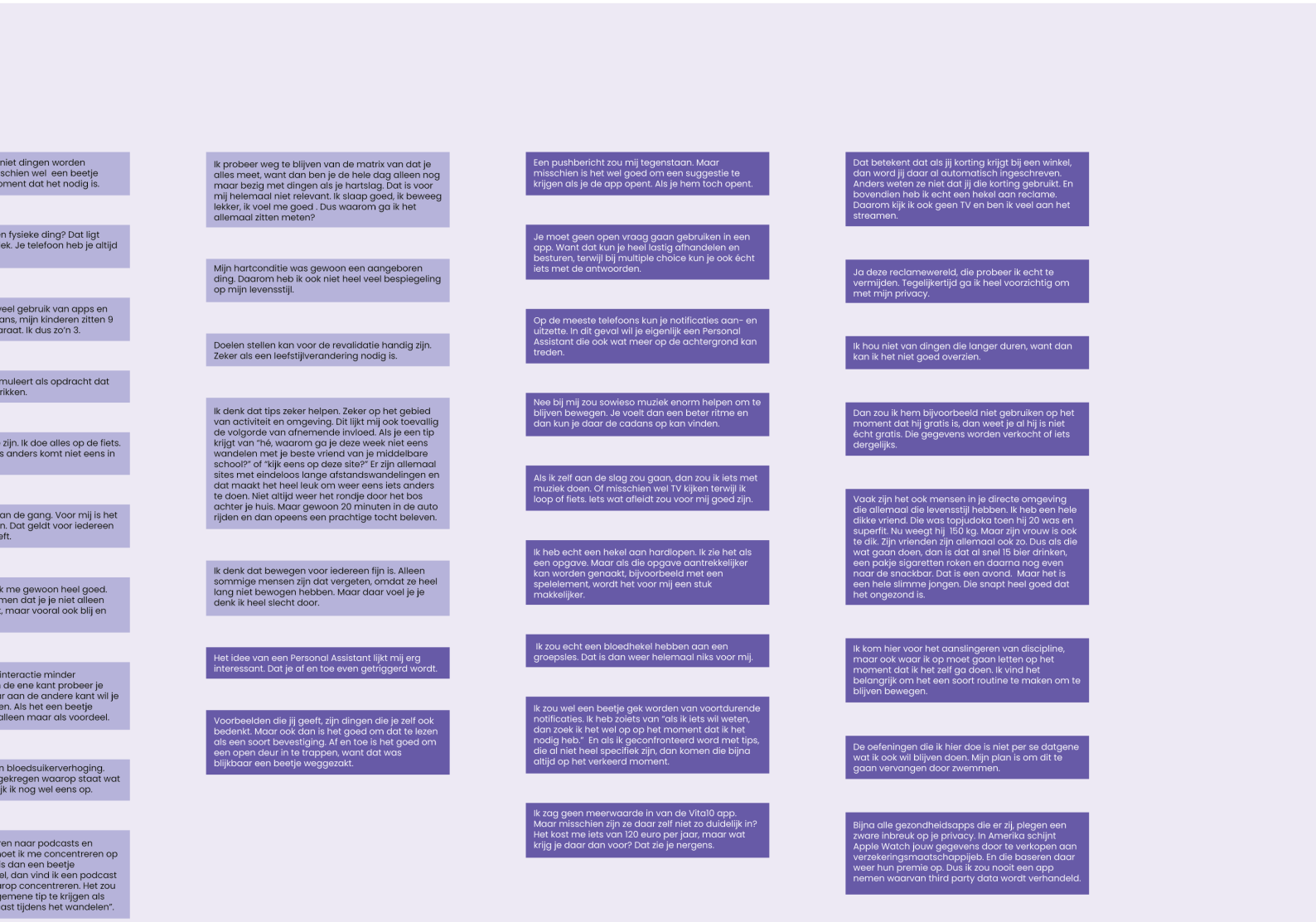
During the Discover-phase, one-hour one-on-one conversations with patients (N=3) enrolled in CardioVitaal's CR-program were conducted. These sessions delved into their motivations, barriers, as well as their needs and preferences, providing comprehensive insights.

This appendix provides a concise overview of the participants' insights gleaned from the interviews. Based on the conversations, participants could be assigned to the different patient types as follows:

- Participant 1.1: Male (63) - Patient type C
- Participant 1.2: Male (51) - Patient type C
- Participant 1.3: Male (57) - Patient type B



The image below showcases a curated selection of quotes carefully extracted from each interview, capturing the essence of the participants' viewpoints. The quotes were meticulously chosen and clustered to serve as invaluable input throughout the project. Upon project completion, summaries were crafted to encapsulate the essence of the conversations. Similar strategies were applied in analyzing patient feedback during co-creative sessions and prototype tests.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ast tijdens het wandelen".
Ik probeer weg te blijven van de matrix van dat je alles meet, want dan ben je de hele dag alleen nog maar bezig met dingen als je hartslag. Dat is voor mij helemaal niet relevant. Ik slaap goed, ik beweeg lekker, ik voel me goed . Dus waarom ga ik het allemaal zitten meten?
Mijn hartconditie was gewoon een aangeboren ding. Daarom heb ik ook niet heel veel bespiegeling op mijn levensstijl.
Doelen stellen kan voor de revalidatie handig zijn. Zeker als een leefstijlverandering nodig is.
Ik denk dat tips zeker helpen. Zeker op het gebied van activiteit en omgeving. Dit lijkt mij ook toevallig de volgorde van afnemende invloed. Als je een tip krijgt van "hé, waarom ga je deze week niet eens wandelen met je beste vriend van je middelbare school?" of "kijk eens op deze site?" Er zijn allemaal sites met eindeloos lange afstandswandelingen en dat maakt het heel leuk om weer eens iets anders te doen. Niet altijd weer het rondje door het bos achter je huis. Maar gewoon 20 minuten in de auto rijden en dan opeens een prachtige tocht beleven.
Ik denk dat bewegen voor iedereen fijn is. Alleen sommige mensen zijn dat vergeten, omdat ze heel lang niet bewogen hebben. Maar daar voel je je denk ik heel slecht door.
Het idee van een Personal Assistant lijkt mij erg interessant. Dat je af en toe even getriggerd wordt.
Voorbeelden die jij geeft, zijn dingen die je zelf ook bedenkt. Maar ook dan is het goed om dat te lezen als een soort bevestiging. Af en toe is het goed om een open deur in te trappen, want dat was blijkbaar een beetje weggezakt.
Een pushbericht zou mij tegenstaan. Maar misschien is het wel goed om een suggestie te krijgen als je de app opent. Als je hem toch opent.
Je moet geen open vraag gaan gebruiken in een app. Want dat kun je heel lastig afhandelen en besturen, terwijl bij multiple choice kun je ook écht iets met de antwoorden.
Op de meeste telefoons kun je notificaties aan- en uitzette. In dit geval wil je eigenlijk een Personal Assistant die ook wat meer op de achtergrond kan treden.
Nee bij mij zou sowieso muziek enorm helpen om te blijven bewegen. Je voelt dan een beter ritme en dan kun je daar de cadans op kan vinden.
Als ik zelf aan de slag zou gaan, dan zou ik iets met muziek doen. Of misschien wel TV kijken terwijl ik loop of fiets. Iets wat afleidt zou voor mij goed zijn.
Ik heb echt een hekel aan hardlopen. Ik zie het als een opgave. Maar als die opgave aantrekkelijker kan worden genaakt, bijvoorbeeld met een spelelement, wordt het voor mij een stuk makkelijker.
Ik zou echt een bloedhekel hebben aan een groepsles. Dat is dan weer helemaal niks voor mij.
Ik zou wel een beetje gek worden van voortdurende notificaties. Ik heb zoiets van "als ik iets wil weten, dan zoek ik het wel op op het moment dat ik het nodig heb." En als ik geconfronteerd word met tips, die al niet heel specifiek zijn, dan komen die bijna altijd op het verkeerd moment.
Ik zag geen meerwaarde in van de Vita10 app. Maar misschien zijn ze daar zelf niet zo duidelijk in? Het kost me iets van 120 euro per jaar, maar wat krijg je daar dan voor? Dat zie je nergens.
Dat betekent dat als jij korting krijgt bij een winkel, dan word jij daar al automatisch ingeschreven. Anders weten ze niet dat jij die korting gebruikt. En bovendien heb ik echt een hekel aan reclame. Daarom kijk ik ook geen TV en ben ik veel aan het streamen.
Ja deze reclamewereld, die probeer ik echt te vermijden. Tegelijkertijd ga ik heel voorzichtig om met mijn privacy.
Ik hou niet van dingen die langer duren, want dan kan ik het niet goed overzien.
Dan zou ik hem bijvoorbeeld niet gebruiken op het moment dat hij gratis is, dan weet je al hij is niet écht gratis. Die gegevens worden verkocht of iets dergelijks.
Vaak zijn het ook mensen in je directe omgeving die allemaal die levensstijl hebben. Ik heb een hele dikke vriend. Die was topjudoka toen hij 20 was en superfit. Nu weegt hij 150 kg. Maar zijn vrouw is ook te dik. Zijn vrienden zijn allemaal ook zo. Dus als die wat gaan doen, dan is dat al snel 15 bier drinken, een pakje sigaretten roken en daarna nog even naar de snackbar. Dat is een avond. Maar het is een hele slimme jongen. Die snapt heel goed dat het ongezond is.
Ik kom hier voor het aanslingeren van discipline, maar ook waar ik op moet gaan letten op het moment dat ik het zelf ga doen. Ik vind het belangrijk om het een soort routine te maken om te blijven bewegen.
De oefeningen die ik hier doe is niet per se datgene wat ik ook wil blijven doen. Mijn plan is om dit te gaan vervangen door zwemmen.
Bijna alle gezondheidsapps die er zij, plegen een zware inbreuk op je privacy. In Amerika schijnt Apple Watch jouw gegevens door te verkopen aan verzekeringsmaatschappijeb. En die baseren daar weer hun premie op. Dus ik zou nooit een app nemen waarvan third party data wordt verhandeld.

Participant 1.1

The participant illuminated various facets of his approach to physical activities and well-being. The interviewee's inclination toward ambient sounds, as opposed to music, during activities, and his longstanding affinity for solo sports underscore his autonomy and competitive nature. The emphasis on feeling good in his body and the practice of self-reflection through attentive listening to his body reveal a holistic and mindful approach to fitness.

Despite initial reservations following his first encounter with the program, the interviewee experienced a transformative moment, realizing his capabilities exceeded his initial beliefs. His distinct perception of a heart attack reflects a resilient mindset, with the individual not considering it a severe issue. Unaware of the Vital10-app linked to the training program, the interviewee's voluntary participation and adherence to medication, coupled with a deliberate avoidance of learning medication names, highlight a conscious effort not to let illness dominate his daily thoughts.

In the program's second phase, centered around autonomy, the interviewee takes charge of his activities, aligning them with his daily preferences. His innate sense of duty, initially causing concerns about group sessions, stems not from a reluctance to share personal troubles but rather from a desire for efficiency.

The interviewee exhibits a deep understanding of his situation without a constant need for discussion, symbolized by his choice to forego wearing a watch to liberate himself from the constraints of time. Future plans post-retirement remain undefined, reflecting a sense of spontaneity and an openness to embracing uncertainties.

Stress's impact on blood sugar prompts the interviewee to adhere to a specific dietary list, showcasing a proactive approach to managing his health. Despite social pressures to drink, the interviewee values the benefits of an alcohol-free lifestyle, illustrating a commitment to well-being beyond physical activity.

The program's positive influence is evident in the interviewee's increased activity levels, marking a restart for his confidence. Notably, his heart attack is attributed not to an unhealthy lifestyle but rather as a factor beyond typical associations. The interviewee's hope to avoid feeling unwell throughout the day aligns with his preference for focusing on the short-term effects of his activities, a perspective that contrasts with the heightened concerns expressed by his friends. Collectively, these insights paint a comprehensive picture of the interviewee's approach to well-being, emphasizing autonomy, mindfulness, and a nuanced understanding of health.

Participant 1.2

The interviewee provided valuable insights into the levels of crafting theory - environment, activity, and self - acknowledging that he hadn't explicitly categorized them in such terms before. He emphasized the significance of receiving tips, particularly regarding the activity and the environment. Notably, he believed thre to be an order of decreasing influence in these areas, ranginf from the environment, to the activity to the self.

The interviewee shared personal experiences that underscored the motivational power of suggestions, such as trying different activities like walking with an old friend or exploring new routes. These instances, he believed, injected variety into routine physical activities, steering away from the monotony of familiar routes.

Within the rehabilitation program, the interviewee directed his focus towards uncovering his cardiovascular limits. He voiced a strong belief in the universal benefits of physical activity, emphasizing its positive impact on mental well-being. He pointed out that while some may have forgotten the joy of movement due to prolonged inactivity, engaging in physical activity can significantly improve one's overall mood and health.

The interviewee revealed personal habits like listening to podcasts and music, each tailored to specific activities. Music served as an energizing companion during runs, while podcasts became a preferred option for contemplative walks. He consciously steered away from extensive measurement and tracking, such as constant heart rate monitoring, citing his focus on overall well-being over meticulous data.

On the topic of technology, the interviewee expressed a preference for avoiding discount codes and resisted the idea of push notifications. He articulated the belief that setting small, achievable goals holds particular relevance, especially for those seeking a transformative lifestyle change. The interviewee stressed the importance of weaving healthy habits, like cycling, into one's daily routine, emphasizing that these habits often become second nature.

Recognizing the influential role of peer habits, the interviewee shared observations about friends with similar lifestyles. He recounted instances where shared activities often leaned towards unhealthy habits, emphasizing the social influence on lifestyle choices. The interview concluded on a positive note, with the individual articulating the profound sense of well-being experienced post-exercise, describing not only increased fitness but also heightened happiness and contentment derived from physical activity.

Participant 1.3

In the course of the comprehensive interview, the interviewee, while exploring the intricacies of maintaining dynamic routines, delved into the crucial aspect of discipline and self-imposed guidelines. The individual's keen interest in substituting existing exercises with swimming to enhance overall fitness showcased a thoughtful approach to personalized wellness.

Privacy apprehensions emerged as a dominant theme, influencing the interviewee's cautious stance toward certain health apps, given their penchant for selling user data. The interviewee expressed a clear aversion to proposed reward systems, grounded in the fear that such features might compromise privacy, particularly in the context of data being traded with insurance companies.

Delving into the intricacies of privacy settings, the interviewee stressed the need for meticulous exploration, especially when engaging with standard functionalities or apps that offer discounts. The individual's strong stance against push notifications and advertising underscored a commitment to privacy and an aversion to intrusive digital elements.

While receptive to the idea of gamification and the addition of a personal assistant feature to enhance engagement, the interviewee emphasized the paramount importance of customization. Acknowledging that not everyone responds uniformly to motivational strategies, the individual advocated for tailoring approaches to individual preferences and comfort.

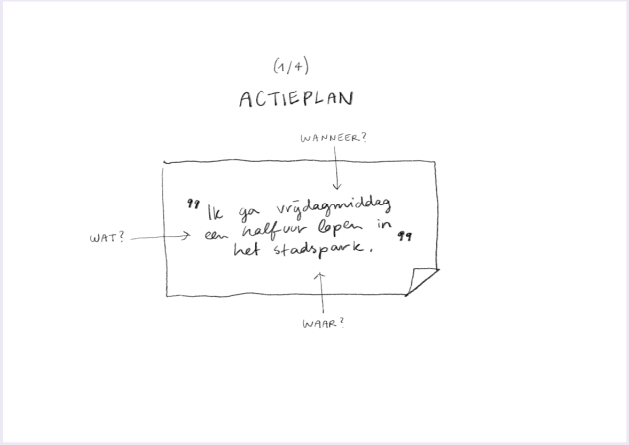
The potential appeal of incorporating a competitive or game-like element in fitness activities surfaced as a key consideration, highlighting the interviewee's belief in the positive impact of distraction and a buoyant mindset during exercises, such as running. The individual's inclination toward solo activities echoed the broader sentiment of finding joy in exercise rather than viewing it as a burdensome obligation.

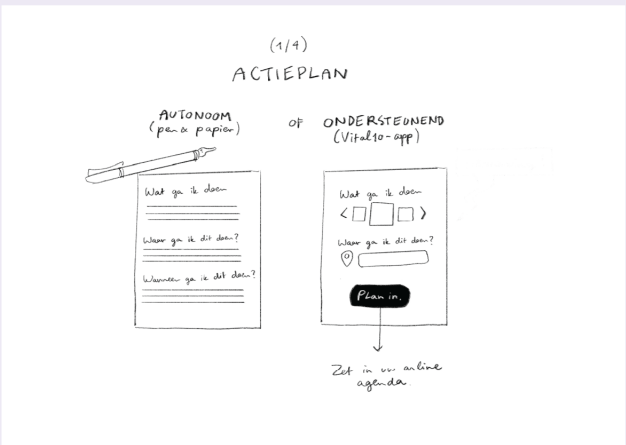
In essence, the interviewee painted a nuanced picture of individualized fitness approaches, anchored in privacy consciousness, an openness to tailored motivational strategies, and a commitment to fostering enjoyment in physical activities for sustained engagement.

6.3 Co-creative sessions

During the Develop-phase, one-hour one-on-one conversations with patients (N=5) who completed CardioVitaal's CR-program at least three months prior to the initiation of the project were conducted. Patients were involved in the design process through sketches. Small exercises, such as writing an action plan and reflection, aided in gaining insights into patients' preferences and behaviors.

This appendix presents participants' summarized feedback, structurized acording to the discussed steps of the crafting process: identifying, exploring, planning, and reflecting. Each session was recorded. Selected quotes were meticulously chosen from each session to vividly convey the viewpoints of the participants. These quotes served as valuable inputs for deriving insights, forming the cornerstone of the summaries presented.

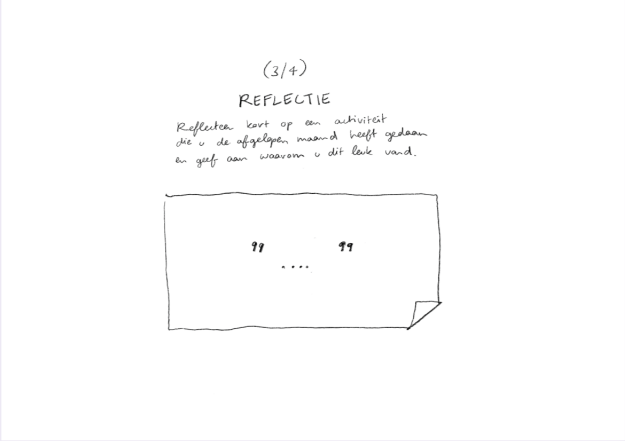


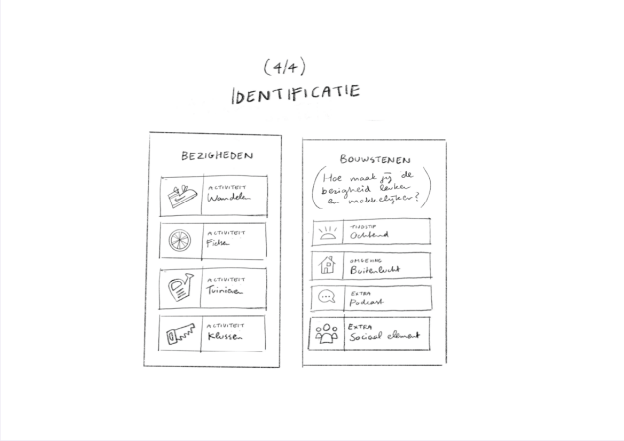


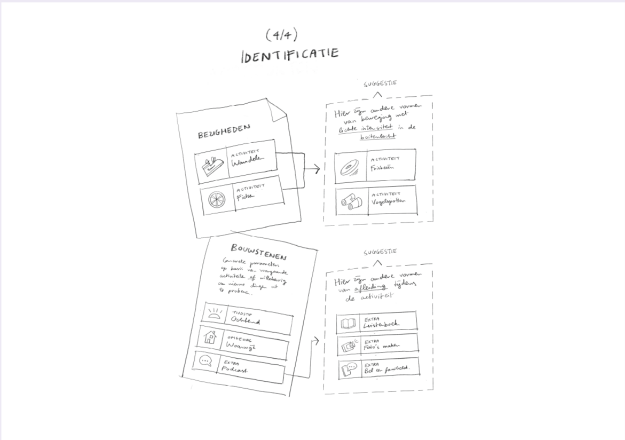
Although the crafting tool is aimed at patient type B, inputs from all different patient types was deemed relevant as it allowed for a more broad view on the crafting process. Based on the conversations, participants could be assigned to the different patient types as follows:

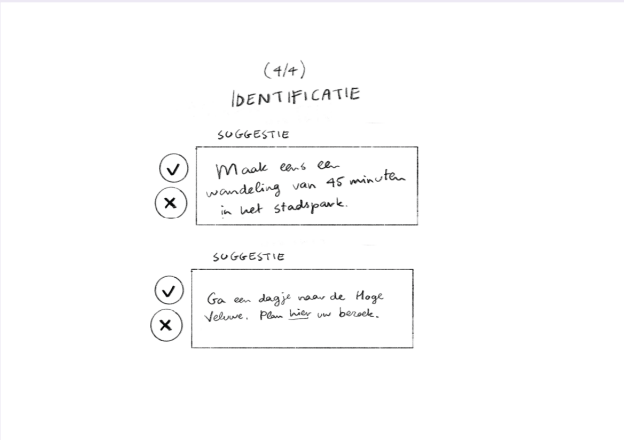
- Participant 2.1: Female (67) - Patient type B
- Participant 2.2: Female (56) - Patient type B
- Participant 2.3: Female (56) - Patient type B
- Participant 2.4: Male (59) - Patient type A
- Participant 2.5: Male (68) - Patient type C

The images below showcase the sketches that were reviewed with all patients during the co-creative sessions. These sketches facilitated discussions on the envisioned crafting interaction, encouraging participants to actively engage in developing action plans, reflecting on past experiences, and grasping the general concept idea.









Step 1: Identifying

Participant 2.1 (Type B)

She found the Vital10 app rather monotonous over time. The relaxation exercises that were proposed to her lacked variety and personalization. The engagement in these exercises wasn't discussed during discussions with CardioVitaal's healthcare professionals, which she would have preferred. Eventually, she lost interest. She would be more interested in an app tailored to her needs. She tries to be aware of exploring new interests - recently, she cut out hiking routes from a magazine and kept them as inspiration for future walks.

Participant 2.2 (Type B)

She was interested in the suggestions the app could offer, stimulating users to consider other options they might not think of themselves. It would be important for her that the suggestions are suitable. It would be helpful if the app simplified the process of creating action plans and helped her with setting up these. Not having to enter everything again but quickly setting up something new based on previous activities and identified facilitators.

Participant 2.3 (Type B)

She appreciated that activities weren't only focused on sports but also on things like cooking and gardening. She would like more context around each activity, so she can better understand how to approach and integrate the activity best. Facilitators could be linked to activities (e.g. you might enjoy music while cycling and listen to a podcast while walking). It's important for her to know what doesn't work as well. This is not perceived as negatively, but rather as enlightening. She finds the idea of suggestive building blocks appealing because it gives her the feeling of being thought about and adds value for her for using the app.

Participant 2.4 (Type A)

He likes the idea of insight to then base an action plan on these insights. He thinks he already somewhat unconsciously knows what works for him and sees it as a positive step to discuss this with professional caregivers during the CR-program.

Participant 2.5 (Type C)

He wonders to what extent people are aware of their preferences and insights regarding exercise. However, he sees the value in mapping these preferences and insights, especially for people who experience more difficulty with maintaining an active lifestyle. He notices that suggestions make him reconsider his personal approach and sees value in introducing more suggestions related to personal preferences and joy in the exercise process. He thinks it could be very beneficial for patients to first think about what they really like, what they enjoy doing themselves to use that as a starting point to kickstart the crafting process.

Step 2: Exploring

Participant 2.1 (Type B)

At the gym, she notice people listening to music during their workouts. It stimulates her curiosity to try it herself and see if it works for her. An action plan can help encourage this exploratory aspect more and not stick rigidly to sometimes less enjoyable routines.

Participant 2.2 (Type B)

Notifications can be helpful to motivate her turning the action plan into action, although she mentioned that they should not be too forceful. When presented with barriers (e.g. bad weather), she suggested the idea of setting up an alternative plan for such moments to remain active.

Participant 2.3 (Type B)

An app that tracks activity data would be very welcome. Checking off tasks in the app gives her a sense of progress. She always has her phone with her, while a booklet tends to disappear somewhere under the table. After surgery and anesthesia, she experienced more trouble with staying focused. Therefore, notifications and reminders could help her to stay focused. However, she would find it annoying if the app constantly urges her to move. But a positive, supportive tone of voice would make her feel motivated.

Participant 2.4 (Type A)

He needs external motivation and concrete appointments to become active. Although an app can help with structure, it's unsure if it's sufficient.

Participant 2.5 (Type C)

He enjoys aligning his movement with the weather. When the weather is favorable, he plans his activities accordingly. For him, there's no need to be reminded to exercise; he does it willingly. On sunny days, he prefers outdoor activities.

Step 3: Planning

Participant 2.1 (Type B)

It is beneficial for her to make her actions concrete. While planning, she prefers to focus on the positive outcomes of exercising.

Participant 2.2 (Type B)

She considered setting up the action plan as the most valuable part of the crafting process. The challenges of full-time work and limited time make regular exercise difficult. Planning ahead helps in creating time for exercising. These action plans can be devised at fixed times, for instance, at the end of the week. When shown an example action plan, the participant was particularly impressed by its simplicity. Explicitly writing down physical activities demonstrates how simple exercising can be. Support in creating action plans, as it might be challenging to do it independently, would be very helpful through an app. However, The Vital10 app currently feels complex when addressing challenges (logging in, extensive forms, etc.).

Participant 2.3 (Type B)

Currently, she doesn't document her plan on paper but discusses it with her partner. Expressing it verbally gives it validity and makes it easier for her to stick to it. This way, she somewhat makes a commitment to herself and her partner. When alone, she appreciates the support of an app to guide her and provide structure. She strongly believes that structure is crucial for most patients. Nowadays, she schedules specific activities in her agenda, especially the moments when she goes exercising at a facility. When exercising at home, she doesn't plan ahead. However, it would be useful in order to stick to them if something else comes up. Having that incentive is especially useful at the beginning, when picking up exercising. She maintains both a physical and online agenda. The physical agenda is always open on the table as a reminder. Although she likes physical objects, she appreciates the ability of an app to easily retrieve information.

Participant 2.4 (Type A)

He struggles immensely with creating an action plan. He feels lost and relies entirely on the physiotherapist to get moving. Although he had signed up for the gym when completing the CR-program, he couldn't keep up with it. The motivation to actually start moving is missing. He craves personal attention and support. He does see the attractiveness of working in small steps within an action plan and understands that this can make it more accessible. He acknowledges the value of action plans, even though he struggles to create one for himself.

Participant 2.5 (Type C)

He isn't keen on putting everything on paper. Exercise is already well integrated into his routine, and he enjoys being active. His pattern hasn't changed much after the cardiac event, because he was already quite active. The only difference is that he notices he does a lot more cardio exercises. He finds the proposed process of planning and reflecting rather cumbersome. Yet, he can imagine other patients struggling with it who are not familiar to exercising. He mainly makes mental promises to himself, not so much about exercising but more about, for instance, eating and drinking habits. He also found the challenges in the Vital10 app not fitting for him. He had to fill in long lists and ended up with a score, which didn't mean anything to him and had no added value.

Step 4: Reflecting

Participant 2.1 (Type B)

She finds it easy and comfortable to contemplate her exercise pattern. However, for her, it's more challenging to get active and motivate herself than to reflect on her activities. Although she is not inclined towards change or new discoveries, she is open to new experiences. Exploring new things based on past experiences might help her to make exercising more enjoyable. She prefers not to reflect immediately after the activity but rather at the end of the week. Currently, she exercises as a routine but realizes she might not reflect on it enough to make it more enjoyable. Although she often perceives exercising as unpleasant, she has had very positive experiences with movement when reflecting on them.

Participant 2.2 (Type B)

She mentioned that it's a good idea to reflect shortly after an activity to quickly jot down how she felt and what she enjoyed about it. She emphasized that the reflection should be brief and concise, especially when it comes to a short walk during lunch break when there's little time in between work. Reflecting on her feelings and emotions can help her find motivation for the next time when things get tough.

Participant 2.3 (Type B)

Verbally reflecting works very well for her. She enjoys discussing it with others and finds it enjoyable to contemplate what went well. She stresses the importance of self-appreciation for achieved goals and becoming aware of her feelings. She is hesitant to reflect extensively after every activity, rather after more intense activities. She also considers it relevant for the crafting tool to compliment and motivate patients on days when they're less active as exercising is not always necessary to experience a good feeling. This could contribute to focusing on the joy of exercising rather than promoting it as a neccessity.

Participant 2.4 (Type A)

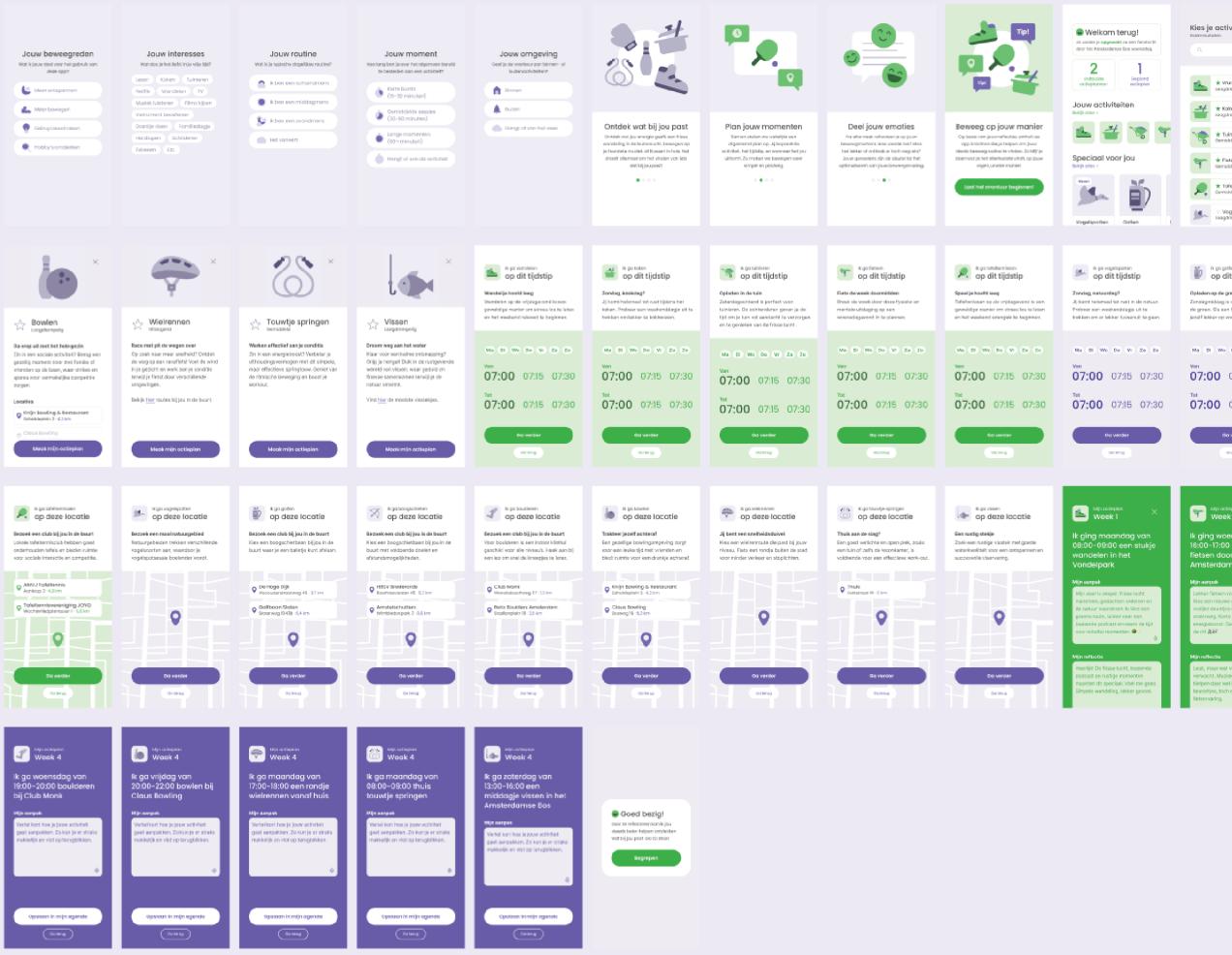
For extensive notes, he might prefer using pen and paper over an app due to the ease and speed of writing. Nevertheless, he appreciates the encouragement of an app and sees a combination of both as a good idea. He feels that the app provides more structure and can offer the feeling of a guided process, whereas a stand-alone product would require the user to be very persistent.

Participant 2.5 (Type C)

Reflection holds little value for him. He already feels comfortable with his exercise pattern and sees no need to constantly put it on paper. He's not focused on constantly measuring his body and does not rely on eHealth devices, but instead on his own feelings to know what his body needs. He simply enjoys being active without focusing too much on measurements or technology.

6.4 Prototype testing

During the Develop-phase, one-hour one-on-one conversations with patients (N=5), most of who completed CardioVitaal's CR-program at least three months prior to the initation of this project, were conducted. These in-depth discussions served as a means to gather valuable insights into the nuances of user interaction, with participants thinking aloud to articulate their experiences. The focus was on refining the application's engagement levels and ensuring an intuitive user experience. Additionally, the various facets and screens of the application were thoroughly explored, allowing for the collection of diverse inputs and suggestions.



This appendix presents participants' summarized overall impressions and thoughts. few of these participants had been previously engaged in discussions. This is attributed to the challenge of recruiting patients and the convenience of involving individuals already acquainted with the project. Based on the conversations, participants could be assigned to the different patient types as follows:

- Participant 2.1: Female (67) - Patient type B
- Participant 2.2: Female (56) - Patient type B
- Participant 1.1: Male (57) - Patient type B
- Participant 3.1: Female (63) - Patient type B
- Participant 3.2: Male (61) - Patient type B

The image below offers a comprehensive view of the various screens designed for the prototype, enabling patients to fully immerse themselves in the application experience.

Participant 2.1

The interviewee was interested in sharing emotions and positive experiences with others to foster sense of community, creating a supportive environment within the app. Enthusiasm for other success stories stems from the motivational boost gained by understanding others' approaches.

In terms of activities, the interviewee suggested refining the process to make them more tangible and rewarding. The ability to personalize the app by selecting favorite activities was highlighted as beneficial, streamlining navigation. Additionally, the prospect of incorporating features like a pedometer was seen as a potential enhancement to the user experience, adding a layer of engagement.

A notable preference for flexibility was expressed, particularly in terms of time commitments. While the interviewee appreciates the value of knowing daily or weekly plans, the option to avoid strict time specifications provides a sense of breathing room. In fact, over-scheduling is met with resistance.

The interviewee finds fulfillment in documenting activities, citing an example of dedicating half an hour to cycling and opting for an electric bike for longer distances. This approach aligns with the perceived freedom that the application provides. The role of emotions emerged as a significant motivational factor, emphasizing the importance of understanding the underlying purpose behind the activities.

Suggestions for practical tips include providing direct links to cooking recipes or playlists to immediately formulate an action plan. Maintaining a balance between guidance and user freedom is emphasized.

Participant 2.2

The interviewee appreciates the clarity provided by the application in reflecting on their feelings and executed activities. The distinct use of colors facilitates a clear distinction, aiding in identifying what is yet to be explored.

The writing style employed in the app is particularly appealing to the interviewee, described as spontaneous, original, and infused with humor, creating an engaging and approachable tone that enhances the reading experience.

The app's low-threshold initiation is deemed beneficial. It is considered particularly useful for individuals without established routines. The interviewee suggests an innovative idea of allowing the app to evolve with the user, offering additional insights and data-driven information with prolonged or more frequent use. However, caution is advised to prevent the app from becoming overly focused on sports-related data, given the abundance of similar apps in the market.

Acknowledging individuals with difficulty in engaging in physical activities, the interviewee proposes tailored suggestions, such as incorporating exercises while watching TV or dancing to favorite music. Household chores are also suggested as potential ways to incorporate movement.

Expanding the app to allow users to discover alternative activities or approaches, highlighting the exploratory aspect, is recommended. While the interviewee values action plans, a suggestion is made to provide a bit more flexibility, especially regarding scheduling, while appreciating the inclusion of duration information.

Recognizing progress and incorporating a reward system is deemed essential. The interviewee finds pleasure in knowing the number of steps taken, distance covered, or new activities attempted during the week, adding a motivational aspect to their engagement.

Participant 1.1

The interviewee emphasizes the importance of maintaining a smooth flow within the app, highlighting the need for seamless navigation without getting lost in various screens. The ability to navigate easily without repeatedly returning to a home screen is deemed essential for a user-friendly experience.

Suggesting a potential commercial aspect, the interviewee proposes linking golf clubs or bowling alleys to the app, creating opportunities for users to explore new activities in these affiliated establishments.

Commencing with general questions, such as focusing on personal goals, body parts of interest, or preferences for group activities, is regarded as a positive starting point for the app's engagement process.

The planning feature is appreciated, especially for creating routines. The app is seen as particularly beneficial at the beginning of the CR program, aiding individuals in restructuring their lives. Planning provides a sense of structure, and healthcare professionals can offer valuable support during this phase.

Over time, the interviewee suggests transitioning the app's focus from providing tips for activities to offering insights within activities. Exploring ways to enhance activities that already align with the user's preferences and tracking progress become valuable aspects.

For reflections, the interviewee recommends separating effort and fulfillment. This approach provides a more comprehensive understanding, considering both the intensity of the activity and the subsequent feelings, allowing users to appreciate the potential for significant rewards following challenging efforts.

Regarding push notifications, the interviewee acknowledges their potential to offer extra stimulation but emphasizes the importance of the option to toggle them on or off.

Participant 3.1

The interviewee, who has a history of engaging in sports, is currently rediscovering activities. The mention of the suggestion to take up archery immediately evoked memories, sparking an interest in revisiting this pastime.

The ability to input both the location and route details for activities is considered valuable. Additionally, having visibility into the number of kilometers covered provides a tangible sense of progress, contributing to a better understanding of one's achievements.

Routine activities like cooking may not require scheduling, as they are already ingrained habits. However, the interviewee recognizes the potential for the app to enhance awareness, particularly for those unaware of the nutritional aspects of their diet. Providing explanations, tips, or healthy recipes could be immensely beneficial in this regard.

The app is praised for its clear layout, offering engaging tips within activities and employing distinct colors to differentiate completed tasks. The interviewee expresses that such an app would have been instrumental in facilitating lifestyle changes in the past. While the interviewee has already successfully transformed their lifestyle, they note that the app might be used less frequently now, as they already know what works for them. Presently, the focus is on monitoring daily steps and tracking nutritional intake, adhering to the belief that "measuring is knowing."

Participant 3.2

The interviewee emphasizes the effectiveness of indicators as powerful motivators. Observing tangible results and understanding the impact of adjustments and efforts not only fosters curiosity about personal development but also contributes to heightened awareness. Over time, this process evolves into a routine that becomes indispensable.

The app is perceived as particularly intriguing for individuals who may be alone or experiencing some level of loneliness. It provides a sense of having a coach who consistently offers guidance, someone to lean on and share the journey with.

The interviewee appreciates the app's writing style, emphasizing that a more relaxed approach is motivating. Unlike a coach who imposes strict directives, the preference lies in a more informal and encouraging interaction, which aligns with the atmosphere conveyed by the app.

Navigating the app is described as easy, with clear visibility and well-designed illustrations that promptly convey information. The interviewee notes the app's effectiveness in presenting information in manageable steps. Acknowledging the tendency to take on too much at once, the app's guidance encourages a balanced pace, allowing for breaks and advising on a sustainable rhythm. The approach is not solely prescriptive but also encourages enjoyable activities and moments of rest.

Crafting a healthy lifestyle. Designing a tool for cardiac patients.

MSc Graduation thesis 2023 - 2024 by L.M.A. van Dijk