Master Thesis:

Designing a Tool to Support the Integration of Activity Tracker Data in Blended Cardiac Rehabilitation

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Preface

This thesis marks the final step of my master's graduation project for the MSc. Design for Interaction at Delft University of Technology. Over the past months, I worked on a design project focused on strengthening blended care within the cardiac rehabilitation pathway at Basalt Leiden. The project allowed me to explore how activity tracker data from The Box can be integrated into existing care practices in a way that supports healthcare professionals.

Working in the context of cardiac rehabilitation showed me how important it is to design not only for patients, but also for the professionals who need to use and implement new tools in daily practice. I learned how complex healthcare innovation can be, especially when digital tools, organisational routines, patient needs, and professional workflows come together.

I would like to thank my supervisory team, Jos and Armagan, for their guidance and support throughout the project. The weekly meetings helped me reflect on my process, sharpen my decisions, and improve my work. I am also grateful to my company mentor and client, Esmee, for her practical feedback and support within the Basalt context.

I would also like to thank Kim Nouwen, who was working on her thesis during the same period. Going through this process together was motivating and helped me stay focused throughout both the thesis and the master's programme. Finally, I would like to thank my friends and family for their support, patience, and encouragement during this project.

Abstract

This graduation project focused on strengthening the blended cardiac rehabilitation pathway at Basalt Leiden by exploring how activity tracker data from The Box, a home-monitoring initiative developed by LUMC for cardiac patients, could be meaningfully integrated into daily practice. Basalt's assignment was to identify possible bottlenecks in the integration of this data and, based on the identified insights and opportunities, a tool is designed that supports its implementation. Integrating step count data is important because it can provide physiotherapists with more objective insight into patients' daily physical activity. Currently, remote coaching moments largely depend on patients' self-reported activity, while Basalt aims to make rehabilitation more data-informed, personalised, and supportive of long-term behaviour change.

The project followed the Double Diamond process, moving from broad exploration towards a focused design proposal. A literature review was conducted on cardiac rehabilitation, blended care, hybrid care, technology adoption, and behaviour change. This was complemented by context research at Basalt, including semi-structured interviews, stakeholder walk-alongs, stakeholder mapping, thematic analysis, and journey mapping. Insights were gathered from patients, physiotherapists, other healthcare professionals, organisational stakeholders, and researchers to understand the current pathway, stakeholder needs, and barriers to implementation.

The research showed that blended care is already present at Basalt, especially within physiotherapy through physical training, home exercises via Physitrack, and evaluation phone calls. However, it is not yet clearly defined, consistently introduced, or structurally embedded in daily practice. Patients are not always sufficiently onboarded, which contributes to limited engagement with digital tools. Physiotherapists also differ in how they apply blended care, partly due to the absence of a shared workflow. In addition, the findings showed that remote coaching currently relies strongly on subjective self-report. This supported Basalt's existing ambition to integrate activity tracker data into the pathway, as step count data could provide physiotherapists with more objective insight into patients' daily physical activity. However, the findings also showed that this data will only be useful if it supports coaching in a practical way and does not create extra workload.

Based on these insights, the design direction shifted towards supporting Basalt's organisational team in onboarding physiotherapists to the use of activity tracker data. The final concept, Steps2Coach, consists of a physical pathway cube and a supporting poster. The cube visualises six phases of the physiotherapy trajectory: physio intake, physical treatment, home training, evaluation preparation, evaluation phone call, and aftercare. Each side explains the patient milestone, the physiotherapist's role, the added value of activity tracker data, and a coaching prompt. The poster provides additional context about The Box and practical support. Together, these elements make activity tracker data visible, tangible, and connected to concrete coaching moments. Evaluation showed that Steps2Coach is clear, engaging, and relevant as a first step towards implementation, while further testing and practical integration are still needed.

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1 Introduction

This chapter introduces the graduation project and outlines its overall direction. It first presents the project background and scope, followed by the project aim and research questions. The chapter then describes the strategy and methods used throughout the project and concludes with the ethics and AI statement.

1.1 Project Background

Cardiovascular disease (CVD) remains a substantial public health challenge in the Netherlands, affecting an estimated 1.8 million people in 2024 (Hart- en Vaatziekten | Leeftijd en Geslacht | Totaal, 2026).

Despite ongoing medical advances, heart disease continues to impose significant long-term burdens on patients, healthcare professionals, and the healthcare system. For patients, a cardiac condition often leads to physical, mental, and social challenges, accompanied by uncertainty about daily functioning and recovery (Borkowski & Borkowska, 2024).

Cardiac rehabilitation (CR) is an evidence-based intervention that supports recovery, reduces the risk of recurrent cardiac events, and improves quality of life. It is typically delivered by a multidisciplinary team consisting of cardiologists, physiotherapists, occupational therapists, dietitians, and psychologists. Despite its proven benefits, fewer than 40% of eligible patients participate in formal cardiac rehabilitation programmes. Barriers such as older age, travel distance, and insufficient referral, contribute to this discrepancy between recommended and actual participation (Eijsvogels et al., 2020).

This limited participation takes place in a broader healthcare context that is increasingly under pressure. The Dutch Integraal Zorgakkoord emphasises the need to maintain healthcare that is accessible, high-quality, and affordable, while acknowledging that demand for care continues to rise. At the same time, staff shortages, high workload, and administrative burden are placing increasing strain on healthcare professionals and the system as a whole. As a result, the agreement calls for a fundamental transition towards more appropriate and sustainable forms of care delivery. Within this transition, digital care is seen as an essential means of supporting scarce healthcare professionals, reducing pressure on the system, and enabling patients to take a more active role in managing their health (ActiZ et al., 2022). This makes blended care, the combination of digital and face-to-face care, increasingly important within cardiac rehabilitation (Hohberg et al., 2022).

1.2 Project Scope

This graduation project takes place within the domain of cardiac rehabilitation at Basalt Leiden, a rehabilitation centre that offers multidisciplinary cardiac rehabilitation. Within Basalt, they work with a blended care approach, in which centre-based rehabilitation is combined with digital and remote elements such as online modules, phonecalls and Physitrack (digital exercise videos).

The assignment from Basalt focuses on further strengthening the Blended Care Cardiac Rehabilitation Pathway through the integration of data from the Box. The Box is a home-monitoring initiative developed by Leiden University Medical Center (LUMC) for cardiac patients. It was originally developed o improve follow-up care by enabling more frequent remote monitoring of key health parameters, while reducing the burden of repeated outpatient visits for patients and lowering the workload for healthcare professionals. In the

original LUMC concept, patients are monitored for one year using several devices at home, including ECG device, blood pressure monitor, weight scale, and activity tracker (Treskes et al., 2017). While the Box collects multiple types of health data, the activity tracker is particularly relevant for cardiac rehabilitation, as it provides direct insights into patients' physical activity behaviour in daily life.

Basalt's ambition is specifically to implement the activity tracker data from the Box into the cardiac rehabilitation pathway, so that physiotherapists can use more objective data in their remote coaching. Currently, remote coaching largely depends on patients' subjective reports of their physical activity. Integrating activity tracker data could therefore help physiotherapists monitor patients more objectively, provide more informed and personalized coaching, and better support patients in maintaining physical activity behaviour during rehabilitation and aftercare.

1.3 Project Aim

The growing demand for rehabilitation care, combined with limited clinical capacity, places increasing pressure on healthcare professionals involved in cardiac rehabilitation. Although Basalt already offers blended cardiac rehabilitation, opportunities remain to strengthen the current pathway by meaningfully integrating data from the Box into daily care practice. The primary aim of this five-month graduation project is to identify the main bottlenecks in implementing Box data within the blended care cardiac rehabilitation pathway at Basalt Leiden. Building on these insights, the project aims to develop a tool that supports its implementation in the Physiotherapy workflow.

To achieve this, the current blended care pathway will first be examined in depth to understand how care is currently organised, how remote coaching is carried out, and where key strengths, challenges, and opportunities for improvement lie. This will be explored through interviews and walk-alongs, involving key stakeholders such as physiotherapists, patients, and other healthcare workers. These insights will then form the basis for identifying design opportunities and developing the final design proposal.

1.4 Research Question

How can the cardiac rehabilitation care pathway at Basalt be redesigned to strengthen blended care, supported by data from the Box, in a way that supports physiotherapists in remote-coaching?

<u>Sub-Research Questions:</u>

In order to address the main research questions, six sub-questions are formulated to ensure guidance during the project:

1. *What is blended care within cardiac rehabilitation and how is it currently applied in similar contexts/practices?*
2. *How is the current Blended Care cardiac rehabilitation care pathway at Basalt Leiden structured?*
3. *What are the needs, experiences, and challenges of patients and healthcare professionals at Basalt Leiden regarding blended care, remote coaching, and the use of data from the Box?*
4. *What are possible design opportunities in order to improve the current blended care cardiac rehabilitation pathway at Basalt Leiden?*
5. *How can data from the Box support physiotherapists from Basalt Leiden in understanding, monitoring, and coaching patients' physical activity behaviour during cardiac rehabilitation?*
6. *What design could support the meaningful integration of Box data into the blended cardiac rehabilitation pathway at Basalt Leiden?*

1.5 Strategy & Methods

This research project will adopt the Double Diamond method, consisting of the following four stages: discover, define, develop and deliver (see Figure 1.1). The figure also showcases the conducted research methods per phase.

The double diamond method is well-suited for this assignment because it supports a broad exploration of the current blended care cardiac rehabilitation pathway at Basalt (discover), insights are then synthesized to narrow down the focus into a design brief (define). Potential solutions to the defined problem statement are then developed (develop), followed by the finalisation of the solution, involving validating the concept with relevant stakeholders.

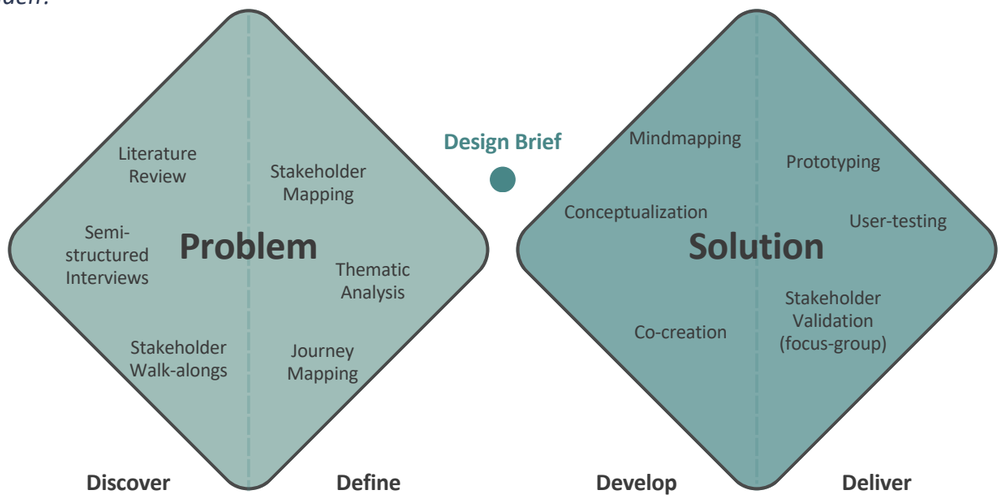


Figure 1.1: The Double Diamond Method

1.6 Ethics

This project involves multiple stakeholders, including healthcare professionals and cardiac rehabilitation patients, whose experiences provide valuable insights into identifying bottlenecks and opportunities. Participation was voluntary, and all information was handled with care. To ensure that the research was carried out in a safe and ethical manner, a Human Research Ethics Committee (HREC) application was approved under application number 6587. Participants received clear information and instructions and provided informed consent forms (see Appendix A-C). Additionally, a data management plan was established to ensure secure handling of all data. During interviews, patients were only asked about their experiences at Basalt; no medical information was requested or collected.

1.7 AI Statement

AI tools were used in this research solely to support clarity and quality of writing. In addition, AI was used as an assistive tool during the coding of interview data to help identify recurring themes. Prior to using AI for analysing interview transcripts, all identifiable and sensitive information was removed to ensure data privacy.

The limitations of AI are acknowledged, including the potential for generating incorrect or misleading information. Therefore, all AI-generated outputs were carefully reviewed and verified. AI was used strictly as a supportive tool and not as a replacement for independent research. All ideas and interpretations were developed by the researcher, with AI only contributing to improving clarity and structuring of the work.

2 Literature Review

This chapter presents a literature review on cardiac rehabilitation, the definition of blended care, the integration of blended care within cardiac rehabilitation, and technology adoption and behaviour change. It concludes with a brief summary of the key findings and the identified literature gap.

The chapter aims to answer the following research question:

- *What is blended care within cardiac rehabilitation and how is it currently applied in similar contexts/practices?*

2.1 Introduction to Cardiac Rehabilitation

2.1.1 Cardiovascular Diseases

Cardiovascular diseases (CVDs) are the leading cause of death globally (World Health Organization: WHO, 2025), contributing to 32% of global deaths recorded in 2019 (Mahmood et al., 2024). In the Netherlands, an estimated 1.8 million people were affected by CVDs in 2024 (Hart- en Vaatziekten | Leeftijd en Geslacht | Totaal, 2026). CVDs include a broad range of conditions affecting the heart and blood vessels, including coronary heart disease, stroke, and peripheral vascular disease. Among these, coronary heart disease is one of the most prevalent and clinically significant conditions (Voedingscentrum, z.d.)

The development of cardiovascular diseases is largely associated with behavioural risk factors such as unhealthy diet, physical inactivity, tobacco use, and harmful alcohol consumption. Moreover, environmental factors like air pollution also contribute to their development. These factors lead to intermediate conditions such as hypertension, diabetes, high cholesterol, overweight, and obesity, all influenced by broader social, economic, and hereditary determinants (World Health Organization: WHO, 2025).

The most common heart diseases include:

- *Cardiac Arrhythmia* (heart rhythm disorder)*:* a condition when the heart beats too slowly, too quickly, or irregularly. It can occur continuously or only occasionally. Symptoms may include shortness of breath, chest pain or pressure, dizziness, and feelings of anxiety or tightness in the chest. There are many types of heart rhythm disorders (Hartstichting, 2026).
- *Heart Failure*: a condition in which the heart is unable to circulate blood through the body properly, often resulting in fatigue, fluid retention, and shortness of breath during physical activity or even at rest. There are two main types of heart failure: the heart may have difficulty relaxing (impaired filling) or difficulty contracting (impaired pumping). Heart failure can be caused by various underlying heart conditions and usually a chronic condition (Hartstichting, 2025a).
- *Myocardial Infarction* (heart attack): a condition that occurs when a coronary artery becomes blocked, causing damage to part of the heart muscle due to a lack of oxygen. As a result, part of the heart muscle is damaged. Chest pain is the most important symptom, and is typically described as a persistent, pressing, or crushing sensation that does not subside, even at rest. It is often accompanied by sweating, nausea, vomiting, radiating pain to the left shoulder or left arm, pale or greyish skin, and shortness of breath (Hartstichting, 2025b).

- *Angina Pectoris* (heart cramp): a condition, characterized by temporary chest pain caused by reduced blood flow to the heart muscle, usually due to narrowed coronary arteries, and the symptoms typically subside after rest. In angina pectoris, similar to a heart attack, a person experiences a painful, pressing sensation in the chest. This sensation may radiate to the neck, jaw, shoulder, or arm (Hartstichting, 2025b).

Treatment

Treatment of heart disease depends on the specific diagnosis and severity of the condition, and begins with establishing a clear diagnosis to determine the most appropriate care plan. Cardiologists work closely with patients through shared decision-making to select treatments that align with patient preferences and clinical needs. Common interventions include catheter-based procedures such as percutaneous coronary intervention (PCI), surgical options like coronary artery bypass grafting (CABG) valve surgery, and rhythm management therapies (Cardiologie Centra Nederland, 2022).

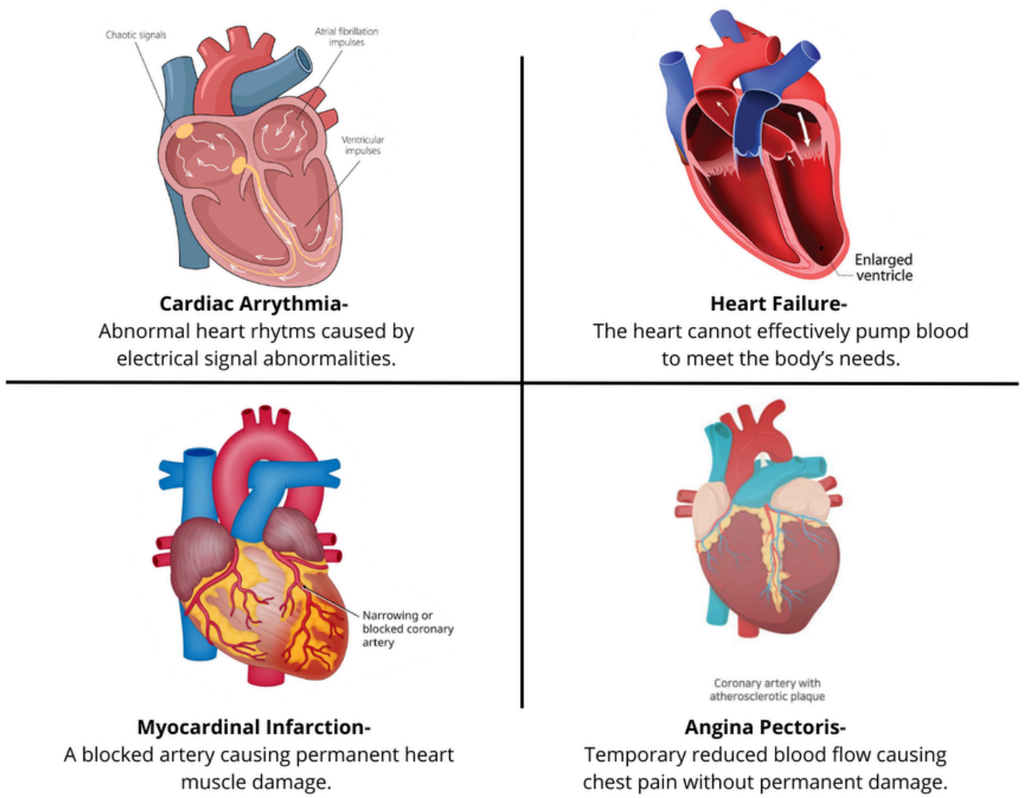


Figure 2.1: Overview of the most common heart conditions (Effective Causes & Treatment For Heart Arrhythmia - CVG Cares Cardiology | CVG, 2025; AgingCare.com, z.d.; Cadence Heart Centre, 2026; Stefan.St, 2026)

Despite ongoing medical advances, heart disease continues to impose significant long-term burdens on patients, healthcare professionals, and the healthcare system. For patients, a cardiac condition often leads to physical, mental, and social challenges, accompanied by uncertainty about daily functioning and recovery. Therefore, literature emphasises the importance of a holistic approach to care that integrates the treatment of not only physical symptoms but also psychological and social aspects (Borkowski & Borkowska, 2024).

2.1.2 Cardiac Rehabilitation

When experiencing burdens due to the effects of various types of heart diseases, it is crucial to engage in cardiac rehabilitation programs. Cardiac rehabilitation is defined by the World Health Organization as *"The sum of activities required to favourably influence the underlying cause of the disease and to provide the best possible physical, mental, and social conditions, so that patients may, through their own efforts, preserve or resume when lost, as normal a place as possible in the community."* (Federatie Medisch Specialisten, 2024).

Cardiac rehabilitation has been proven effective: it reduces the risk of mortality due to heart disease by 32 percent. Nevertheless, fewer than 40 percent of cardiac patients participate in a cardiac rehabilitation programme. This low participation rate is primarily due to older age, insufficient referral by physicians and practical barriers such as accessibility and transportation (Eijsvogels et al., 2020).

Patients

Cardiac rehabilitation is intended for patients who have recently or previously been diagnosed with a heart condition and who experience symptoms as a result (Federatie Medisch Specialisten, 2024). During cardiac rehabilitation, patients work together with healthcare professionals and peers on their recovery, learning to explore and potentially expand their physical and personal limits (Hartstichting, 2025a). Cardiac rehabilitation focuses on improving the patient's physical, psychological, and social functioning. The aim is to help patients cope with the long-term consequences of their condition, while also preventing further cardiac complications (Federatie Medisch Specialisten, 2024).

Living with a heart condition does not only affect the patient, but also their family members and relatives, who may experience feelings of insecurity, powerlessness, or sadness. Therefore, they can also participate in certain parts of the programme and receive support and information as well (Hartstichting, 2025a).

Rehabilitation Programme

The cardiac rehabilitation programme typically lasts between three to six months and usually takes place in a hospital or rehabilitation centre (Federatie Medisch Specialisten, 2024). Figure 2.2 illustrates the cardiac rehabilitation model as applied in the Netherlands.

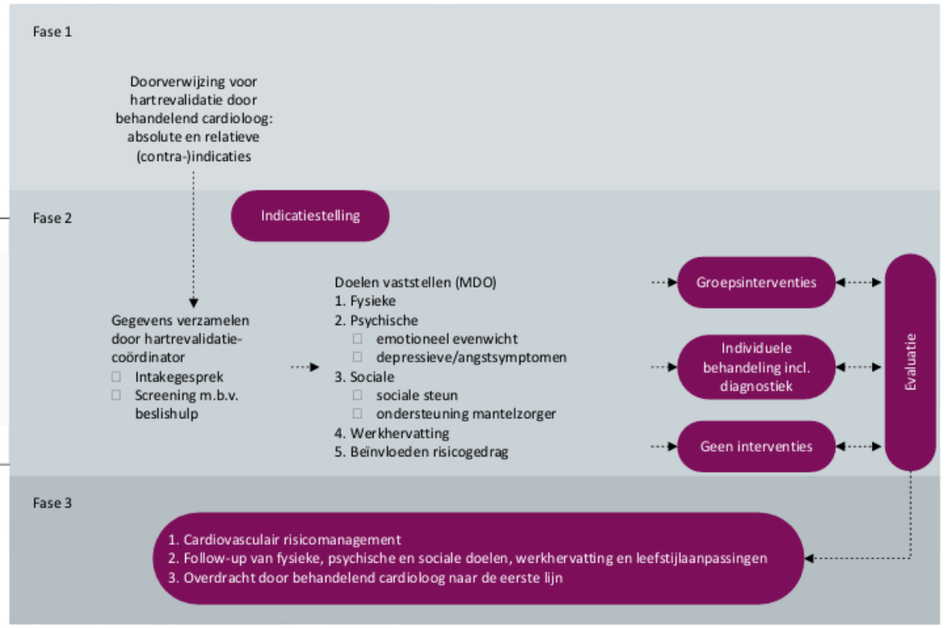


Figure 2.2: Dutch CR model (Federatie Medisch Specialisten, 2024)

Phase 1

Before the start of the cardiac rehabilitation programme, the patient's eligibility for participation is assessed. Patients are typically referred to cardiac rehabilitation by their treating cardiologist (from the hospital), often following a hospital admission or cardiac event (Federatie Medisch Specialisten, 2024).

Phase 2

Following referral, an intake and assessment are conducted with the clinician who holds overall responsibility for cardiac rehabilitation (e.g., a specialised cardiovascular nurse, nurse practitioner, physician assistant, or cardiologist). During this intake, medical, physical, psychological, and social information is collected, supported by an online questionnaire. Treatment goals are discussed, which will later be used to evaluate progress. In addition to this consultation, patients have an intake with a physiotherapist to assess physical limitations and define physical goals. When relevant, additional intake sessions may take place with a psychologist, dietitian, social worker, and/or occupational therapist (Federatie Medisch Specialisten, 2024).

The insights gathered during the intake phase are discussed within the multidisciplinary team and used to develop a personalised treatment plan. These goals are documented in the electronic health record (EHR), allowing both healthcare professionals and patients to monitor progress (Federatie Medisch Specialisten, 2024).

The rehabilitation programme itself is typically delivered in a group setting, although individual guidance may be provided when necessary. Cardiac rehabilitation follows a holistic, multidisciplinary approach and includes the following components (Hartstichting, 2025a):

- **Information provision:** Patients receive information on cardiovascular risk factors, the consequences of heart conditions, physical activity, healthy nutrition, and medication use. Smoking cessation programmes are offered when applicable.
- **Physical recovery:** Patients participate in supervised group sessions aimed at improving cardiovascular fitness under the guidance of a physiotherapist.
- **Psychological support:** Patients are supported in coping with anxiety, stress, and uncertainties related to their condition.
- **Social support:** Attention is given to resuming daily activities, including work, household responsibilities, and family life.

Phase 3

Before discharge, a final evaluation is conducted with the clinician responsible for cardiac rehabilitation, during which the patient and healthcare professional review achieved goals across physical, mental, and social domains. Moreover any remaining points of attention for sustaining lifestyle changes are identified. If goals have not been fully achieved, the responsible healthcare professional may refer the patient to primary care physiotherapy and/or psychological care, with follow-up supported through e-health monitoring. If, after evaluation in the multidisciplinary team, the programme is concluded, care is transferred to the treating cardiologist (from the hospital) or to primary care (Federatie Medisch Specialisten, 2024).

2.2 Blended Care Definition

Blended care is an intervention that is increasingly used in healthcare, especially in mental healthcare, physiotherapy, and chronic disease management. It is a relatively new concept within healthcare, which became more popular during COVID-19 (Van Zutphen, 2025).

Blended care is care that intentionally integrates digital and face-to face care within one treatment process. It is a coordinated combination of therapist-guided interventions (face-to-face) and digital interventions, and its combination is meant to complement each other (Hohberg et al., 2022).

Therapist-guided interventions focus more on personal and physical contact between therapist, specialist, coach, and patient. Examples include individual counseling, group sessions, or sport programmes. This face-to-face interaction results in social support, accountability, direct tailored feedback, and support for adherence. However, this physical treatment is time-consuming, expensive and location-dependent. Digital interventions on the other hand, such as apps, web-based tools, or online programmes, are more flexible as they are more accessible independent of time and place. Moreover, they are more scalable and often more cost-effective. However, when used on their own, they tend to have small or short-term effects, often accompanied by low adherence. Combining both approaches can therefore strengthen the intervention: the digital component can support self-monitoring and feedback, while the therapist-guided component can provide personal guidance, motivation, and problem-solving support (Hohberg et al., 2022).

Blended Care vs. Hybrid Care

Although the terms blended and hybrid are often used interchangeably, they do not refer to exactly the same approach. Drawing on the distinction between blended learning and hybrid learning, *blended* is understood as a design principle in which physical and digital activities are intentionally integrated into one coherent process, whereas *hybrid* refers to situations where some participants are physically present while others join online at the same time (Vrije Universiteit Amsterdam, 2026). In this project, this distinction is translated to healthcare. Blended care is therefore understood as the purposeful integration of face-to-face and digital components within one structured care pathway, whereas hybrid care refers to situations in which care is delivered simultaneously to patients both on-site and online.

2.3 Integrating Blended Care in Cardiac Rehabilitation

Research specifically focused on blended care within cardiac rehabilitation remains limited. Therefore, this section discusses insights from blended care in similar healthcare contexts, as well as examples of hybrid care practices within cardiac rehabilitation. Although hybrid care and blended care are not identical, these examples still provide valuable insights into how digital and physical care components can be integrated within cardiac rehabilitation.

2.3.1 Case Studies

According to Keteyian et al. (2021) successful implementation of hybrid CR depends on careful patient eligibility screening, safety protocols, staff and patient engagement, clear monitoring procedures, and integration of core CR components such as exercise, education, and risk-factor counselling. The paper also highlights that hybrid CR can help reduce barriers such as travel distance, work constraints, and limited access, but that further research is still needed to determine optimal programme design and long-term outcomes.

Seron et al. (2024) provide clinical evidence for hybrid care approach through a randomized clinical trial in which patients first received supervised centre-based sessions and then continued with home-based support through telephone calls and text messages. Their findings suggest that hybrid CR was not inferior to standard centre-based CR in terms of recurrent cardiovascular events and showed higher adherence to supervised sessions, indicating that hybrid models can be a feasible alternative when resources are limited.

Damery et al. (2025) add insight into patient and healthcare professional experiences. Their study found that hybrid CR was generally experienced as acceptable, convenient, and flexible. Patients valued being able to continue rehabilitation from home, felt reassured by remote monitoring, and experienced more ownership over their recovery. Healthcare professionals valued the ability to monitor patients' progress remotely and tailor support to individual needs.

Finally, Toonders et al. (2021) show that blended care in primary care can support personalisation, improve patient preparation before face-to-face sessions, reduce workload during consultations, and facilitate interprofessional collaboration. This is relevant for CR because it suggests that digital components should not function as separate add-ons, but as integrated parts of the care pathway that prepare, support, and extend face-to-face guidance.

Together, these studies suggest that blended care within CR can add value by making rehabilitation more flexible, personalised, data-informed, and supportive of self-management, while still preserving the importance of face-to-face professional guidance.

2.3.2 Patient Eligibility

The literature also shows that blended or hybrid CR is not automatically suitable for every patient. Keteyian et al. (2021) stress that most stable cardiac patients may be able to exercise remotely at relatively low risk, but that safety screening remains important.

Brouwers et al. (2021) further show that participation in hybrid cardiac rehabilitation is influenced by demographic and health-related factors. The most common reasons for non-participation were insufficient technical skills or lack of interest in digital health, preference for centre-based rehabilitation, and not being convinced of the added value of telerehabilitation. This suggests that patient eligibility should not only be assessed clinically, but also in relation to digital skills, motivation, confidence, health iteracy, psychological readiness, and personal preference.

2.3.3 Preconditions

Successful implementation of blended care within CR requires more than simply adding digital tools to an existing programme. Several preconditions need to be addressed first. At the patient level, acceptance of the digital component is an important challenge, especially when patients fear losing in-person contact with healthcare professionals (Weber et al., 2023).

At the professional and organisational level, Damery et al. (2025) show that hybrid CR requires sufficient staff training, time for patient onboarding, technical support, and organisational resources to integrate the new approach into daily practice. Their study also highlights practical barriers such as technical issues, governance delays, login problems, limited digital literacy, internet access, reduced social interaction, and uncertainty about long-term engagement.

Toonders et al. (2021) highlight that when healthcare professionals shift from a therapist role towards a coaching role, clear roles, instructions, and support are essential. In addition, the technology used should be reliable and user-friendly.

2.4 Technology Adoption and Behaviour Change

The successful implementation of blended care in cardiac rehabilitation does not only depend on patient engagement. It also depends on healthcare professionals' willingness and ability to adopt digital tools and data-driven practices, as they are the ones who inform, guide, and coach patients throughout the rehabilitation process.

Implementing activity tracker data places new demands on physiotherapists. They are not only expected to adopt a new technology, but also to change their way of working by integrating this data into their existing workflow and remote coaching practices. Therefore, a strong theoretical foundation is needed to understand what supports or hinders this adoption and to guide the implementation of the Box's activity tracker data in practice.

2.4.1 The Unified Theory of Acceptance and Use of Technology

In Figure 2.3 the Unified Theory of Acceptance and Use of Technology (UTAUT) research model can be seen. The theory explains technology adoption through four factors: performance expectancy (whether the tool improves work), effort expectancy (whether it is easy to use), social influence (whether important others support its use), and facilitating conditions (whether enough organisational and technical support is available) (Venkatesh et al., 2003).

UTAUT is relevant for guiding the design by ensuring that the final concept clearly communicates the added value, feels easy to use, is supported by the organisation, and fits within existing workflows.

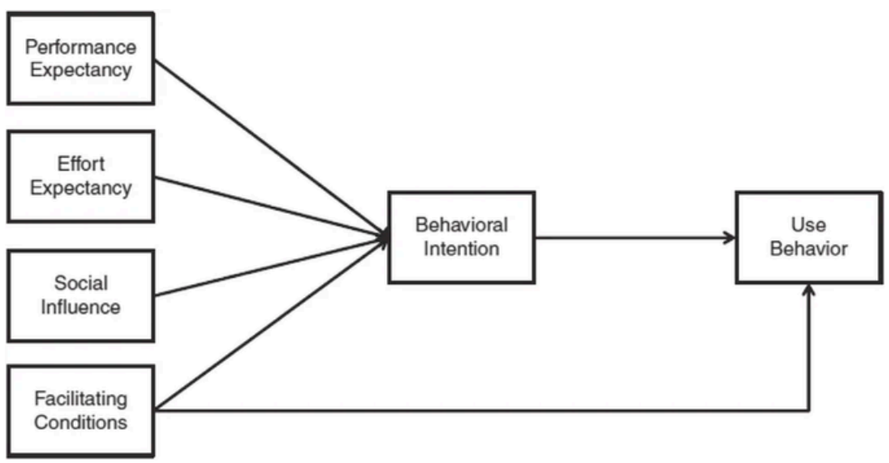


Figure 2.3: The Unified Theory of Acceptance and Use of Technology Research Model (Venkatesh et al., 2003)

2.4.2 The COM-B Model

The COM-B model in Figure 2.4 explains behaviour as the result of capability, opportunity, and motivation (Michie et al., 2011). Capability refers to having the knowledge and skills to perform a behaviour, opportunity refers to the external conditions that make the behaviour possible, and motivation includes both conscious decision-making and automatic processes such as habits and emotions.

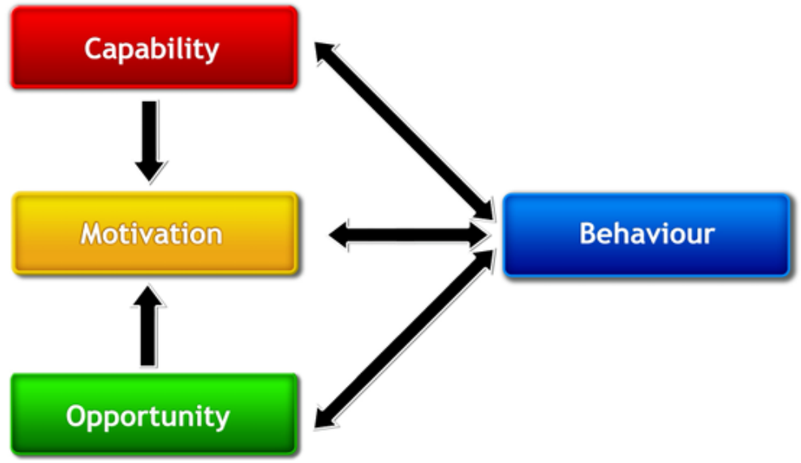


Figure 2.4: The COM-B Model (Michie et al., 2011)

The COM-B model adds to UTAUT by focusing not only on whether physiotherapists accept the technology, but also on whether they are able and motivated to use it in practice. For this project, COM-B can guide the design process by identifying what physiotherapists need to use activity tracker data effectively, such as knowledge, confidence, time, workflow support, and motivation to apply the data during remote coaching.

2.5 Summary of Key Findings

This chapter aimed to answer the following sub research question:

- *What is blended care and how is it currently applied in similar contexts/practices?*

Key findings

Cardiac rehabilitation is important for supporting patients' physical, psychological, and social recovery after a cardiac event, yet participation remains low and healthcare services are under increasing pressure. As care demand grows while professional capacity remains limited, digital tools can play an important role in making rehabilitation more flexible and sustainable. The literature shows that blended care can support this transition.

Blended care is not simply adding digital tools to care, but intentionally combining face-to-face and digital components within one coherent pathway. For this project, this means that Box activity data should be meaningfully integrated into Basalt's CR pathway, rather than used as a separate add-on. Literature on hybrid CR and telerehabilitation suggests that remote components can improve flexibility, accessibility, self-management, and data-informed coaching, but only when patients and professionals receive sufficient support.

Literature Gap

There is limited research specifically on blended care within cardiac rehabilitation, especially in relation to the practical integration of activity tracker data into physiotherapy workflows. Existing studies often focus on hybrid or telerehabilitation models, clinical outcomes, or patient participation, but less on how healthcare professionals actually adopt and use patient-generated data in day-to-day coaching. There is also limited insight into how physiotherapists experience this shift towards data-informed remote coaching, what support they need, and how digital data can be integrated without increasing workload or reducing the value of face-to-face care.

The next step in this project is therefore to explore how blended care currently functions within Basalt's cardiac rehabilitation pathway and where the main barriers and opportunities lie. This includes investigating how physiotherapists currently conduct remote coaching, how they perceive the use of Box activity data, what they need to feel confident and motivated to use it, and how patients experience digital tools within their rehabilitation process. To support this, UTAUT and COM-B will be applied throughout the design process to ensure that the final design supports both technology adoption and behaviour change among physiotherapists. These insights will be used to redesign the current blended care pathway.

3 Context Exploration

This chapter aims to develop a comprehensive understanding of the cardiac rehabilitation pathway and the implementation of blended care at Basalt Leiden. A context exploration was conducted by first reviewing existing data, research, and literature to establish an overall understanding of the current pathway, blended care practices, and the introduction of the Box. In addition, semi-structured interviews and stakeholder walk-alongs were carried out to gain in-depth insights into stakeholder experiences. The chapter concludes with a thematic analysis of all interview transcripts to identify recurring themes across stakeholder groups.

The chapter aims to answer the following sub research questions:

- *How is the current Blended Care cardiac rehabilitation care pathway at Basalt Leiden structured?*
- *What are the needs, experiences, and challenges of patients and healthcare professionals at Basalt Leiden regarding blended care, remote coaching, and the use of data from the Box?*

3.1 Cardiac Rehabilitation at Basalt

3.1.1 Basalt Leiden

Basalt Leiden is an expertise centre for rehabilitation care, supporting children, young people, and adults who experience difficulties with movement and/or cognition as a result of an accident, illness, or condition. Its rehabilitation approach is multidisciplinary: patients are treated by a specialised team, which may include physiotherapists, psychologists, occupational therapists, and other professionals, under medical supervision. Basalt also emphasises innovation, the use of new healthcare technologies, and collaboration across the care chain. Within Basalt, Leiden is the largest location and functions as an expertise centre, treating a relatively high number of complex patients. This makes it a relevant context for this project, which focuses on strengthening the blended cardiac rehabilitation pathway through the integration of activity tracker data (Leiden - Basalt - de Kracht van Revalidatie, z.d.).

Figure 3.1: Entrance Basalt Leiden (Leiden - Basalt - de Kracht van Revalidatie, z.d.)

3.1.2 Metro Map Basalt

In June 2025, Basalt's data team developed a metro map (see Figure 3.2) to visualise the structure of the cardiac rehabilitation pathway and make the flow of data within this pathway explicit. Basalt operates across multiple locations, including Leiden, Delft, The Hague, and Zoetermeer. Among these, Leiden is the largest location and functions as an expertise centre, treating a relatively high number of complex patients.
This project focuses solely on Basalt Leiden.

The metro map provides a structured overview of the full CR pathway, from referral to finalisation, and highlights key moments of data collection and clinical activities. It shows that care is delivered by a multidisciplinary team, including cardiologists, physiotherapists, psychologists, occupational therapists, social workers, dietitians, and CPET (Cardiopulmonary Exercise Test) technicians.

The analysis of the metro map reveals a clearly structured pathway consisting of referral, intake, treatment, evaluation, and finalisation phases, supported by systems such as HiX and Questmanager.

However, the map mainly focuses on data registration and does not yet incorporate blended care elements.

<u>CR Online Questionnaires</u>
Before the intake, patients receive online questionnaires via MijnBasalt, approximately one week before their first consultation. Their answers are automatically stored in HiX under Indicatiestelling Hartrevalidatie. These include validated questionnaires on:

- Quality of life (KvL-H),
- Depressive symptoms (PHQ-9),
- Anxiety (GAD-7),
- Perceived social support (MSPSS);
- and alcohol use (Five Shot).

Patients also complete the non-validated Questmanager Intake Questionnaire, which covers topics such as medical situation, lifestyle, work, physical functioning, physical activity, energy balance, psychosocial functioning, trauma screening, rehabilitation preferences, and research consent.
Before discharge or final evaluation, patients complete a similar set of questionnaires, stored in HiX under *Eindevaluatie*.

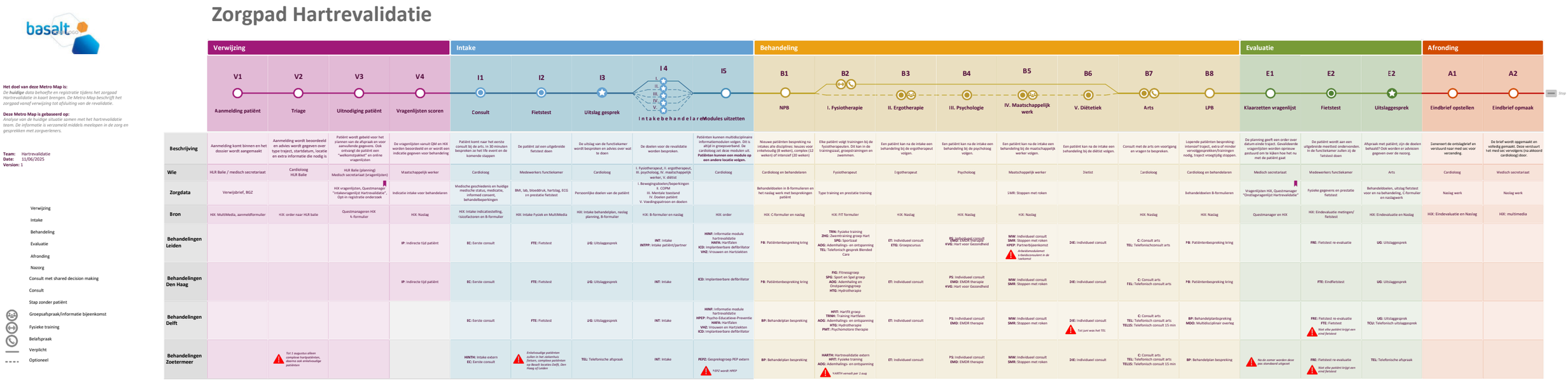


Figure 3.2: CR Metromap Basalt

3.1.3 Blended Care at Basalt

Blended Care was introduced at Basalt in 2021 as part of a strategic programme to integrate digital and physical care. It focuses on delivering care at the right place and time by complementing or replacing face-to-face interactions with digital solutions, resulting in more patient-centred and flexible care.

Within cardiac rehabilitation, blended care was initially developed mainly for the physical component of the programme, namely physiotherapy. Over time, additional elements were added to the blended care approach. Currently, blended care within CR includes:

- **Physiotherapy treatment:** one-on-one evaluation phone calls between patients and physiotherapists, and home exercises via Physitrack.
- **Therapieland:** digital support for psychological treatment.
- **Heart failure information module:** an online module that provides patients with information related to heart failure.

Figure 3.3 illustrates the blended care flowdiagram at Basalt.

The flow diagram follows the general CR structure identified in the metro map, but specifies how patients move through different trajectories: a simple programme (8 weeks), a complex programme (12 weeks), or an intensive programme (12+ weeks). After referral and intake (including cardiologist consultation, CPET, and result discussion), patients complete additional intakes and are discussed in a multidisciplinary meeting to determine the most appropriate trajectory. This is followed by the treatment phase and a final evaluation, after which patients are discharged.

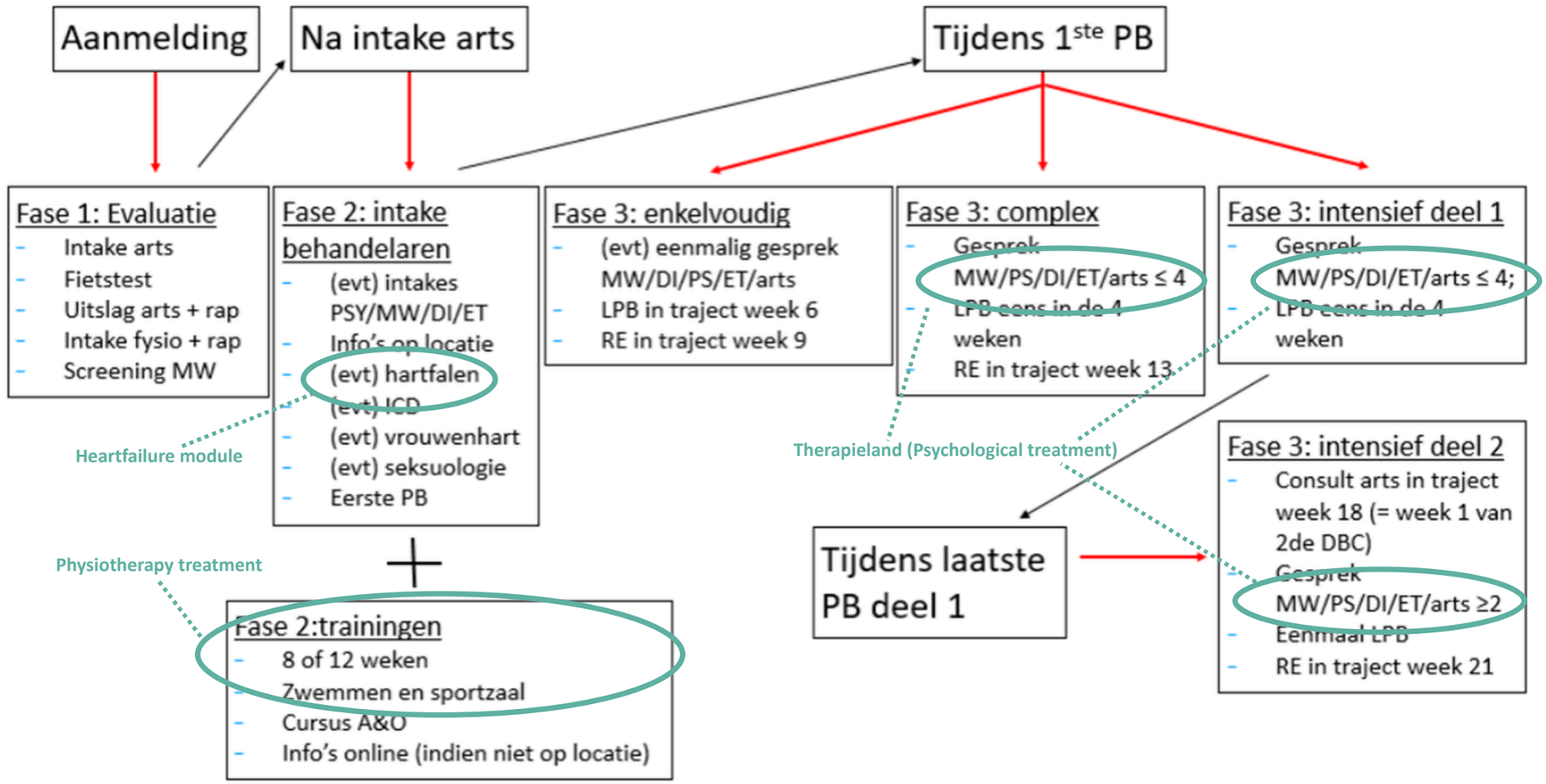


Figure 3.3: Flow Diagram Blended Cardiac Rehabilitation Pathway at Basalt

Blended Care Physiotherapy Pathway (CR)

In Appendix D, the original physiotherapy trajectory sheet can be seen. This sheet is displayed on the wall in the physiotherapy office and functions as a practical reminder and framework for the team to follow. It shows the three blended care trajectories used within the physiotherapy treatment: simple, complex, and intensive. These trajectories are summarised in Figure 3.4 below.

Within this project, physiotherapists are the most relevant stakeholders, as they are expected to become the primary users of the activity tracker data. At Basalt Leiden, six physiotherapists are actively involved in cardiac rehabilitation. The physiotherapy pathway combines on-site group training sessions (see Figure 3.5) with home-based exercises supported by Physitrack. Across the trajectory, the number of physical sessions is reduced, while patients are expected to train more independently at home. This gradual shift is intended to support patients in building confidence and ownership over their physical activity behaviour outside the rehabilitation centre.

During the programme, physiotherapists conduct two evaluation phone calls with patients. In these calls, they discuss the patient's progress, how the home-based training is going, and whether any adjustments are needed. This makes the physiotherapy pathway the clearest example of blended care within the current cardiac rehabilitation programme at Basalt, as it actively combines face-to-face training, digital support, and remote coaching moments.

Pathway	Training programme	If swimming / sports hall is included	Evaluation phone calls
Simple pathway	• **Weeks 1–4:** 2x/week physical training in the fitness room + 1x/week Physitrack • **Weeks 5–8:** 1x/week physical training in the fitness room + 2x/week Physitrack	• **Weeks 1–2:** 2x/week physical training in the fitness room + 1x/week Physitrack • **Weeks 3–4:** 1x/week physical training in the fitness room + 1x/week swimming / sports hall + 1x/week Physitrack • **Weeks 5–8:** 1x/week swimming / sports hall + 2x/week Physitrack	**Week 4 and week 7**
Complex pathway	• **Weeks 1–6:** 2x/week physical training in the fitness room + 1x/week Physitrack • **Weeks 7–12:** 1x/week physical training in the fitness room + 2x/week Physitrack	• **Weeks 1–4:** 2x/week physical training in the fitness room + 1x/week Physitrack • **Weeks 5–6:** 1x/week physical training in the fitness room + 1x/week swimming / sports hall + 1x/week Physitrack • **Weeks 7–12:** 1x/week swimming / sports hall + 2x/week Physitrack	**Week 6 and week 10**
Intensive pathway	• Follows the complex pathway structure. • For pathways longer than 12 weeks: 1x/week physical training in the fitness room + 2x/week Physitrack until the end of the programme.	• Same as the complex pathway, depending on the patient's rehabilitation plan.	**Week 6 and week 10**

Figure 3.4: Blended Care Physiotherapy Trajectory

Physitrack

Within Basalt, Physitrack is used to support patients in exercising at home as part of the blended care physiotherapist treatment. Physitrack is a digital platform that allows physiotherapists to create and send personalised home exercise programmes, supported by instructional videos and educational content (see Figure 3.6). Through the patient app, patients can follow their exercises, register progress, report discomfort or pain levels, and provide feedback. For physiotherapists, Physitrack provides a place to monitor adherence, progress, discomfort levels, and patient outcomes, making it a useful tool to support remote guidance.

Figure 3.5: Fitness Room Basalt Leiden

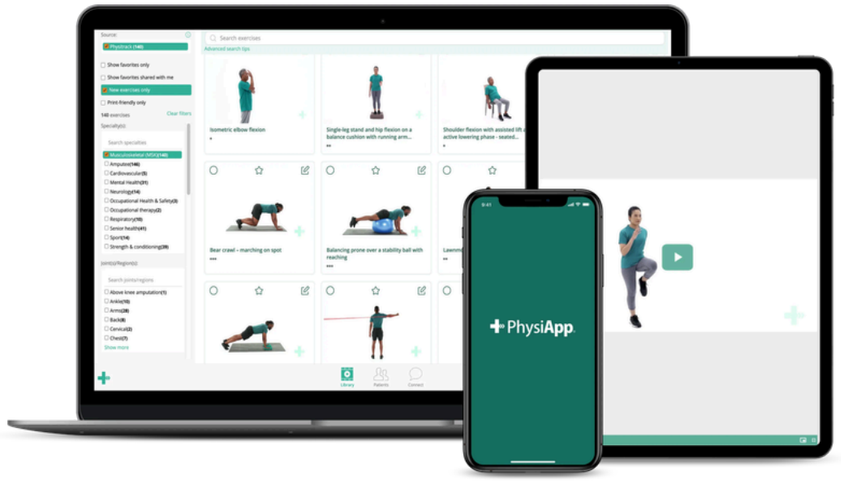


Figure 3.6 Physitrack interface exercise videos (Interface Overview | Physitrack Academy, z.d.)

3.1.4 The Box

The Box is an initiative developed by the LUMC (Leiden University Medical Centre), in which cardiac patients receive a set of home-monitoring devices prior to hospital discharge (see Figure 3.7). For up to one year after surgery, the LUMC remains responsible for monitoring the collected data. The Box includes several measurement tools, such as an electrocardiogram device, oximeter, blood pressure monitor, thermometer, weight scale, and an activity tracker (Treskes et al., 2017).
Each year, approximately 800 patients from the LUMC follow a CR program at Basalt, of which around 80% participate in the blended care pathway.

Figure 3.7: The Box (Treskes et al., 2017)

<u>The Activity Tracker</u>

Within this project, the focus lies on integrating the activity tracker into the Blended Care cardiac rehabilitation pathway at Basalt. Basalt aims to use this data, to support physiotherapists in remotely coaching patients based on objective insights, in order to provide more informed and personalized coaching, and better support patients in maintaining physical activity behaviour during rehabilitation and aftercare.

Within the Box, patients' step count is measured through a Withings watch, such as the ScanWatch (see Figure 3.8). The watch automatically records the number of steps taken and is connected to the Withings app, allowing patients to monitor their activity data. Subsequently, this data is shared with the LUMC through the Ancora Health app (Leids Universitair Medisch Centrum, z.d.).

Figure 3.8: Scanwatch (Team Box Support, 2021)

3.1.5 Stakeholder Ringmap

The stakeholders involved in the Blended Care Cardiac Rehabilitation at Basalt (Leiden) are mapped in a stakeholder ringmap (see Figure 3.9). The map is arranged based on their proximity and level of influence on the patient.

The inner ring represents stakeholders with the highest level of direct influence on the patient. The stakeholders that are bold represent the healthcare professionals that are in all trajectories involved in cardiac rehabilitation treatment at Basalt, and are therefore the most relevant for analysing the current blended care pathway within this project. Cardiologists and physiotherapists are the primary caregivers involved in every patient's trajectory. The cardiologist conducts the initial intake and determines the treatment plan, while physiotherapists play a central role in guiding physical rehabilitation. Additional caregivers, such as psychologists, social workers, occupational therapists, and dietitians, are mainly involved in more complex cases. After completion of the program, the treating cardiologist and general practitioner (GP) become the main points of contact again.

The second ring includes stakeholders with an indirect but relevant influence on the patient's pathway, such as peers, friends, administrative staff, and organisational roles within Basalt and the LUMC. Basalt maintains a strong collaboration with the LUMC, from which a large proportion of patients are referred. Additionally, current innovations, such as the integration of data from the Box, originate from the LUMC and further strengthen this connection.
The outer ring represents the broader context, including stakeholders who influence the system more indirectly.

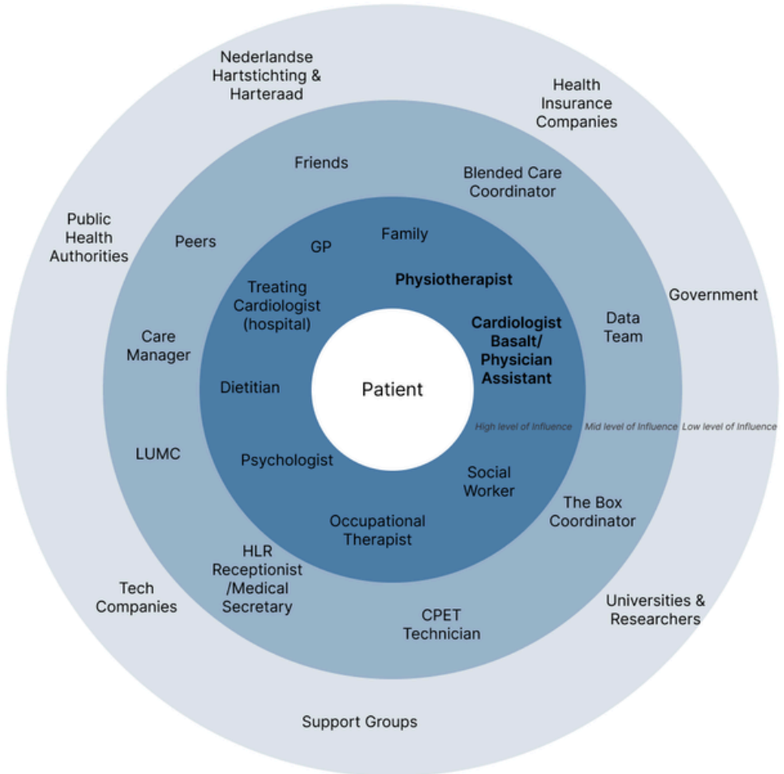


Figure 3.9: Stakeholder Ringmap Blended Care CR at Basalt

3.2 Research Method

3.2.1 Interviews & Walk-alongs

Purpose

Interviews and walk-alongs were conducted to gain an in-depth understanding of the current blended care cardiac rehabilitation pathway at Basalt. The interviews provided qualitative insights into stakeholders' experiences, roles, needs, and perceived barriers within the pathway. The walk-alongs complemented these insights by observing the pathway in practice. They helped capture real-life interactions between healthcare professionals and patients, as well as the workflow, routines, and contextual factors that may not always become visible through interviews alone.

Participants

A total of 16 participants were interviewed, including healthcare professionals, organisational stakeholders, researchers, and patients.

Healthcare professionals (n = 9) involved in the cardiac rehabilitation pathway at Basalt and the LUMC included:

- 1 cardiologist from the LUMC (also founder of the Box)
- 1 nurse practitioner from the LUMC
- 2 cardiologists from Basalt
- 2 physiotherapists from Basalt (one of whom is also team coordinator)
- 1 psychologist from Basalt
- 1 social worker from Basalt
- 1 occupational therapist from Basalt
- 1 dietitian from from Basalt

Organisational stakeholders (n = 2) included the care manager and the blended care coordinator at Basalt, who were interviewed to better understand implementation processes and strategic considerations.

Patients (n = 3) who were currently following, or had almost completed, a blended care cardiac rehabilitation programme at Basalt were included to capture user experiences, needs, and perspectives.

Researchers (n = 2) with expertise in cardiac rehabilitation were interviewed to provide broader insights, inspiration, and expert perspectives on current developments and challenges within the field.

Interview Procedure

Semi-structured interviews were conducted either on-site at Basalt or online via Microsoft Teams. Each interview lasted approximately 30 minutes and followed an interview guide (see Appendix E & F), while still allowing room for follow-up questions. Topics included the participant's role in the pathway, current use of blended care, experiences with remote coaching, perceived barriers, needs, and opportunities for improvement.

Walk-along Procedure

In addition to the interviews, walk-alongs were conducted at Basalt to observe the cardiac rehabilitation pathway in practice. The aim of these observations was to gain insight into how healthcare professionals interact with patients, how decisions are made during consultations, and how care is delivered in real-life settings. Particular attention was given to communication, workflows, and coordination between professionals. Field notes were taken during and immediately after the observations; these can be found in Appendix G.

A total of two walk-along days were conducted:

- **Walk-along day 1:** During the first day, a cardiologist was shadowed while conducting multiple intake consultations with patients. This provided insight into the intake process, clinical decision-making, and patient–professional communication.
- **Walk-along day 2:** During the second day, a new patient was followed through several key moments in the pathway. This included the intake consultation with the cardiologist, CPET, the discussion of CPET results, and the intake with the physiotherapist. In addition, the cardiologist was observed during multidisciplinary discussions with a physiotherapist, focusing on the progress of ongoing patients.

Data Handling

Interview recordings and field notes were anonymised and organised for analysis. The collected interview transcripts and field notes were then used as input for the thematic analysis.

Figure 3.10: Cardiologist Walk-along day

3.2.2 Thematic Analysis

To analyse the interview data, a thematic analysis was conducted following the process described by Braun and Clarke. This method was chosen because it is suitable for identifying recurring patterns across qualitative data while still allowing space for unexpected insights to emerge. This made it possible to compare perspectives between patients, physiotherapists, and other healthcare professionals, and to translate the findings into key themes. The thematic analysis method follow six steps (Braun et al., 2008):

1. **Familiarise yourself with the data:** Transcribe interviews if needed, read and re-read the transcripts.
2. **Generate initial codes/prompts:** Code interesting or relevant parts of the data systematically across all interviews.
3. **Search for themes:** Group related codes together and start forming possible themes.
4. **Review themes:** Check whether the themes fit the coded data and the full dataset. Cluster themes into overarching themes.
5. **Define and name themes:** Clarify what each final theme means, what it includes, and give each theme a clear name.

Step 1:

As a first step, the interviews were transcribed using Notebook LM (AI-Tool). The transcripts were scanned through and thoroughly reviewed. Some important insights were highlighted.

Step 2:

Then ChatGPT 5.5 think (AI-Tool) was used as a tool to help summarize relevant insights systematically across all interview for both the patient group and the healthcare professional group. An example of a prompt that was utilized:

"You are analysing interview transcripts from healthcare professionals involved in the blended care cardiac rehabilitation pathway at Basalt. Use an inductive thematic analysis approach based on Braun and Clarke.

Your task is to systematically code interesting and relevant parts of the interview data across all transcripts. Use an open coding approach, but pay specific attention to the following sensitising topics:
- their role in the current pathway
- experiences with blended care
- barriers, needs, and opportunities for improvement
- potential use of Box/activity tracker data

After coding all transcripts, provide a complete coding table that summarizes the key insights per interview.

Do not invent findings. Only use information that is clearly present in the transcripts.".

The initial coding output was carefully reviewed by the researcher to ensure that the codes and summaries accurately reflected the interview data. When relevant information had not yet been included in the initial output, additional codes, notes, or clarifications were added manually. These additions were based on fragments that had been highlighted by the researcher during the transcript review.
Full results of the coding tables can be found in Appendix H.

Step 3:

Results from the previous steps were used as input for identifying recurring themes for both the healthcare professional group and patient group using the following prompt in ChaptGPT 5.5 think:

"Analyze the coding table (healthcare provider) which summarizes the key insights of the interview transcripts, and identify 5-10 recurring themes which highlight the main tensions.

For each theme, provide:
1. A clear theme name
2. An explanation of the theme
3.Which stakeholders mentioned this theme

Do not invent findings. Only use information that is clearly present in the coding table."

The initial coding output was carefully reviewed. Initially, nine themes were formulated for the healthcare professional group and nine themes for the patient group (see Appendix H for the full output). However, because several themes showed conceptual overlap, the themes were reviewed, refined, and combined into seven final themes per group. These final themes are summarized in Figures 3.11 and 3.12.

Healthcare Professional Themes	Descriptions
There is no clear shared definition of blended care	Blended care was interpreted differently across caregivers. Some linked it to the structured physiotherapy pathway, while others referred to online modules, Therapieland, remote monitoring, or any mix of digital and physical care. This lack of a shared definition contributes to a fragmented pathway and inconsistent use across disciplines.
Physiotherapists differ in their level of engagement with and confidence in blended care	The interviews suggest that not all physiotherapists are equally positive about blended care. Some already see clear benefits, while others are more hesitant or feel that too much face-to-face care has been removed, which leads to differences in how strongly blended care is supported and applied in practice.
The blended care pathway is still fragmented and lacks standardisation	A recurring issue is that blended care is not yet embedded in a clear, consistent workflow. There is no shared format for the evaluation calls, practices differ between physiotherapists, and time pressure makes it difficult to monitor patients properly or use digital tools in a structured way.
One-size-fits-all blended care does not work	While respondents express a clear need for more structure in the cardiac rehabilitation pathway, they also emphasize that this should not come at the expense of personalization. A one-size-fits-all approach to blended care does not align with the diverse needs of patients. Patients differ in their physical capabilities, digital skills, motivation levels, and personal circumstances.
More patient ownership is needed	Physiotherapists see home exercise as valuable, but difficult to sustain because it depends on patients building their own routine. This creates a tension between encouraging self-management and recognising that many patients still need active support.
Remote coaching currently relies too much on subjective self-report	The evaluation phone calls are currently short and mainly based on what patients say about how they are doing and how much they exercise. Physiotherapists see value in adding step-count data, but they also said that objective data should be well integrated into the conversations and that it should be clear how to use it meaningfully in coaching.
The transition to aftercare is still a vulnerable point in the journey	Aftercare remains a vulnerable phase, as long-term behaviour change is difficult to maintain once the structured programme ends. Caregivers observe frequent relapse, as patients lose the structure and guidance provided during rehabilitation.

Figure 3.11: Thematic Analysis Healthcare Professional Interviews

Patient Themes	Descriptions
Patient onboarding into blended care is weak, so digital components are often underused.	The interviews indicate that the introduction of blended care and its digital components is often insufficiently structured and explained to patients. As a result, patients do not fully understand the purpose or added value of tools such as Physitrack, leading to limited engagement and underuse.
Clarity and expectation management at the start of the pathway are often insufficient	Several patients struggled to understand what the trajectory would look like, how long it would last, who they would see, and what was expected from them. This lack of clarity created confusion and uncertainty, especially in the early stages of rehabilitation.
Patients want rehabilitation to fit their personal situation rather than a standard protocol	The interviews show that patients differ in physical abilities, preferences, confidence, and broader health context. They appreciate it when care is adapted to what suits them, such as alternative exercise formats or more attention to additional conditions, rather than being treated through one fixed approach.
The physical on-site program feels safer and easier to engage with than exercising alone at home	Patients experience on-site rehabilitation as structured, supervised, and reassuring. Exercising at home is described as more difficult because it competes with fatigue, household tasks, uncertainty, and the absence of direct professional support or peer presence.
Peer contact is a major source of motivation	Patients value being with others who have gone through similar experiences. Contact with peers helps them feel understood, less alone, and more motivated, while also giving them a space to exchange coping strategies and normalize their recovery process.
Remote data monitoring evokes mixed reactions and highlights privacy concerns	Patients respond differently to wearable data and remote monitoring. Acceptance depends on whether monitoring feels supportive and meaningful, rather than controlling or intrusive.
Readiness for aftercare differs greatly between patients	Some patients feel confident continuing independently after rehabilitation, while others feel the program ends just when they are beginning to understand their limits and build a routine. This suggests that the transition to aftercare is not equally manageable for everyone.

Figure 3.12: Thematic Analysis Patient Interviews

Step 4 & 5: Final Overarching Themes

The themes identified in step 3 were analysed and manually clustered into five overarching themes (see Figure 3.13). These themes capture the main tensions within the pathway from both the healthcare professional and patient perspective:

1. Blended care is insufficiently defined, introduced, and embedded in the pathway.
2. The pathway needs more personalisation, rather than a one-size-fits-all approach.
3. Patients feel more secure and motivated within the physical programme.
4. Remote coaching currently relies too much on subjective self-report.
5. Aftercare remains a vulnerable phase.

To ensure a clear focus for the project, not all themes will be addressed in the next phase. Theme 1 emerged as the strongest and most recurring theme across the interviews. It shows that blended care is already present within the cardiac rehabilitation pathway, but is not yet consistently defined, introduced, or embedded in daily practice. This affects both professionals' workflow and patients' understanding of what is expected from them.

Theme 4 is also highly relevant, as it directly relates to the client's assignment: exploring how Box activity tracker data can be implemented within the cardiac rehabilitation pathway at Basalt. Currently, evaluation phone calls rely strongly on patients' self-reported activity and progress, which limits physiotherapists' ability to coach patients based on objective insight into daily movement behaviour.

Therefore, the project will focus mainly on themes 1 and 4. Together, these themes provide a relevant lens for identifying potential pain points in the implementation of Box data, such as onboarding, workflow integration, professional responsibilities, and patient understanding of the digital component.

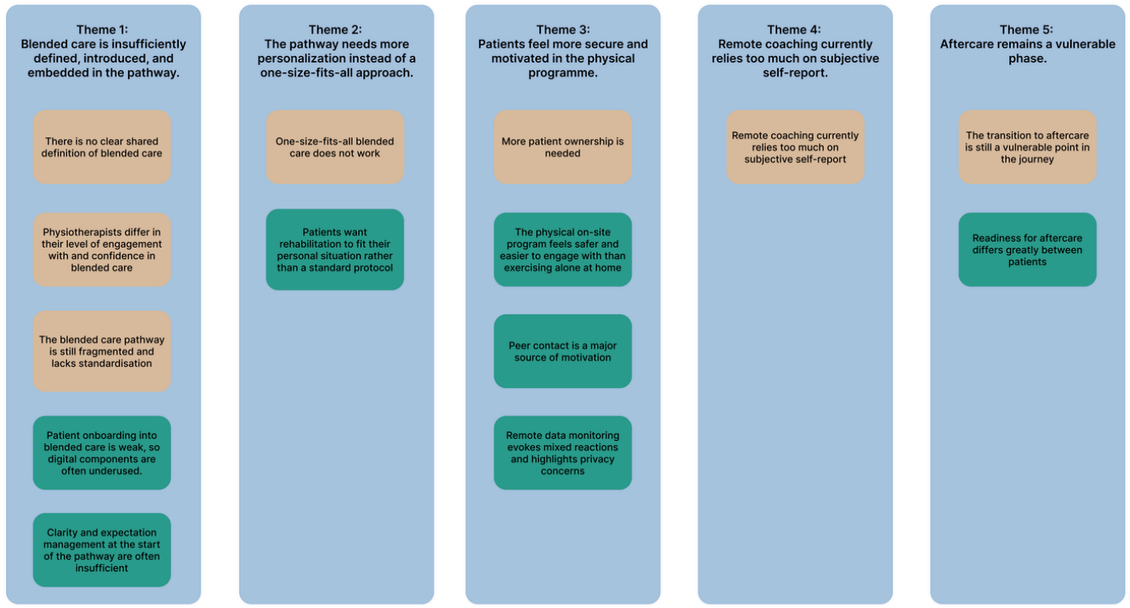


Figure 3.13: Thematic Analysis Overarching Themes

3.3 Summary of Key Findings

This chapter aimed to answer the following sub research questions:

- *How is the current Blended Care cardiac rehabilitation care pathway at Basalt Leiden structured?*
- *What are the needs, experiences, and challenges of patients and healthcare professionals at Basalt Leiden regarding blended care, remote coaching, and the use of data from the Box?*

Key Findings

Chapter 3 shows that the current Blended Care CR pathway at Basalt is structured around referral, intake, treatment, final evaluation, and completion. All patients see a cardiologist and receive physiotherapy treatment, while other professionals, such as a psychologist, occupational therapist, social worker, dietitian, and CPET technician, are involved depending on the patient's needs. The treatment phase typically lasts 8–12+ weeks, depending on whether the patient follows a simple, complex, or intensive trajectory.

Although Basalt aims to make blended care the standard within CR, its current integration is still fragmented. A structured blended care pathway mainly exists within physiotherapy, where patients partly train at home using Physitrack. In other disciplines, digital tools such as Therapieland are available, but their use remains limited and inconsistent. Informational modules are also mostly delivered on-site, with only a few offered in a blended or hybrid format.

The thematic analysis identified several needs and challenges, including the need for more personalisation, patients' stronger sense of safety and motivation in the physical programme, and the vulnerability of the aftercare phase. However, two themes were selected as the main focus for the next phase. Theme 1 showed that blended care is already present within the pathway, but is not yet clearly defined, consistently introduced, or structurally embedded in daily practice. This affects both professionals' workflows and patients' understanding of what is expected from them.

Theme 4 was selected because it directly relates to Basalt's assignment to explore the implementation of Box activity tracker data. Currently, remote coaching through evaluation phone calls relies heavily on patients' self-reported activity and progress. This limits physiotherapists' ability to coach patients based on objective insight into daily movement behaviour. The findings therefore support Basalt's ambition to integrate activity tracker data into the pathway, but also show that this data must fit within physiotherapists' existing workflow and not create additional workload.

Together, themes 1 and 4 provide the main lens for the next phase. They point towards potential pain points in the implementation of Box data, including onboarding, workflow integration, professional responsibilities, and patient understanding of the digital component.

4 Defining the Current Blended Cardiac Rehabilitation Pathway

In this chapter, insights gathered from the literature review and context exploration, including interviews and walk-alongs, are synthesised and visualised. Stakeholder mapping is used to identify relationships and data flows between key actors involved in the cardiac rehabilitation pathway at Basalt. In addition, journey mapping is applied to visualise the current pathway and to identify bottlenecks, needs, and opportunities across its different phases. These insights are then translated into possible design opportunities.

The chapter aims to answer the following sub research question:

- *What are possible design opportunities in order to improve the current blended care cardiac rehabilitation pathway at Basalt Leiden?*

4.1 Stakeholder Relationship Map

Figure 4.1 showcases a stakeholder relationship map. The map was developed to understand how the implementation of Box activity tracker data would fit within the existing cardiac rehabilitation pathway at Basalt. The aim of the map was not only to identify the stakeholders involved, but also to visualise how they currently interact, where information is exchanged, which digital systems are used, and where blended care components are already present or fragmented. This helped to reveal where responsibilities, communication flows, and digital tools would need to be aligned when introducing Box data into remote coaching.

The map shows that the pathway is highly multidisciplinary, with the patient positioned at the centre of a broad network of care providers, digital tools, and informal support actors. Most formal communication and data exchange takes place between care providers through HiX, the electronic patient record system, which functions as the central hub for clinical information. In addition, Questmanager is used for questionnaires, while tools such as videos, phone calls, Teams, Therapieland, and Physitrack support dfferent forms of digital care and remote coaching.

The map also applies the distinction between blended and hybrid care, drawn from the definition by Vrije Universiteit Amsterdam (2026) and translated to the healthcare context.

In this project, blended care is understood as the purposeful combination of physical and digital components within one structured pathway, while hybrid care refers to physical and digital care being offered in parallel or simultaneously, without necessarily being integrated.

Although many digital tools are available within Basalt's CR pathway, not all of them can be considered blended care. Currently, the main blended care elements are the evaluation phone calls, Physitrack home exercises, and the heart failure module, as these are more directly integrated into the treatment process. Other digital elements, such as general information modules, intake phone calls, and Teams group sessions, function more as hybrid or separate digital touchpoints. As a result, digital care is not yet integrated into one coherent pathway, and its use differs considerably per caregiver.

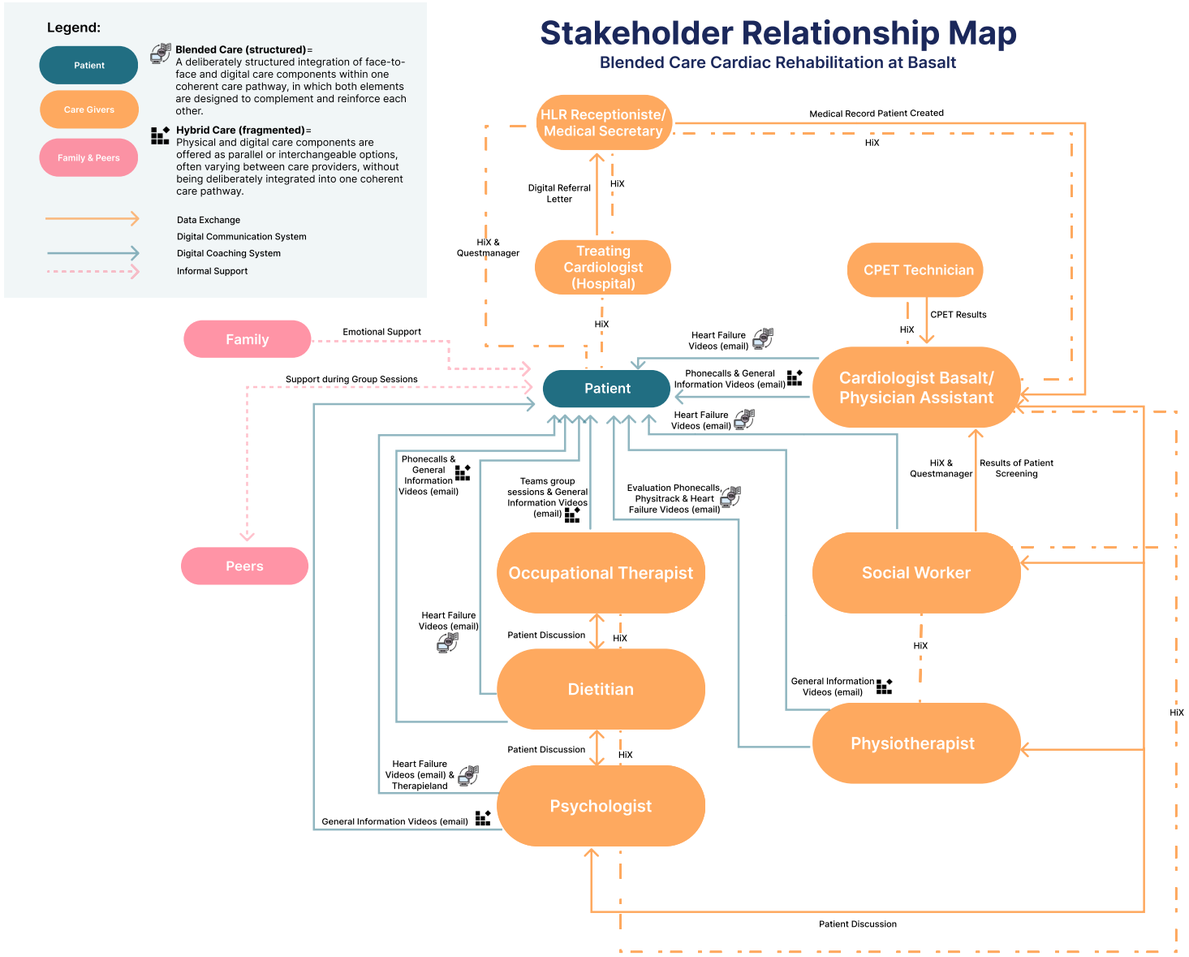


Figure 4.1: Stakeholder Relationship Map Blended Care CR at Basalt

4.2 Journey Mapping

Journey mapping was conducted to summarise the insights from the context exploration into a clear overview per phase of the cardiac rehabilitation pathway. The journey maps visualise the experiences of the involved stakeholders, including both patients and healthcare providers. This helped to organise the collected insights and translate them into pain points, needs, and possible design opportunities. Journey mapping adds value by placing the insights within the sequence of the rehabilitation process. This made it possible to see not only what issues emerged, but also where they occurred in the pathway. In this way, journey mapping supported both zooming out to understand the full rehabilitation process and zooming in on specific phases where stakeholder experiences change or drop.

4.2.1 Overview of the Journey Maps

To gain a comprehensive understanding of the current cardiac rehabilitation pathway, two journey maps were developed:

1) The first is a **zoomed-out journey map** that visualises the entire Blended Cardiac Rehabilitation pathway at Basalt Leiden, providing a clear overview of all phases, key steps, and stakeholder interactions. This map offers insights into both patient and stakeholder experiences throughout the pathway, as well as existing bottlenecks and potential opportunities for improvement. Additionally, although this map presents a broad overview, it also provides valuable insights for the physiotherapy pathway, as all phases are interconnected. Opportunities or insights to improve blended care within physiotherapy may therefore also originate in earlier phases of the journey.

2) The second is a **zoomed-in journey map** focusing on the physiotherapy context, where blended care currently plays the most significant role. This map allows for a more detailed analysis of interactions, workflows, and digital support within physiotherapy. Additionally, the integration of data from the Box, specifically the activity tracker, is most relevant in this context, as physiotherapists are primarily responsible for guiding patients in their physical activity.

4.2.2 The Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

The blended cardiac rehabilitation journey map (Figure 4.3) brings together insights from the literature review, interviews, and walk-along observations into one comprehensive overview. It visualises the full blended cardiac rehabilitation journey from hospital discharge to aftercare and includes the perspectives of both patients and healthcare professionals. The map highlights the main phases of the pathway, including intake, treatment, evaluation, completion, and aftercare.

How to read the map:

The journey map is read from left to right, following the cardiac rehabilitation pathway from phase 1 up until phase 3. The colour coding indicates these three phases: purple, blue, and grey (see Figure 4.2 for the legend of the journey map). The upper layers of the journey map show the pathway structure, including phases, actors, touchpoints, data flows, and digital tools. The middle layers show patient emotions and stakeholder experiences, while the lower layers translate these findings into pain points, needs, current initiatives, and design opportunities.

A high-resolution version of the Journey Map can be found in Appendix I.

Phase 1

Phase 1, Hospital Discharge & Referral, takes place before the start of the cardiac rehabilitation programme at Basalt. This phase

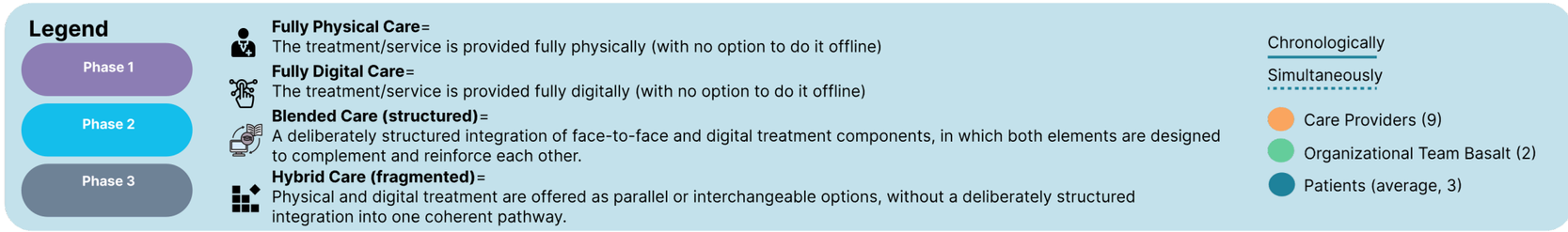


Figure 4.2: Legend Blended Care Cardiac Rehabilitation Journey Map at Basalt Leiden

includes the patient's discharge from the hospital, the information they receive about recovery and rehabilitation, and the referral to Basalt. After discharge, patients enter a waiting period before the rehabilitation programme starts. This phase is important because it shapes the patient's first understanding of the rehabilitation process and can influence how prepared and motivated they feel when starting the programme.

Phase 2

Phase 2, during the rehabilitation programme, covers the period in which the patient actively follows the cardiac rehabilitation programme at Basalt. This phase includes sign-up, the physician intake, practitioner intakes, treatment, evaluation, and completion of the programme. Cardiac rehabilitation at Basalt is highly multidisciplinary. Patients follow a basic, complex, or intensive trajectory, depending on their needs and rehabilitation goals. While all patients receive physiotherapy, the cardiologist or physician assistant oversees the overall programme. Additional support may involve an occupational therapist, psychologist, social worker, or dietitian. Digital tools are currently used in a mostly hybrid way, meaning they are available alongside physical care but are not always structurally embedded in the pathway. A more structured blended approach is mainly visible within physiotherapy.

Phase 3

Phase 3, Aftercare, focuses on the period after the cardiac rehabilitation programme has been completed. In this phase, the patient is no longer actively treated at Basalt, and the treating cardiologist from the hospital becomes responsible again for the patient's further care. Patients may receive periodic check-ups through the hospital or their general practitioner. At the same time, they are expected to continue managing their own recovery and physical activity in daily life. This makes aftercare an important phase for supporting long-term self-management and helping patients maintain the progress they made during rehabilitation.

On the next page the key insights of the journey map will be discussed.

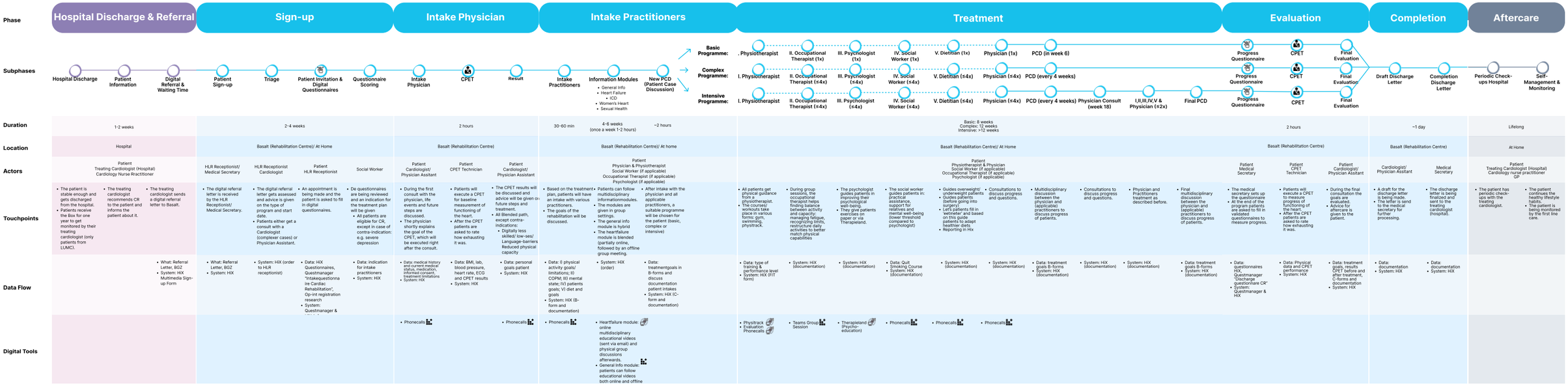


Figure 4.3a: Blended Care Cardiac Rehabilitation Journey Map at Basalt Leiden

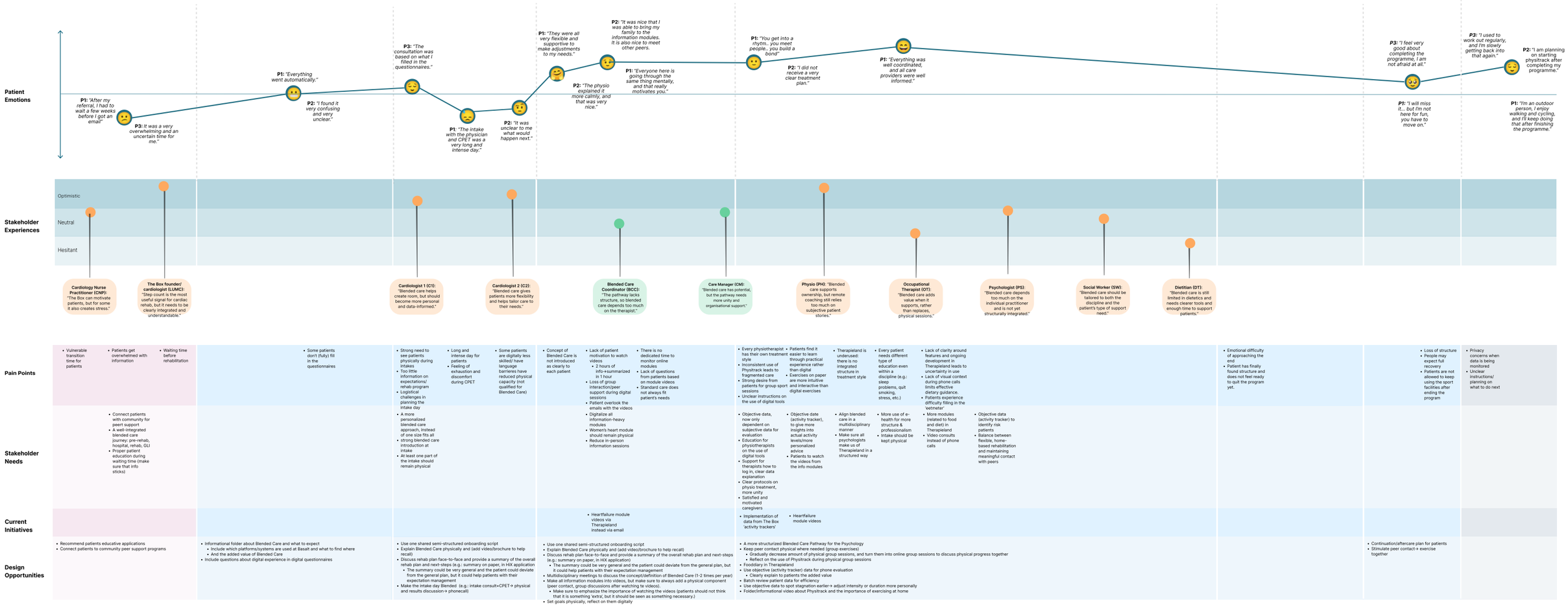


Figure 4.3b: Blended Care Cardiac Rehabilitation Journey Map at Basalt Leiden

Key Insights Zoomed-out Journey Map

1) The physician intake day is experienced as intense: In the patient emotion layer slightly negative emotions during the physician intake day can be seen. Patients experienced this day as long and exhausting, mainly because multiple appointments take place consecutively:

- physician intake;
- CPET;
- CPET results discussion;
- physiotherapy intake.

2) Stakeholders see potential, but also need more structure: The stakeholder experiences highlight that blended care is generally seen as valuable, but is not yet applied in a consistent or structured way. Many healthcare professionals at Basalt have limited experience with structured blended care, which makes it difficult to integrate digital tools into daily practice. The organisational team recognises the potential of blended care, but also emphasises the need for more unity and structure across the pathway. From the LUMC perspective, the nurse practitioner explained that The Box can motivate patients, but may also create stress when its purpose and use are not clearly explained. The LUMC cardiologist, who is also the founder of The Box, emphasised the value of step count data because it provides direct insight into patients' actual activity levels and progress.

3) Current Blended Care practices are underused: The map shows that several blended care tools are already available within the cardiac rehabilitation pathway, but that they are not used consistently in practice. Blended care is not clearly introduced to every patient, and patients do not always feel motivated to engage with digital content, such as the heart failure module videos. At the same time, healthcare professionals have limited time to monitor patients' online engagement, which makes it difficult to structurally follow up on digital tool use. Tools such as Physitrack and Therapieland are therefore underused, and their application often depends on the individual therapist. Overall, the current blended care approach lacks a shared definition, structure, and consistency across the pathway.

Design Opportunities

The journey map highlights several design opportunities:

- Make the physician intake day less exhausting by exploring which parts could become blended or remote.
- Introduce blended care more clearly at the start of the rehabilitation programme.
- Provide patients with clearer expectations about digital tools such as Physitrack, Therapieland, and online modules.
- Create a shared definition of blended care among caregivers.
- Develop guidelines or scripts for intake and evaluation calls to reduce variation between therapists.
- Organise regular meetings or workshops where caregivers can discuss uncertainties, experiences, and improvements related to blended care.

Overall, the map shows that the main design challenge is not simply adding more digital tools, but creating a clearer structure for how blended care and Box data can be meaningfully integrated into the existing cardiac rehabilitation pathway.

4.2.3 Physiotherapy-focused Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

To gain more detailed insight into the physical treatment pathway, a physiotherapy-focused journey map was created (see Figure 4.5). This map zooms in on the part of the cardiac rehabilitation pathway most relevant to the implementation of the Box: the physiotherapy trajectory. It visualises the patient journey from the physiotherapy intake to aftercare, including physical training, home exercises, evaluation calls, and the transition toward self-management.

How to read the map:

Similar to the zoomed-out journey map, the physiotherapy-focused map is read from left to right. It follows the pathway from Phase 2: rehabilitation to Phase 3: aftercare. The colour coding indicates these two phases: blue represents the rehabilitation phase, while grey represents the aftercare phase (see Figure 4.4 for the legend of the journey map).

The upper layers show the pathway structure, including phases, subphases, duration, location, actors, touchpoints, and digital tools. The middle layer visualises stakeholder emotions from both patients and physiotherapists. The lower layers translate these findings into pain points, stakeholder needs, and design opportunities.

A high-resolution version of the map can be found in Appendix J. In the following sections, the most relevant insights will be discussed.

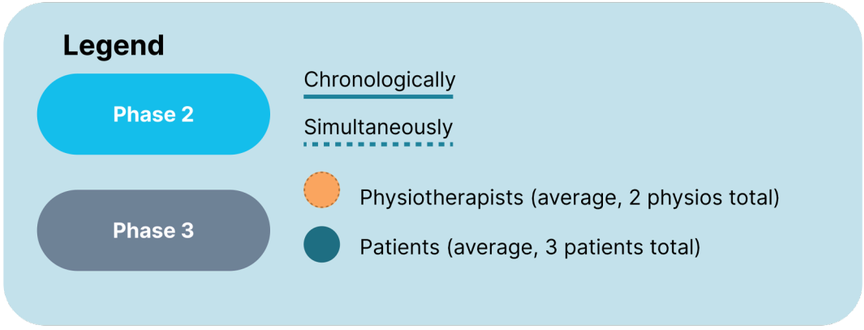


Figure 4.4: Legend Physiotherapy-focused Journey Map

Phase 2

Phase 2, describes the physiotherapy treatment part of the cardiac rehabilitation pathway. This phase starts with the physiotherapy intake, where the physiotherapist discusses the patient's physical goals, limitations, and training plan. During the first part of treatment, patients train twice a week at Basalt and once a week at home using Physitrack. After this period, the first evaluation phone call takes place, in which the physiotherapist discusses the patient's progress and experiences with home training. In the second part of treatment, on-site training is reduced to once a week, while home training increases to twice a week. Patients are therefore expected to train more independently. The phase ends with the final evaluation phone call, where the physiotherapist and patient discuss the continuation plan for after the rehabilitation programme.

Phase	Intake Physiotherapist		Patient Discussion	Physical Treatment Part 1	Evaluation 1	Physical Treatment Part 2	Evaluation 2	Aftercare
Subphases	Patient Transfer	Intake Physiotherapist	New Patient Case Discussion	Training Hall Basalt (2x/week) Physitrack (1x/week) Swimming Programme (if applicable)	Evaluation Phonecall 1	Training Hall Basalt (1x/week) Physitrack (2x/week) Swimming Programme (if applicable)	Evaluation Phonecall 2	Continued Recovery & Exercising Self Management & Monitoring
Duration	5 min	30 min	~2 hours	Basic: 4 weeks Complex: 6 weeks Intensive: 6 weeks	15 min	Basic: 4 weeks Complex: 6 weeks Intensive: until the end	15 min	Lifelong
Location	Basalt		Basalt	Basalt/ At Home	Basalt/ At Home	Basalt/ At Home	Basalt/ At Home	At Home
Actors	Physiotherapist Cardiologist	Patient Physiotherapist	Physiotherapist Cardiologist Other applicable caregivers	Patient Physiotherapist Other Peers	Patient Physiotherapist	Patient Physiotherapist Other Peers	Patient Physiotherapist	Patient Primary Care
Touch points	• After the physician intake, the physician shares important patient information with the physiotherapist.	• The physiotherapists asks the patient questions regarding current physical activities and their goals. • The physiotherapist explains the use of Physitrack • After the intake the physiotherapists asks the planner to schedule the evaluation phonecalls with the patients.	• Multidisciplinary discussion. • After intake with the physician and all applicable practitioners, new patients will be discussed	• The patient receives treatment according to their assigned plan: basix, complex, intensive. • The training consists of group training sessions at Basalt and at home exercises through Phisitrack. • There is also option for patients to follow a swimming program.	• The physiotherapist discusses with patients how the treatment plan is going. • If necessary, adjustments to the treatment plan are made.	• The patient receives treatment according to their assigned plan: basix, complex, intensive. • The training consists of group training sessions at Basalt and at home exercises through Phisitrack. • There is also option for patients to follow a swimming program.	• The physiotherapist discusses with patients how the treatment plan is going. • Advice on next steps after rehabilitation are discussed.	• The patient continues the healthy lifestyle habits. • The patient is being monitored by the first line care.

Figure 4.5a: Physiotherapy-focused Blended Care Cardiac Rehabilitation Journey Map at Basalt Leiden

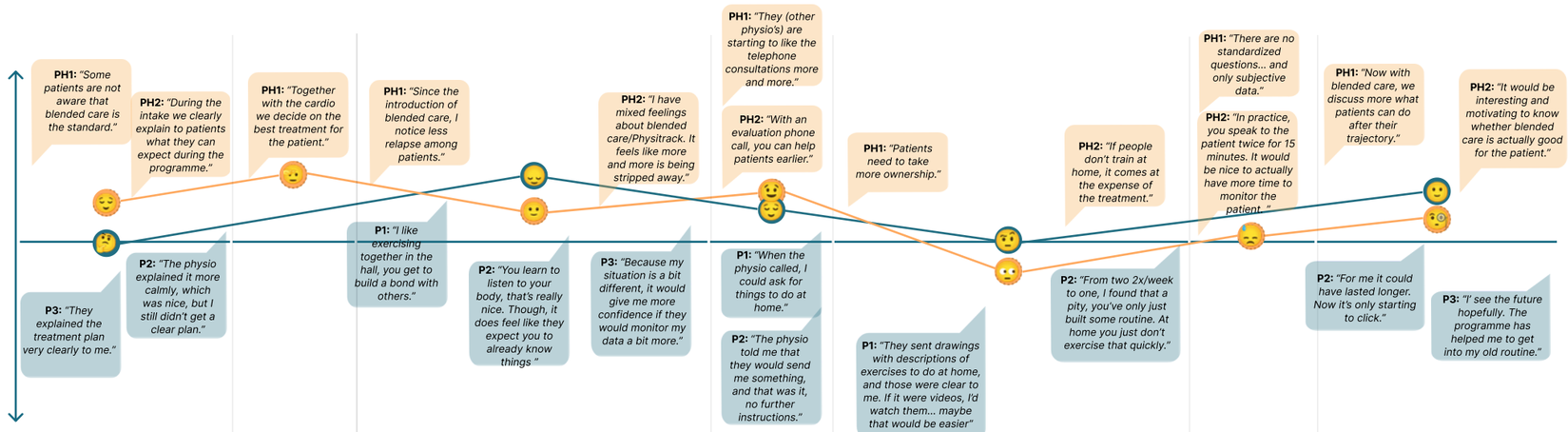
Phase 3

Phase 3, Aftercare, describes the period after the physiotherapy rehabilitation programme has ended. In this phase, patients are expected to self-manage their physical progress based on the continuation plan discussed with the physiotherapist during the final evaluation phone call. The focus shifts from guided training to maintaining physical activity independently in daily life.

Key Insights Zoomed-in Journey Map

1) Insufficient patient onboarding into blended care: The physiotherapy intake is an important moment for setting expectations for the rest of the physiotherapy pathway. However, the journey map shows that patients do not always clearly understand the treatment plan, the role of Physitrack, or that blended care is the standard approach within the programme. This means that the intake should not only be seen as a clinical intake, but also as an onboarding moment. During this moment, patients need clear information about the pathway, home exercises, digital tools, and future monitoring, so they understand what is expected from them from the start.

2) Transition from physical training to home-based exercise is a vulnerable moment: Patients value physical group training because it helps them build routine, motivation, and peer connection. However, in the second part of the treatment, the pathway shifts towards more home-based exercise through Physitrack, while on-site training is reduced from twice a week to once a week. This transition is vulnerable, as patients may lose structure, motivation, and confidence when exercising more independently.



Pain Points	• Information overload
	• Fragmented and confusing intake
	• (Physio) treatment plan unclear to patients
	• Patients may feel unsure whether the physio team knows their full background/additional conditions
	• No clear, shared structure for what should be discussed about blended care
	• No (clear) instructions on the use of physitrack
	• Some physio's don't see the added value of giving a 'blended' treatment
	• Not every patient is suitable for blended care
		• Variation in how blended care is applied and interpreted by different professionals/ physios
		• Not all Physiotherapist properly explain the use of Physitrack
		• Patients do not always understand why they are placed into a certain trajectory
			• The standard treatment/circuit may not suit everyone
			• Uncertainty about planning, grouping, and changes
			• Inconsistent introduction and guidance of home exercises
			• Less confidence and motivation when exercising independently
			• Blended care depends on patient adherence
			• Concerns from Physios about reduced physical support
			  • Limited visibility into patient adherence
				• Follow-up actions may be unclear after the call
				  • Unclear/ unstructured intstructions on home-exercises
				• Limited time during evaluation phonecalls
				• No allocated time to monitor Physitrack data
				• Based on subjective reports
				• No shared format or structured questions/topics that are being discussed
					• Reduction in group sessions/ physical trainings could feel abrupt, when they are only just building routine
					  • loss of structure and contact
					• Unclear instructions on the use/purpose of Physitrack
					• At-home exercise leads to motivation drop without structure
					• Patients may feel overly monitored if data use is introduced poorly
					• When pathway shifts toward less physical contact, physios worry whether patients stay motivated enough
					  • Uncertainty about whether fewer in-person sessions are equally as good for the patient
						• No feeling of real closure with Physio
						• Limited time for in-depth evaluation during phone calls
						• No allocated time to monitor Physitrack data
						• Reliance on subjective patient input
						• Lack of structure in evaluation conversations
						• Difficulty addressing low activity without discouraging patients
							• Patients differ strongly in readiness
							• Continuation options such as safe group exercise, swimming, or warm-water alternatives are limited
							• Recovery is influenced by other factors, such as: work pressure and daily demands
							• Risk of relapse after the programme

Stakeholder Needs	• More clarity and personalization
	• Explicit discussion of limitations, preferences and goals
	• Reassurance that physio team is aware of patient's full history and risk factors
	• Less variation in treatment/intake style between different physiotherapists
		• Better alignment across the team on when and how blended care should be used
		• More consistency in the pathway regardless of which physio the patient sees
		• Clear communication of why the patient gets a certain trajectory and what the expectations are
			• More visible room for tailoring within physio: hall sports, circuit, swimming, etc.
			• Clearer communication about location, grouping, and what to expect
			• Better onboarding for home exercise
			  • More reassurance and support when patients are expected to exercise independently at home
			• Support for helping patients build routine and intrinsic motivation
			• A balance between efficiency and sufficient supervision/support.
			• Better ways to monitor adherence to home exercises
				• End the call with clear agreements about the next phase
				• Enough time to go beyond a brief check-in and actually coach and monitor the patient
				• More structure in evaluation phonecalls
				• More objective input during calls
					• Stronger support for patient self-management
					• More engaging and supported home exercise experience
					• Patient-centered and meaningful use of data
					• Maintain clinical quality while increasing patient ownership
					• Better insight into effectiveness of blended care
						• Clear closure of the physio relationship
						• More time or better workflow if objective data is added
						• Complete view of patient activity (steps, strength training)
						  • Clear translation from data to action
						  • Guidance for motivational conversation based on activity data.
							• Differentiated aftercare approach:
							  • Independent continuation for those who are ready
							  • Continued/structured group support for those who are not ready yet
							• A clear, practical handover plan
							  • to local physio or self-management routine
							• Better support for long-term self-management and maintaining healthy habit after the trajectory
							• More engaging feedback from digital tools, clear communication about why data is being used and the effects of it

Design Opportunities	• A more **standard intake script** for blended care
	  • Questions/reassurance of patient's risk factors
	  • Clear blended care explanation
	  • Clear expectation setting about how the trajectory will taper from more physical to more home-based care.
	  • Clear explanation of the purpose of home exercise
	  • Clarify the purpose of monitoring the activity tracker data
	• A clear (visual) **personalized start plan with milestones**: what the patient will do, how often, why, important milestones and what might change later
	• **Rehab Onboarding Kit**
		• A **clear and aligned treatment plan per trajectory**, while allowing room for **individual personalization**
		  • Clear agreements on which parts of the treatment are standard and which parts could be personalized
		• A **multidisciplinary blended care discussion** (e.g.: every 3 months)
		  • To ensure alignment of the blended care definition
			• Enough meaningful in-person contact early in the pathway to **build motivation and routine**
			  • Focus on motivational behaviour change: motivational interviewing, social support
			• **Clearer onboarding for home exercises**
			  • Create a guided first-time setup for home exercises with clear instructions and expectations
			  • Introduce a structured onboarding moment for home exercises (what, why, how, when)
			• **Strengthen peer interaction during physical sessions** and enable continued contact during home exercise
			  • Enable **peer coaching groups or buddy systems** for shared support during home exercise
			• Time for Physios to **coach patients through digital tools**
				• Introduce **online peer sessions** for practical and motivational support; and use evaluation calls for **individual coaching and monitoring**
				  • Check progress of the patients
				  • Adapt the plan based on earlier barriers
				• Provide a **standard evaluation phonecall format**
				• Allocated time to **monitor objective data**: activity tracker, Physitrack activity
					• Enable **peer coaching groups or buddy systems** for shared support during home exercise
					• Make the **impact of blended care visible for physios** through patient progress and outcomes
					  • Offer periodic summaries (e.g. monthly) of blended care results
					  • Visualise how blended care compares to traditional care outcomes
					  • Create a simple dashboard showing key research findings and outcomes
					• Provide **guidance for interpreting activity data** using weekly or monthly trends instead of daily values
					• Time for Physios to **coach patients through digital tools**
						• Provide a **standard evaluation phonecall format**
						  • Make readiness for discharge explicit
						  • Discuss confidence in continuing independently
						  • Provide support tools options after discharge
						  • Continuation plan
						• Allocated time to **monitor objective data**: activity tracker, Physitrack activity
							• Offer **different aftercare routes** per patient type
							• Format with (independent) **continuation plan**
							  • Which the Physio could fill in based on each patient's needs
							  • A **motivating aftercare approach** that gives patients more ownership
							• Offer patients to sign up for **peer support groups for aftercare**
							  • To continue supporting each other
							  • To continue exercising together

Figure 4.5b: Physiotherapy-focused Blended Care Cardiac Rehabilitation Journey Map at Basalt Leiden

Physiotherapists also worry whether patients remain sufficiently active when physical support decreases. Although patient progress can be monitored in Physitrack, this rarely happens in practice due to limited time. In addition, none of the interviewed patients actively used Physitrack. Some received unclear instructions, others received no explanation, and one patient received paper-based home exercises instead.

3) Evaluation phone calls are currently too short, unstructured, and dependent on subjective patient input: During the treatment phase, patients receive two evaluation phone calls. These are the main remote-coaching moments within the physiotherapy pathway, but they are currently limited by their short duration of 15 minutes, a lack of clear structure, and a strong reliance on subjective patient input. Some patients also experienced uncertainty about the follow-up actions

after the call. For example, one patient explained that Physitrack was introduced during the call, but that the instructions were confusing, which resulted in them not using it. This shows that the evaluation phone calls have potential as remote-coaching moments, but require clearer structure and better support to be effective.

4) Differences in aftercare readiness amongst patients: The aftercare phase is important because patients differ in how ready they feel to continue independently. Some patients feel confident, while others risk losing structure, motivation, or support after the programme ends. For some patients, the programme ends just when things are starting to “click”. One patient mentioned wanting to start Physitrack after rehabilitation, but still felt unsure about how to use it. This lack of readiness may partly result from limited support during the treatment phase, especially around independent exercise and the use of Physitrack.

Design Opportunities

The journey map highlights several design opportunities:

- Introduce blended care more clearly during the physio intake.
- Provide patients with a clear start plan, including the trajectory, home exercises, digital tools, and monitoring.
- Support the transition from physical training to home-based exercise more gradually.
- Make evaluation phone calls more structured and data-informed.
- Translate Box data into practical coaching prompts, rather than only showing numbers.
- Give physiotherapists a simple workflow for using activity data without adding extra workload.
- Tailor aftercare to patient readiness through a clear continuation plan.

Overall, the map shows that the main opportunity starts with aligning the role of physiotherapists within the blended care approach. A shared understanding of blended care, digital tools, and activity data is needed so physiotherapists can inform patients more clearly and consistently. This creates the foundation for meaningful use of Box data during remote coaching, home-based exercise, and aftercare.

4.2.4 Comparison Design Opportunities Journey Maps

The design opportunities from the zoomed-out and zoomed-in journey maps show clear overlap. The most important overlapping opportunities are:

- Introduce blended care more clearly from the start
- Create more structure and consistency in the use of digital tools
- Support physiotherapists in onboarding patients
- Strengthen the transition from physical training to home-based training
- Make evaluation phone calls more structured and data-informed
- Translate activity tracker data into practical coaching support

Together, these opportunities guides the concept development towards a tool that supports onboarding, creates a shared understanding, and helps physiotherapists connect activity tracker data to concrete coaching moments within the existing pathway.

4.3 Validation Journey Maps

Purpose

To ensure the accuracy of the developed journey maps and the relevance of the identified insights, the current blended care cardiac rehabilitation pathways were validated with a healthcare professional, namely a cardiologist from Basalt. The aim of this validation was to confirm whether the overall structure of the pathway, as well as the interpretation of key phases and challenges, accurately reflect clinical practice and are recognizable from a medical perspective

Participant

Cardiologists play a key role in the early phases of the CR pathway and also monitor the overall progress of the patient. Validating the pathway with a cardiologist therefore ensures that the broader system-level understanding is accurate and that the identified insights are grounded in the clinical reality of cardiac rehabilitation. Additionally, this strengthens the overall reliability of the findings.

Validation Procedure

The validation process will be conducted through a one-hour online meeting with a cardiologist following the validation process guide (see Appendix K).

Summary of the Validation Results

The cardiologist confirmed that the journey maps were broadly accurate and recognizable, while suggesting refinements such as aligning the structure with the official cardiac rehabilitation phases and clarifying the role of blended care across disciplines;
the full validation results are included in Appendix L. Importantly, the cardiologist agreed with the key insight and design focus that physiotherapists need stronger onboarding, practical guidance, and implementation support before Box activity data can be meaningfully integrated into the care pathway.

4.4 Summary of Key Findings

This chapter aimed to answer the following sub research questions:

- *What are possible design opportunities in order to improve the current blended care cardiac rehabilitation pathway at Basalt Leiden?*

Key Findings

This chapter shows that the main design opportunities for improving Basalt's blended cardiac rehabilitation pathway lie in creating more structure, consistency, and practical support. These opportunities are especially relevant for the implementation of The Box's activity tracker data, because this data needs to be embedded in an existing pathway that is currently still fragmented. Although blended care is already present, it is not clearly introduced from the start and its use differs across caregivers and disciplines. This makes it less clear for patients how digital tools, such as Physitrack and the activity tracker, fit within their rehabilitation process. Therefore, a key opportunity is to introduce blended care more clearly during onboarding and to support physiotherapists in guiding patients through the use of digital tools.

The findings also show that the transition from physical training at Basalt to home-based training needs stronger support. Patients often feel more secure and motivated during physical sessions, while engagement with home exercises and digital tools can decrease outside the rehabilitation centre. This highlights the need to better connect on-site treatment, home-based training, and remote coaching.

The design opportunities from the zoomed-out and zoomed-in journey maps show clear overlap. The most important opportunities are to introduce blended care more clearly from the start, create more structure and consistency in the use of digital tools, support physiotherapists in onboarding patients, strengthen the transition from physical training to home-based training, make evaluation phone calls more structured and data-informed, and translate activity tracker data into practical coaching support. Together, these opportunities guide the concept development towards a tool that supports the implementation of The Box's activity tracker data by creating a shared understanding, supporting onboarding, and helping physiotherapists connect step count data to concrete coaching moments within the existing pathway.

5 Design Brief

In this chapter, the insights gathered through the literature review, context exploration, and analysis are translated into a design brief. This design brief defines the direction for the next phase of the project and consists of a design goal and a set of design criteria. Together, these elements clarify what the final design should achieve and what requirements it should meet to meaningfully support the integration of Box data into the blended cardiac rehabilitation pathway at Basalt.

5.1 Research Conclusions

5.1.1 Key Themes

As discussed in the thematic analysis part (Chapter 3.2.2), Theme 1 and Theme 4 were selected as the main focus of this project.

Theme 1: Blended care is insufficiently defined, introduced, and embedded in the pathway.

This theme highlights a fundamental barrier in the current pathway. Blended care is not yet supported by a shared definition, structured onboarding, or consistent way of working. This leads to uncertainty among physiotherapists, variation in treatment approaches, and underuse of digital tools such as Physitrack. Addressing this theme is important, because the integration of Box data first requires a clear and shared understanding of how blended care should be applied in practice.

Theme 4: Remote coaching currently relies too much on subjective self-reporting.

This theme directly relates to Basalt's ambition to integrate activity data from the Box into the rehabilitation pathway. At the moment, remote coaching mainly depends on what patients report themselves. Physiotherapists see the potential of objective activity data to support more personalised coaching, but also express concerns about time constraints and additional workload. Evaluation phone calls are important remote-coaching moments, but currently lack structure and objective input.

Together, these themes show that the design direction should address both the structural foundation of blended care and the practical use of activity data in remote coaching. This creates a focused direction aimed at supporting physiotherapists in adopting a more structured and data-informed way of working within the existing pathway.

5.1.2 Design Opportunities Journey Maps

In the previous chapter, several key design opportunities were identified based on journey mapping:

- Introduce blended care more clearly from the start
- Create more structure and consistency in the use of digital tools
- Support physiotherapists in onboarding patients
- Strengthen the transition from physical training to home-based training
- Make evaluation phone calls more structured and data-informed
- Translate activity tracker data into practical coaching support

These design opportunities were used to translate the main pathway challenges into a focused direction for supporting physiotherapists in the structured and practical use of activity tracker data within blended cardiac rehabilitation.

5.2 Design Goal

The following design goal is formulated:

*To design a **tool** that **supports Basalt's organisational team** in providing **structured onboarding for physiotherapists** on the use of the Box's **activity tracker data** within the cardiac rehabilitation pathway, so that physiotherapists are **better informed, supported, and motivated** to use this data for remote coaching.*

5.3 Target Group & Users

The final design focuses on two levels within Basalt:

1) Primary target group : **the organisational stakeholders**

- Care manager
- Cardiologists
- Physiotherapists' team coordinator

These stakeholder are involved in initiating and coordinating the integration of Box activity data into the cardiac rehabilitation pathway.

2) Main users: **the physiotherapists**

Physiotherapists will work directly with the activity tacker data during remote coaching. Therefore, the design needs to fit their daily workflow and support their coaching role.

5.4 Design Criteria

The design criteria (see Figure 5.1) were formulated by translating the selected research themes and design opportunities into concrete requirements for the final design. The thematic analysis showed two main challenges: blended care is not yet clearly defined, introduced, or embedded in the pathway, and remote coaching currently relies too much on subjective self-reporting. The journey maps further translated these challenges into design opportunities, such as introducing blended care more clearly from the start, creating more consistency in the use of digital tools, supporting physiotherapists in onboarding patients, and making evaluation phone calls more structured and data-informed.

	Design Criteria	UTAUT/ COM-B
Organisational Team Implementation	• The design should be visually clear, and suitable for explaining the implementation to the physiotherapy team.	Effort Expectancy/ Capability
	• The design should make organisational support visible by showing that Basalt's organisational team supports the use of activity tracker data in remote coaching.	Social Influence/ Opportunity
Physiotherapist Team Adoption	• The design should help physiotherapists see the added value of using activity tracker data in remote coaching.	Performance Expectancy/ Motivation
	• The design should explain how activity tracker data fits within the existing physiotherapy workflow.	Effort Expectancy/ Opportunity
	• The design should support practical use of the activity tracker data.	Facilitating Conditions/ Opportunity
	• The design should be low-effort and time-efficient, enabling physiotherapists to quickly understand the key message.	Effort Expectancy/ Opportunity

Figure 5.1: Design Criteria

UTAUT and COM-B were then used to strengthen these opportunities from an adoption perspective. The design should not only show physiotherapists what activity tracker data is, but also support the conditions needed for them to actually use it in practice. UTAUT helped identify factors that influence technology acceptance, such as perceived usefulness, ease of use, organisational support, and facilitating conditions. COM-B added a behaviour change perspective by focusing on whether physiotherapists have the capability, opportunity, and motivation to use activity tracker data in remote coaching.

Together, these models helped translate the design opportunities into adoption-focused design criteria. For example, the opportunity to "translate activity tracker data into practical coaching support" was translated into a criterion about helping physiotherapists see the added value of the data. The opportunity to "create more structure and consistency" was translated into criteria about fitting the data within the existing workflow and making the design low-effort and time-efficient. Similarly, the need for organisational onboarding was translated into a criterion about making Basalt's organisational support visible.

In this way, the design criteria form a bridge between the research findings and the final concept. They ensure that the design addresses both the practical pathway challenges and the behavioural conditions required for physiotherapists to adopt activity tracker data in daily coaching practice.

6 Ideation & Conceptualisation

In this chapter, the design goal and design criteria are used as the starting point for ideation and concept development. Ideas are generated through mind mapping and clustered into three concept directions. These directions are then evaluated against the design criteria, after which the strongest concept is selected and further developed.
A co-creation session is conducted to refine the selected direction and gather input for the final design.

The chapter aims to answer the following sub-research question:

- *How can data from the Box support physiotherapists from Basalt Leiden in understanding, monitoring, and coaching patients' physical activity behaviour during cardiac rehabilitation?*

6.1 Ideation

6.1.1 Mindmapping

Mindmapping was used to generate ideas related to technology adoption and behaviour change (see Figure 6.1).

The ideation was guided by the following question: *How might we help physiotherapists understand, trust, and use activity tracker data in their daily cardiac rehabilitation practice?*

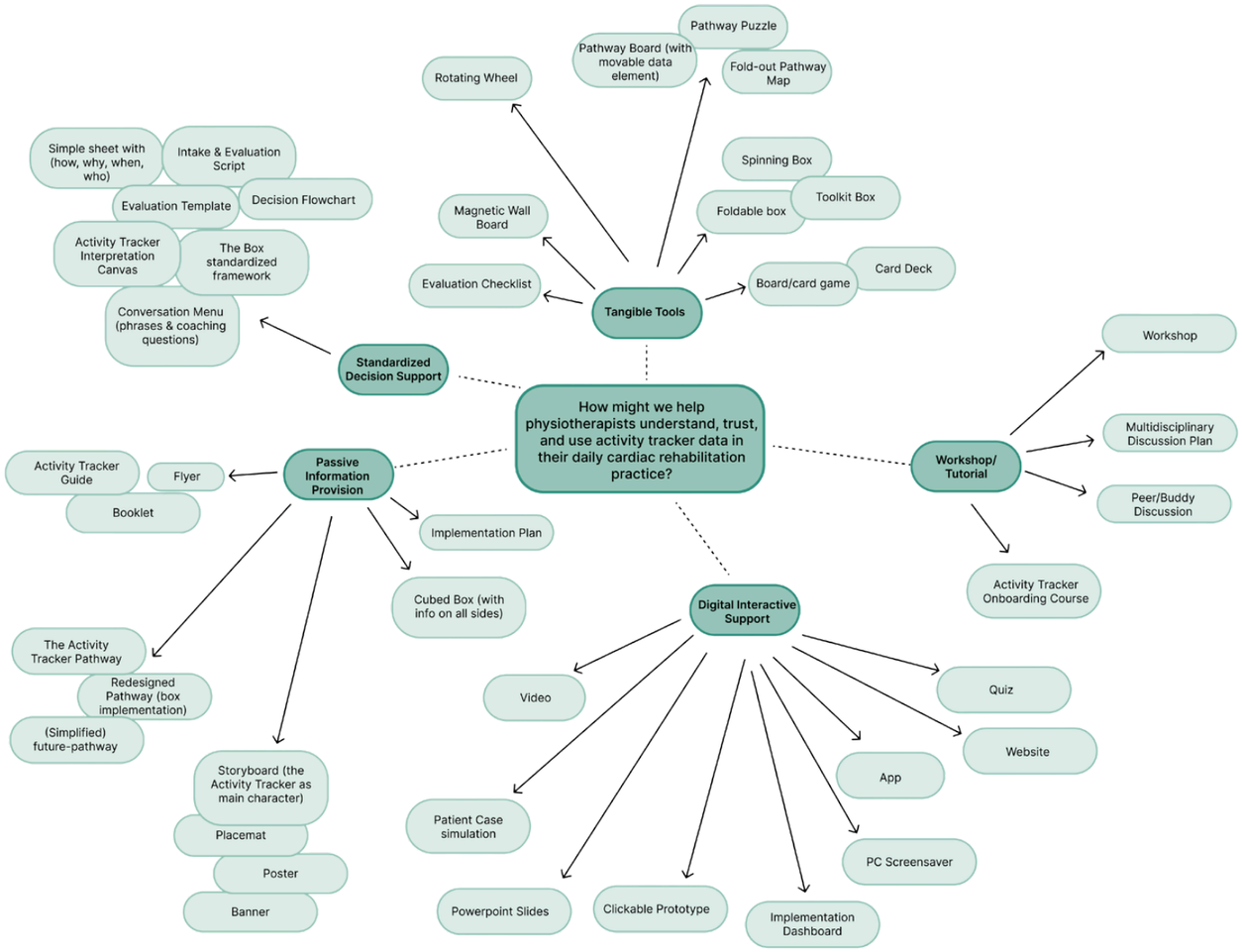


Figure 6.1: Ideation Mindmapping

6.1.2 Clustering Ideas

The ideas were then clustered into three concept directions (see Figure 6.2):

1) Coaching Support Tool
2) Interactive Learning Experience
3) Tangible Pathway Explorer

Each direction was further explored through additional ideation (see Appendix M). This resulted in three concrete concepts, which are discussed in the following sections.

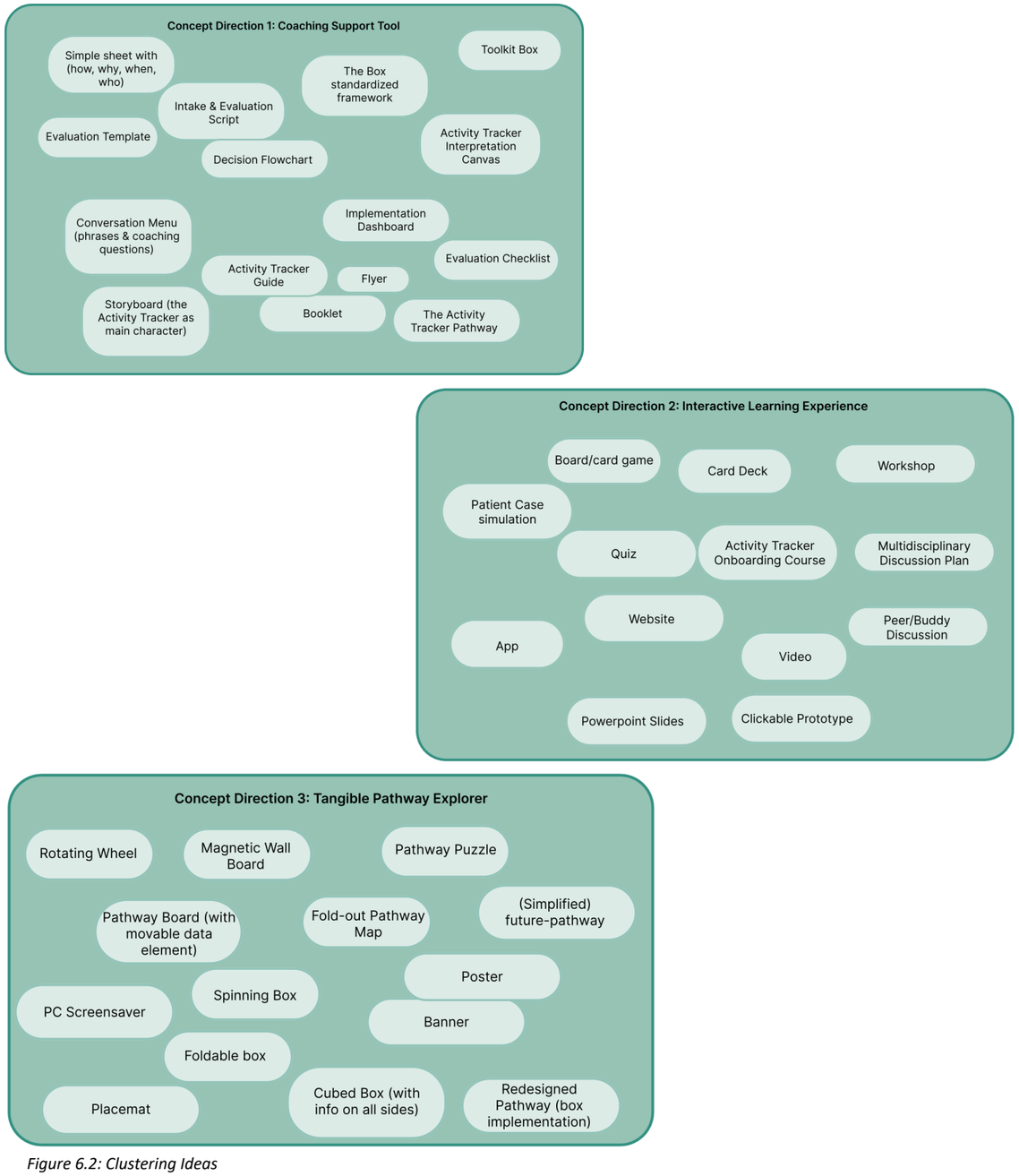


Figure 6.2: Clustering Ideas

6.2 Conceptualisation

Concept 1: The Activity Tracker Toolkit

What?

A box with practical support tools that can be used during onboarding and patient coaching (see Figure 6.3).

<u>Components:</u>

- Data-to-dialogue wheel: The wheel helps physiotherapists turn data insights into coaching conversations. Based on different data patterns (see Figure 6.4), it provides prompts and questions that can be used during coaching.
- Introduction Booklet: The booklet explains the origin of the Box's activity tracker, its added value, and when it can be used. It answers the most relevant practical questions physiotherapists may have.

Figure 6.3: Activity Tracker Toolkit Box

Why?

The toolkit helps physiotherapists translate activity tracker data into meaningful patient conversations and concrete next steps. The booklet also provides a practical introduction to the activity tracker data.

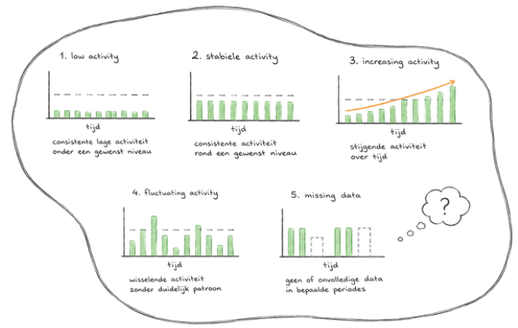


Figure 6.4: Data Patterns

How?

The toolkit could be introduced during an onboarding workshop. After this introduction, the tools in the box could be used during coaching moments with patients.

Risk

Physiotherapists may not read the booklet. In addition, the toolkit could be perceived as extra work rather than as practical support.

Concept 2: The Digital Learning Experience

What?

A clickable digital learning experience that introduces physiotherapists to the purpose and use of activity tracker data through simple examples and a short patient case simulation (see Figure 6.5 and 6.6).

Components:

- Introduction to the Activity Tracker
- Short patient case simulation
- Poster with QR code

Why?

The digital experience gives physiotherapists an accessible and flexible introduction to activity tracker data. It helps them understand how the data can support blended care, remote coaching, and patient conversations within the rehabilitation pathway.

How?

The digital prototype could be used as presentation material during an onboarding workshop, but it could also be completed independently. The poster would be placed in a visible location to encourage physiotherapists to access the prototype.

Risk

Physiotherapists need to take extra steps to access the prototype. Interacting with the prototype may also take more time than using a more direct support tool.

Figure 6.5: Homescreen Box Digital Prototype

Figure 6.6: Example Interface Screen Box Digital Prototype

Concept 3: The Pathway-Box Explorer

What?

A tangible pathway tool that shows how a patient moves through the physiotherapy pathway (see Figure 6.7). The patient passes through key milestones in each phase, while the physiotherapist supports them in achieving their rehabilitation goals. The pathway also highlights the key activity tracker data moments and shows where the data fits within the physiotherapy journey.

Components:

- Tangible box with simplified physiotherapy pathway on it
- Activity Tracker data moments
- Poster/folder with additional information

Why?

The Pathway-Box Explorer helps physiotherapists understand where, why, when, and how activity tracker data can be used in the physiotherapy pathway. It shows that the data is not a separate tool, but something that can support different moments throughout the care pathway. It also highlights the added value of the activity tracker for coaching and patient support.

How?

The Pathway-Box Explorer could be placed in the physiotherapy office, allowing physiotherapists to interact with it when needed. The box could also invite physiotherapists to look at the poster in the office, which provides additional information.

Risk

The box could become too text-heavy, making it difficult to read and use. To be effective, it should remain visually simple and easy to understand.

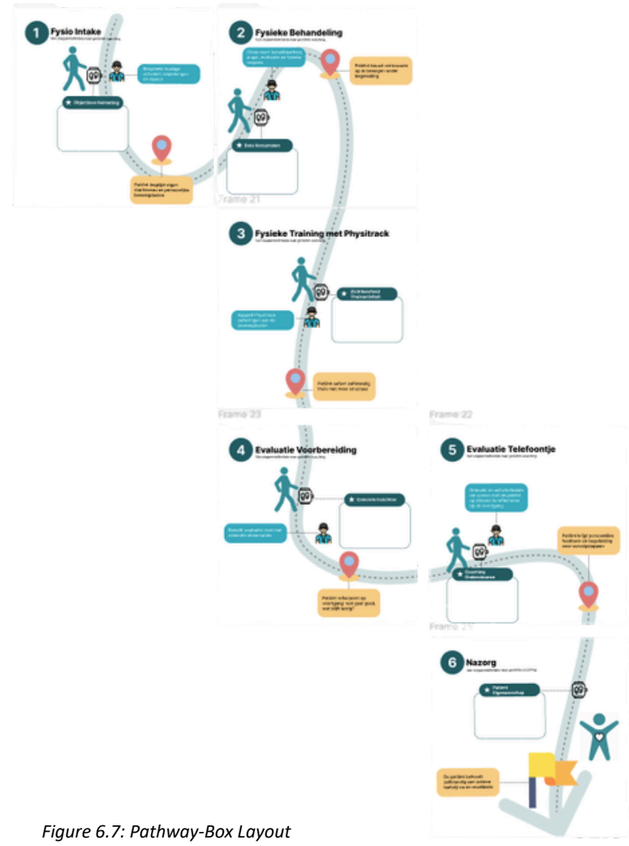


Figure 6.7: Pathway-Box Layout

6.3 Concept Choice

To select the final concept direction, a weighted decision matrix was used (see Figure 6.8). This method made it possible to compare the three concept directions in a structured and objective way, based on the previously defined design criteria. Each design criterion was assigned a weight from 1 to 3, depending on its importance for the design goal. The concepts were then scored on each criterion from 1 to 5, where a higher score indicated a stronger fit with the criterion.

Criteria related to clarity and implementation support were weighted higher, such as "the design should be visually clear and suitable for explaining the implementation to the physiotherapy team," because the main purpose of the concept is to onboard physiotherapists and help them quickly understand how activity tracker data fits within their workflow. The concept direction with the highest weighted score, concept 3, was selected for further development.

Criteria	Weight	Concept 1	Concept 2	Concept 3
The design should be visually clear, and suitable for explaining the implementation to the physiotherapy team.	3	3	2	4
The design should make organisational support visible by showing that Basalt's organisational team supports the use of activity tracker data in remote coaching	1	3	4	2
The design should help physiotherapists see the added value of using activity tracker data in remote coaching.	3	3	4	5
The design should explain how activity tracker data fits within the existing physiotherapy workflow.	2	2	3	5
The design should support practical use of the activity tracker data.	2	5	3	3
The design should be low-effort and time-efficient, enabling physiotherapists to quickly understand the key message.	3	3	1	4
Total		**44**	**37**	**57**

Figure 6.8: Weighted Decision Matrix (concept choice)

6.4 Concept Iteration

To strengthen the chosen concept, the Pathway-Explorer Box, both visually and content-wise, an additional iteration phase was conducted. This phase started with a co-creation session, which was used to gather input, refine the concept direction, and identify improvements for the next version of the design (see Figure 6.9).

6.4.1 Co-creation Session

Purpose

The purpose of the co-creation session was to enrich the Pathway-Box Explorer by gathering input on patient milestones, the physiotherapist's role, the added value of activity tracker data, and possible support elements. These insights were used to explore how the pathway box could better support onboarding and remote coaching.

Participants

The session was held with four members of Basalt Leiden's Data team. Two participants joined via Microsoft Teams. All participants were familiar with the project context, but had not yet been involved in the project process

Procedure

The co-creation session lasted one hour and was supported by a presentation slides. The session consisted of four parts: an introduction, pathway brainstorming, brainstorming based on three prompts, and brainstorming support elements for each phase. A total of ten printed sheets were used during the session. Six sheets represented the phases of the simplified physiotherapy pathway. For each phase, participants brainstormed around three questions: what the patient aims to achieve, how the physiotherapist supports the patient, and how activity tracker data can support either the physiotherapist or the patient.

Afterwards, participants brainstormed possible additions to the pathway box. These additions focused on making onboarding clearer, more educational, and more supportive for remote coaching.

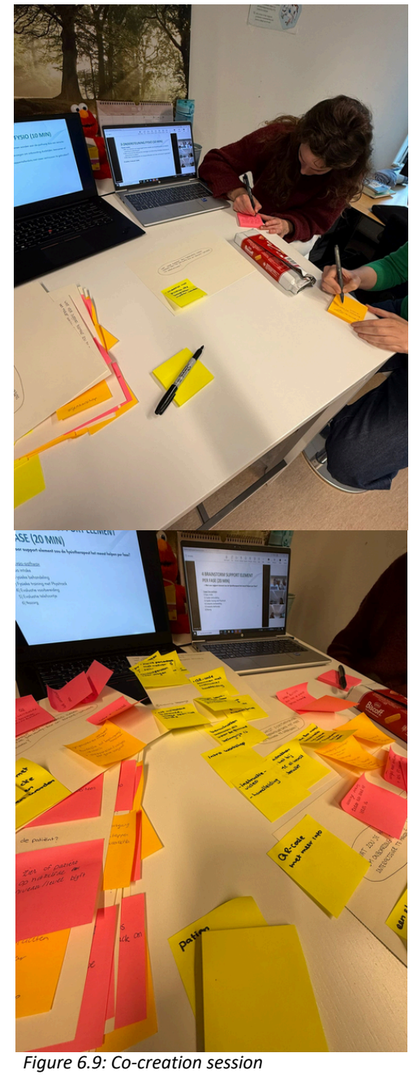


Figure 6.9: Co-creation session

Results

The session resulted in phase-specific sticky notes on patient milestones, the physiotherapist's role, the value of activity tracker data, and possible support elements for the box.

The full co-creation outputs can be found in Appendix N. The key insights per phase are summarised below.

In addition, the brainstorm generated several support elements for the pathway box. These were clustered into five main themes: data and confidence explanation explanation, coaching support, onboarding & learning experience, phase-specific support, and visual and interactive enrichments. The results can be found in Appendix O.

Phase	Patient Milestone	Physio Role	Activity Tracker added Value
1. Physio Intake	Patient understands expectations, personal goals, and how the Box is used in the programme.	Listens, informs, and supports training schedule and goal setting.	Provides baseline insight into activity history and starts the conversation about movement.
2. Physical Treatment	Patient improves physical activity, uses the tracker, and builds confidence in training.	Provides a personalised training schedule, physical tips, and motivational support.	Monitors activity during training and at home, showing whether physical treatment improves activity levels.
3. Home training with Physitrack	Patient applies physical goals at home, trains independently, and improves physically.	Creates the Physitrack training schedule, monitors progress, and reminds patients to use it.	Gives insight into at-home activity levels, progress, and motivation.
4. Evaluation Preparation	Patient reflects on activity levels, goals, and questions for the physiotherapist.	Reviews data patterns and prepares insights or advice for the evaluation.	Provides objective data to support evaluation and confirm behaviour.
5. Evaluation Phonecall	Patient gains insight into progress, asks questions, and receives personalised advice.	Gives personalised feedback, stimulates ownership, adjusts goals, and motivates the patient.	Supports the conversation, enables quick goal monitoring, and gives patients more ownership.
6. Aftercare	Patient takes ownership of own physical activity, maintains independence, and prevents relapse.	-	Supports patient ownership, motivation, and comparison with previous activity levels.

Figure 6.10: Insights Pathway Phases Summary

Design Decisions

Based on the co-creation session, several design decisions were made to further develop the Pathway-Box Explorer.

The phase-specific insights will be used to define the content for each phase of the pathway. This includes:

- **Patient milestones**
- **Physiotherapist role**
- **Value of activity tracker data**

These insights will be translated into short, scannable content for each side of the box.

A key decision was to keep the box visually simple and avoid too much text. Therefore, more detailed information could be provided through a poster.

The co-creation session also led to several additional design decisions:

- Additional information on research from LUMC regarding the Box
- A contact person for practical or technical support
- Short coaching prompts or facts on each side of the box

The session also generated insights that are useful for further recommendations. For example, a future version of the pathway box could be developed for patients. The current concept mainly focuses on onboarding physiotherapists in the use of activity tracker data, while a patient-focused version could support patients in understanding their own rehabilitation journey and the role of the activity tracker.

6.5 Summary of Key Findings

This chapter aimed to answer the following sub research questions:

- H*ow can data from the Box support physiotherapists from Basalt Leiden in understanding, monitoring, and coaching patients' physical activity behaviour during cardiac rehabilitation?*

Key Findings

The findings show that Box data, specifically activity tracker data, can support physiotherapists when it is not treated as a separate data source, but as part of the physiotherapy pathway. Through mind mapping, ideas were generated around how physiotherapists can understand, trust, and use activity tracker data in daily practice. These ideas were clustered into three concept directions: a coaching support tool, an interactive learning experience, and a tangible pathway explorer.

The Pathway-Box Explorer was selected as the strongest concept direction because it helps physiotherapists understand where, when, why, and how activity tracker data can be used throughout the pathway. It makes the role of Box data visible across key moments, such as the physio intake, physical treatment, home training, evaluation preparation, evaluation phone calls, and aftercare.

The co-creation session confirmed that activity tracker data can add value in different ways across the pathway: as a baseline for discussing movement, as input for monitoring at-home activity, as objective support for evaluation conversations, and as a way to stimulate patient ownership and long-term selfmanagement.

Overall, the chapter shows that Box data can best support physiotherapists when it is translated into clear pathway moments, practical coaching prompts, and scannable guidance. This helps physiotherapists use activity data more confidently and consistently, without adding unnecessary complexity to their workflow.

7 Final Design

In this chapter, the final design is presented: ***Steps2Coach***. The design consists of two components: a physical pathway cube and a supporting poster. Together, these components introduce the role of the Box and the activity tracker, and show how activity tracker data can support more targeted coaching across six phases of the rehabilitation trajectory.

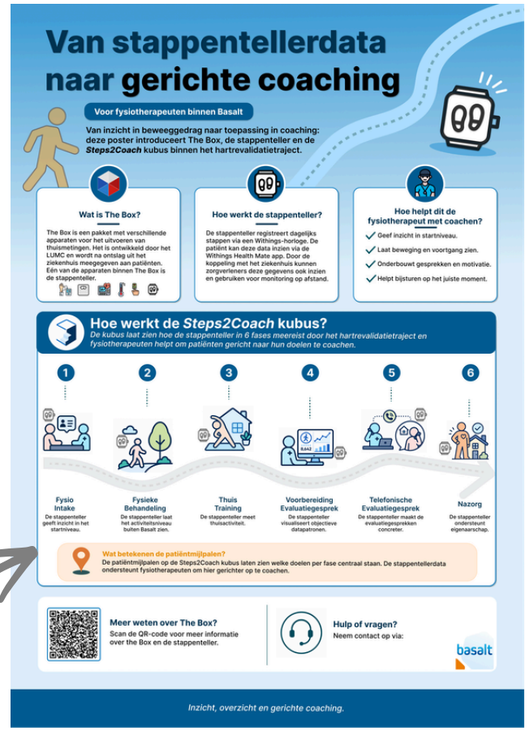
The chapter aims to answer the following sub-research question:

- *What design could support the meaningful integration of Box data into the blended cardiac rehabilitation pathway at Basalt Leiden?*

7.1 Concept Overview

The final concept, Steps2Coach, is a physical onboarding tool that helps physiotherapists understand how activity tracker data can be used within the blended cardiac rehabilitation pathway. The name "**Steps2Coach"** was chosen because the concept visualises the six main steps of the physiotherapy trajectory and shows how these steps can support physiotherapists in coaching patients throughout rehabilitation. At the same time, the name refers to the added value of step count data from the activity tracker, which can help make coaching more targeted and data-informed.

The visual design was aligned with Basalt's identity by using a colour palette based mainly on blue tones, supported by orange accents that reflect the colours of the Basalt logo.



Steps2Coach Poster

Steps2Coach

*Van stappentellerdata naar **gerichte coaching.***

Steps2Coach Cube

Steps2Coach consists of two components:

- **The Steps2Coach cube**: The main element of the concept. It functions as a physical onboarding tool that visualises the six main steps of the physiotherapy trajectory and shows physiotherapists when, why, and how activity tracker data can support patient coaching.
- **The supporting poster**: A supporting element that provides additional explanation without making the cube too text-heavy. It introduces The Box, explains the role of the activity tracker, and gives an overview of how the cube connects to the six phases of the pathway.

7.2 The Cube

7.2.1 Content

The Steps2Coach Cube is the main physical tool of the concept. It introduces physiotherapists to the role of activity tracker data within the physical cardiac rehabilitation pathway.

The cube consists of six phases that are based on the current physiotherapy pathway. To ensure a clear and easy-to-understand visual overview, the pathway was simplified and translated into six key phases.

Each side of the cube represents one phase of the pathway and the content on each side is based on the co-creation insights summarised in Figure 6.10. Each side describes:

- **Patient milestone**: what the patient aims to achieve in this phase.
- **Physiotherapist role**: how the physiotherapist supports the patient.
- **Added value of activity tracker data**: how step data can support coaching in this phase.
- "**Wist je dat" fact**: briefly explains the added value of the activity tracker data in that specific phase.
- **Coaching prompt**: gives physiotherapists a practical direction for using the activity tracker data in during coaching of the patient.

In this way, the cube makes the pathway tangible and helps physiotherapists understand when, why, and how activity tracker data can support coaching.

As mentioned before, the pathway on the cube is a simplified version of the actual physiotherapy pathway. In practice, physical training and home training often take place simultaneously. However, as treatment progresses, physical training at Basalt is gradually reduced, while home-based training becomes increasingly important. The simplified six-phase structure was therefore chosen to create a clear onboarding tool that highlights the moments where activity tracker data can add value throughout the rehabilitation trajectory.

Moreover, the phases on the cube represent an ideal future version of the physiotherapy pathway in which activity tracker data has already been successfully implemented and integrated into daily practice. As a result, some phases differ slightly from the current pathway. For example, "Evaluation Preparation" is included as a separate phase, even though it is not currently a formal step within the pathway. This phase was added because meaningful use of activity tracker data requires physiotherapists to review and interpret the data before evaluation phone calls.

<u>Phase 1: Physio Intake</u>

Phase 1 (see Figure 7.1), introduces the step counter as part of the rehabilitation pathway. Before the physiotherapy intake, patients have already completed a CPET. Since patients receive The Box from the hospital, they may also already be measuring their steps before starting rehabilitation at Basalt. This baseline activity data, collected during the waiting period between hospital discharge and rehabilitation, can complement the CPET by giving physiotherapists additional insight into the patient's actual movement behaviour in daily life. Before the intake, physiotherapists could review this data and use it to ask more targeted questions about the patient's current activity level, barriers, and confidence in becoming more active.

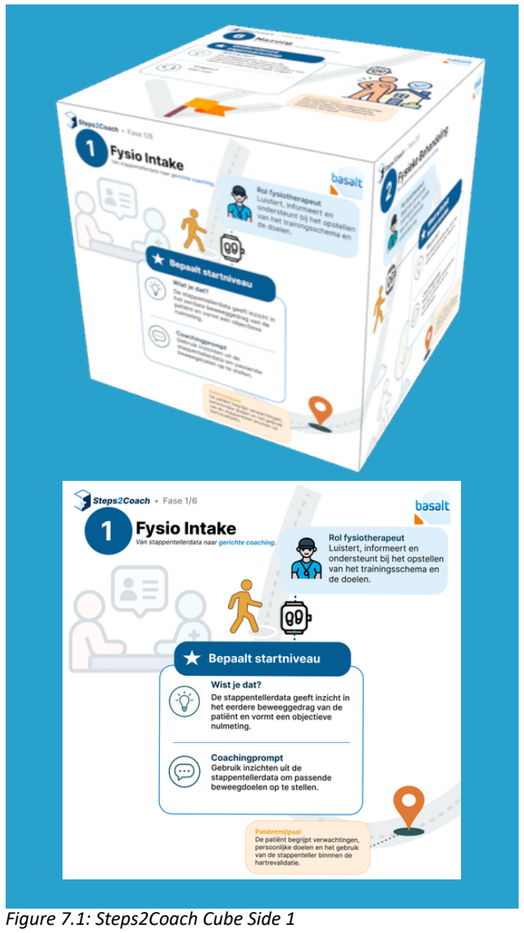


Figure 7.1: Steps2Coach Cube Side 1

<u>Phase 2: Physical Treatment</u>

Phase 2 (see Figure 7.2) shows how activity tracker data can connect supervised training at Basalt to the patient's daily activity outside the clinic. Currently, physiotherapists mainly see the patient's performance during supervised training sessions, but have limited insight into how active patients are between sessions. With the activity tracker, physiotherapists could also view activity levels outside the clinic. This can help them understand whether progress in treatment is reflected in everyday movement and use this insight to guide coaching more specifically.

Figure 7.2: Steps2Coach Cube Side 2

Phase 3: Home exercising

Phase 3 (see Figure 7.3), focuses on the shift toward more independent exercise at home. During home training, activity tracker data can help physiotherapists gain insight into how active patients are outside the supervised training sessions at Basalt. Currently, this part of the rehabilitation process largely depends on what patients report themselves. Step count data can make home activity more visible by showing whether patients are gradually increasing their daily movement, maintaining activity between sessions, or struggling to stay active at home. This can support physiotherapists in giving more targeted coaching, adjusting advice when needed, and helping patients connect their rehabilitation goals to everyday movement behaviour.

Phase 4: Evaluation preparation

Phase 4 (see Figure 7.4), highlights the need for physiotherapists to review activity patterns before the evaluation phone call. Currently, this is not a separate phase within the pathway. However, once activity tracker data is implemented, it becomes a crucial step to ensure that physiotherapists have dedicated time to analyse and interpret the data. By reviewing the data beforehand, they can prepare a more focused and data-informed conversation with the patient. This side also includes a designated box for a QR code, which will later link to clear login instructions once these have been developed by the client.

Phase 5: Evaluation phone call

Phase 5 (see Figure 7.5), shows how step counter data can support the evaluation phone calls by making remote coaching more concrete and data-informed. Currently, these conversations largely rely on subjective self-reporting. The first evaluation phone call focuses on progress and possible adjustments to the rehabilitation plan, while the second and final phone call focuses on the patient's self-management plan. Activity tracker data can support both conversations by providing insight into the patient's movement behaviour, helping physiotherapists discuss progress, barriers, and next steps more specifically.

Phase 6: Aftercare

Phase 6 (see Figure 7.6), focuses on long-term self-management after rehabilitation. In this phase, the physiotherapist no longer plays an active role, and the focus shifts towards the patient taking ownership of their own activity behaviour. Activity tracker data can support this by helping patients monitor their own step count and follow their progress over time. This makes daily movement more visible and can encourage patients to stay active after the rehabilitation programme has ended.

Figure 7.3: Steps2Coach Cube Side 3

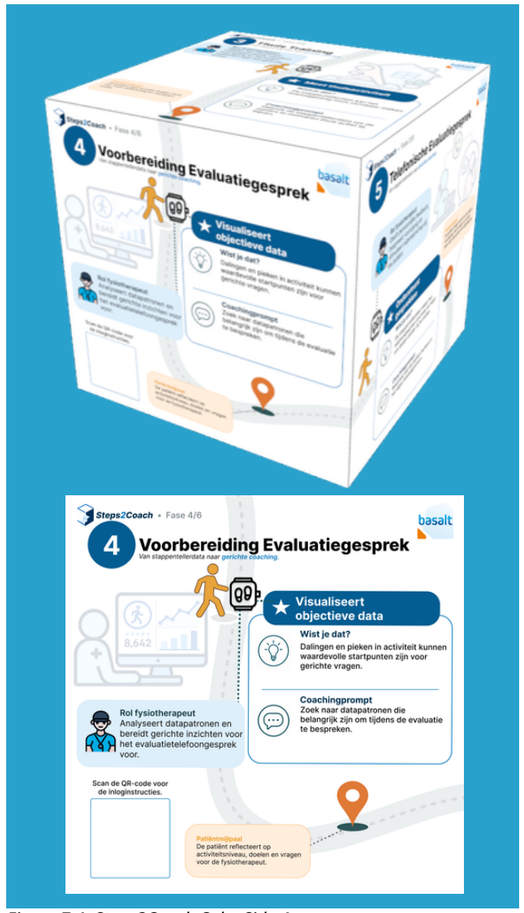


Figure 7.4: Steps2Coach Cube Side 4

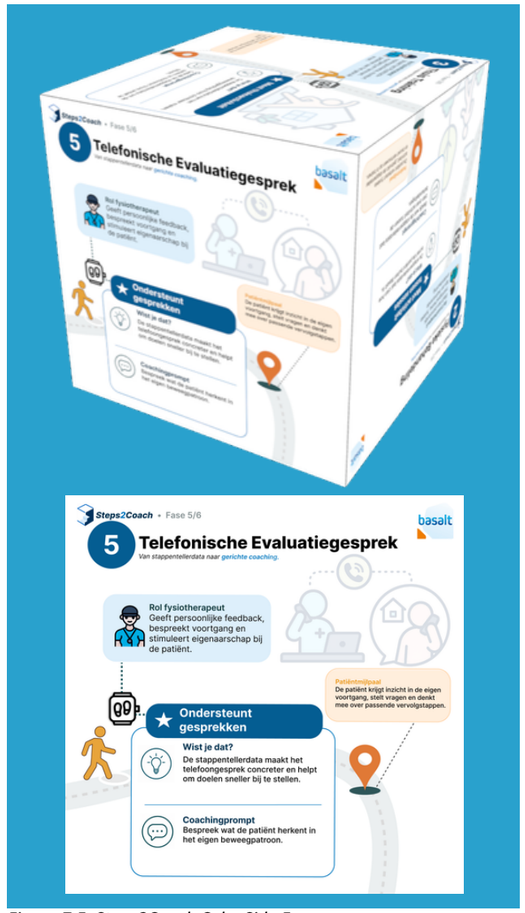


Figure 7.5: Steps2Coach Cube Side 5

Figure 7.6: Steps2Coach Cube Side 6

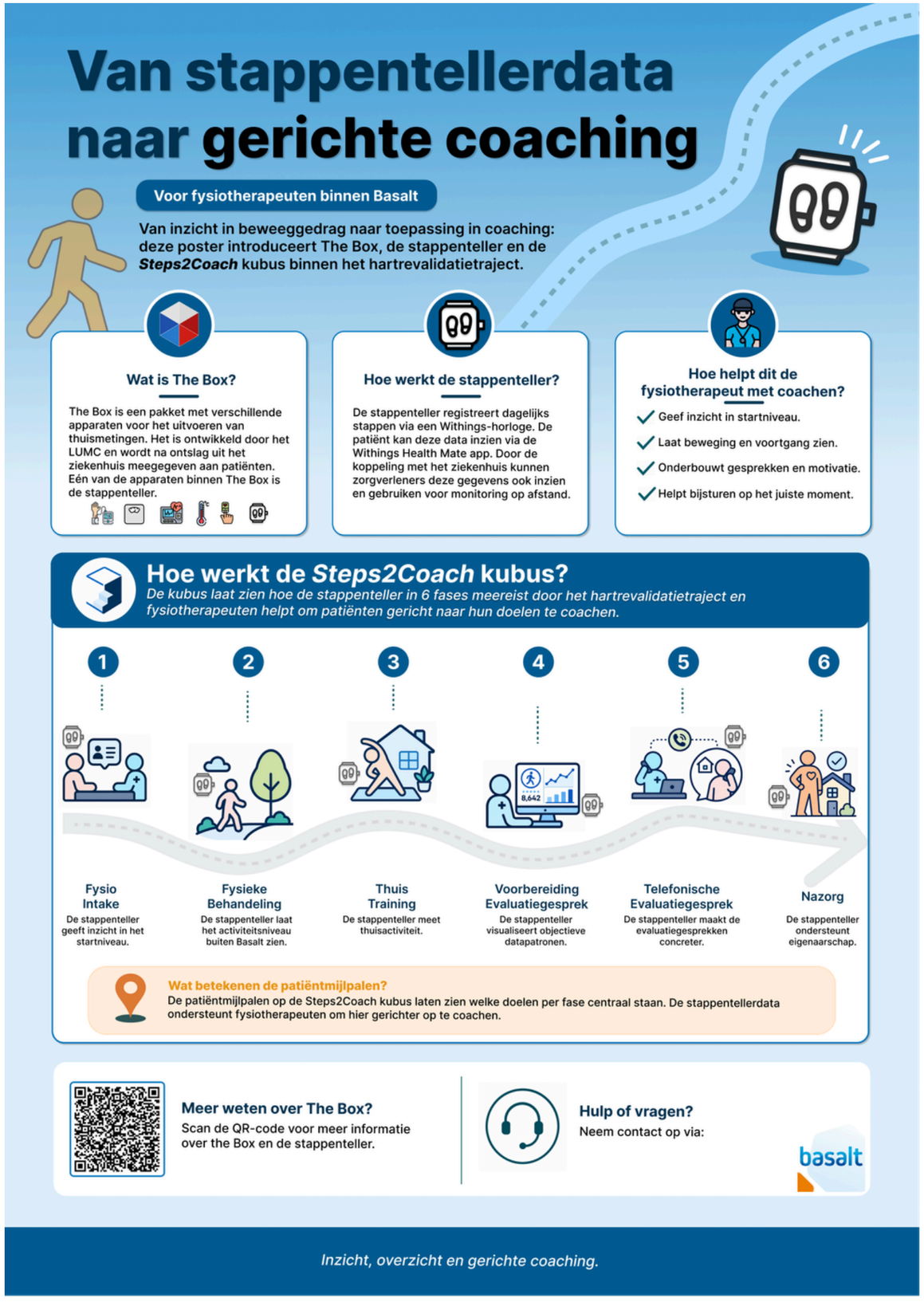


Figure 7.7: Steps2Coach Poster

7.3 The Poster

The supporting poster (see Figure 7.7) provides extra context for the Steps2Coach cube and functions as a quick reference for physiotherapists. It explains:

- what The Box is;
- how the activity tracker works;
- how activity tracker data can support coaching;
- what the activity tracker's role is across the six key phases.

The poster gives a quick overview of the activity tracker data's added value across the different phases: physio intake, physical treatment, home training, evaluation preparation, evaluation phone call, and aftercare.

In addition, the poster includes a QR code that links to the LUMC website with more information about The Box and the activity tracker. This was added because The Box originates from LUMC, and the main explanations, research background, and patient-facing information about The Box are provided by LUMC. Since patients also receive The Box through LUMC, the QR code directs physiotherapists to the original and most relevant source of information. The poster also includes space for a contact person for practical or technical questions. Together, the poster and cube form an onboarding tool that helps physiotherapists understand how step counter data can be connected to their coaching role in cardiac rehabilitation.

A full-sized version of the poster can be found in Appendix Q.

7.4 Use Scenario

The Steps2Coach cube and supporting poster are placed in locations where physiotherapists regularly work, such as:

- the physiotherapy office;
- training hall;
- and consultation rooms.

The poster is hung in a visible place and functions as a quick reference. The cube is placed nearby, for example on a shared desk or table.

The cube has two main functions. First, it acts as an onboarding tool that introduces physiotherapists to the use of activity tracker data within the rehabilitation pathway. Second, it functions as a quick reminder during relevant coaching moments. Together, the cube and poster make the use of activity tracker data more visible, structured, and accessible within the existing workflow of physiotherapists.

<u>Storyboard</u>

A storyboard was created to illustrate how the Steps2Coach concept could be used in practice (see Figure 7.8). The storyboard starts in the physiotherapy office, where the physiotherapist notices the Steps2Coach cube on the desk. After picking up the cube and looking at it, the physiotherapist is reminded of the activity tracker and is invited to read the supporting poster on the wall.

The storyboard then moves to a later moment during a patient intake. The Steps2Coach cube is visible on the table between the physiotherapist and the patient. During the conversation, the cube functions as a reminder to introduce the activity tracker and ask about the patient's current activity level. For example, the

physiotherapist may ask: “How do your daily steps currently look?” This shows how the cube can support physiotherapists in making activity tracker data part of the coaching conversation.

7.5 Design Rationale & Decisions

7.4.1 Concept Rationale

A physical cube was chosen because it makes the rehabilitation pathway tangible, encourages active exploration and facilitates conversation by making relevant infromation visible and shareable. Rather than presenting information in a linear document, the cube allows physiotherapists to engage with the pathway phase by phase. This supports the goal of helping physiotherapists understand how activity tracker data can be used throughout the rehabilitation process and how it can support coaching conversations at different moments in the pathway.

The supporting poster was added to provide additional context and explanation without making the cube too text-heavy. During the co-creation session, participants emphasised that the intervention should be concise, visual, and easy to scan. Therefore, the cube only contains the most relevant information per phase, while more detailed information about The Box, the activity tracker, and practical support is provided on the poster. Together, the cube and poster create a balance between simplicity and completeness.

7.4.2 Visual and Physical Design Decisions

The visual design was aligned with Basalt's visual identity by using a colour palette based on **blue, white, and orange**. These colours were selected because they reflect the colours used in the Basalt logo and help create a familiar and recognisable appearance for physiotherapists working within the organisation.

The Steps2Coach cube was designed with dimensions of **15 x 15 x 15 cm**. This size was selected because it provides sufficient space for icons and text to remain readable, while still being compact enough to hold, move around, and place on desks, tables, or other shared workspaces. The cube is intended to function as a visible and interactive onboarding tool rather than a static information source.

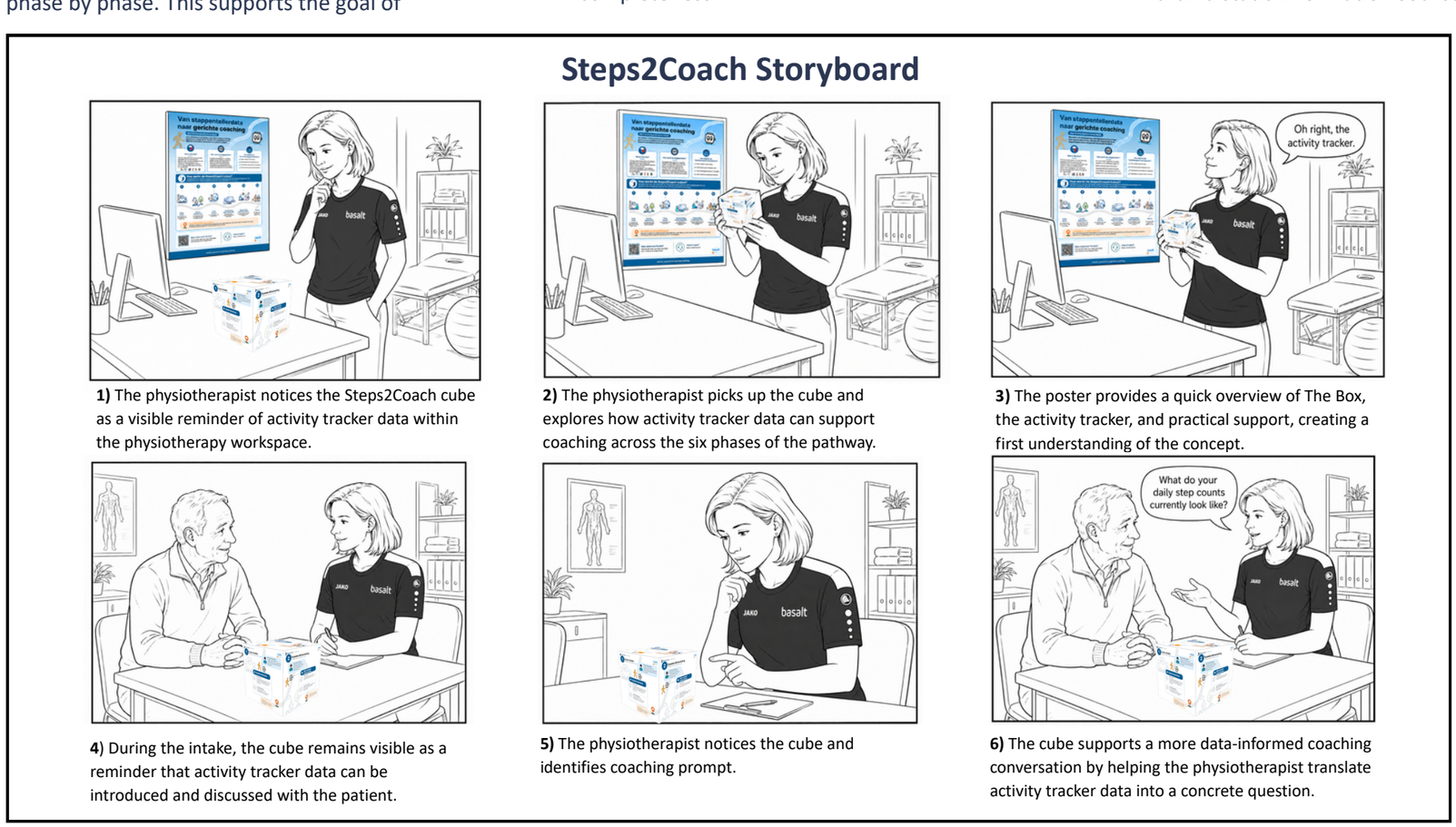


Figure 7.8: Storyboard Steps2Coach

For the final design, the cube is envisioned to be produced from **PVC with matte vinyl stickers**. PVC was selected because it is:

- lightweight;
- durable;
- sturdy enough for repeated use;
- suitable for placement in different physiotherapy spaces, such as the physio office, consultation rooms, or training hall;
- easy to move between locations when needed.

The matte vinyl stickers provide a professional finish and reduce glare, which improves readability under different lighting conditions.

The supporting poster is intended to be produced in **A2 format**. This size was chosen to ensure that the poster remains noticeable and readable when placed in physiotherapy workspaces, while still fitting within the available wall space.

7.4.3 Prototype Development

For the prototype, a cardboard version was created with the same 15 x 15 x 15 cm dimensions and finished with matte vinyl stickers (see Figure 7.9). This approach allowed the prototype to closely mimic the appearance and handling characteristics of the envisioned PVC design while remaining quick and cost-effective to produce. The prototype was weighted to approximately 300 grams, providing a similar feel and stability to the intended final product.

Figure 7.9: Cardboard prototype in the consultation room

7.6 Scope of the Intervention

Steps2Coach is designed as an onboarding and awareness tool for physiotherapists at Basalt Leiden. The intervention serves as a first introduction to the use of activity tracker data within cardiac rehabilitation and aims to increase understanding of when and how this data can support coaching throughout the physiotherapy pathway.

The concept does not currently support the practical use of activity tracker data, such as interpreting activity patterns, allocating time for data analysis, or providing detailed login instructions. This is because the activity tracker has not yet been technically implemented within the cardiac rehabilitation pathway at Basalt. Before implementation can take place, several organisational and logistical aspects first need to be addressed.

These include establishing login procedures, providing physiotherapists with training on how to access and interpret activity tracker data, and determining how activity tracker data should be integrated into existing workflows.

In addition, physiotherapists would likely require dedicated time to review and interpret activity tracker data before evaluation phone calls. Without sufficient time allocation and implementation planning, the potential value of the activity tracker data may be difficult to realise in practice.

Therefore, Steps2Coach was designed for an ideal future scenario in which the activity tracker has already been implemented and the required organisational conditions are in place. For implementation, Basalt needs to ensure that the technical setup works smoothly to avoid creating unnecessary extra workload for physiotherapists. For example, logging in through the server and accessing the activity tracker data should work seamlessly before physiotherapists are expected to use the data in practice.

The concept focuses on creating awareness and supporting onboarding, rather than addressing the current logistical barriers that must first be resolved before implementation can occur.

7.7 Final Design Summary

This chapter aimed to answer the following sub-research questions:

- *What design could support the meaningful integration of Box data into the blended cardiac rehabilitation pathway at Basalt Leiden?*

<u>Summary</u>

Steps2Coach supports the meaningful integration of Box data by making the role of activity tracker data visible, tangible, and connected to the physiotherapy pathway. The cube helps physiotherapists understand when and how the data can be used across six phases, while the poster provides additional context. Together, the components support onboarding, create a shared understanding, and help translate activity data into more targeted coaching. This is relevant because targeted coaching can lead to more meaningful conversations and better guidance, helping patients follow the rehabilitation programme more effectively. Since the goal of rehabilitation is to support patients in becoming more physically active and independent, activity tracker data can also help patients monitor their own progress, take more ownership over their recovery, and stay active after the programme has ended.

8 Design Evaluation

In this chapter, the final design is evaluated. The evaluation examines whether the design meets the design requirements and supports physiotherapists in understanding and using activity tracker data for coaching. This is done through user testing with physiotherapists and stakeholder validation through a focus group. The insights from this evaluation are used to assess the value of the concept and inform further recommendations, which are discussed in the final chapter.

8.1 Evaluation Setup

8.1.1. User-testing & Stakeholder Validation

Purpose

To evaluate the relevance and practical value of the final design, Steps2Coach was tested and validated with key stakeholders. User testing with a physiotherapist focused on whether the cube and poster were clear, usable, and supportive in translating activity tracker data into coaching practice.

Stakeholder validation through a focus group aimed to assess whether the concept aligned with the broader organisational goal of implementing The Box within blended cardiac rehabilitation.

The insights from both evaluation activities were used to identify recommendations for further development and implementation. Feedback that related to broader organisational, technical, or workflow-related changes was translated into recommendations beyond the scope of this project.

Participants

- 1 physiotherapist for the user-testing
- 3 cardiologists for the stakeholder validation

User-testing procedure

User-testings were conducted on-site at Basalt and took approximately an hour. The user-testing guide can be found in Appendix R.

Stakeholder validation procedure

In addition to the user-testings, an online stakeholder validation meeting of 30 minutes also took place. The stakeholder validation guide van be found in Appendix S.

8.2 User-testing Results

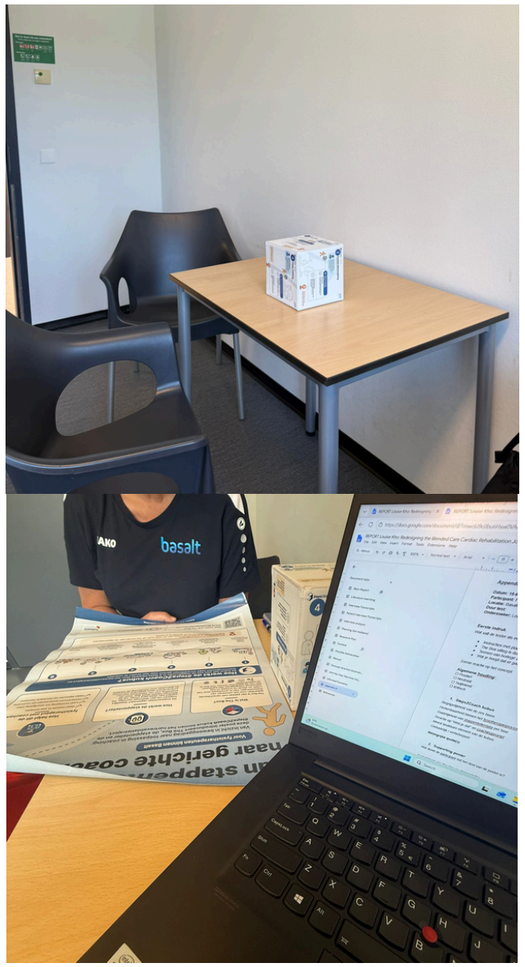


Figure 8.1: User-Testing at Basalt

The user test with one physiotherapist (see Appendix T for the full results) showed that Steps2Coach was generally received positively. The physiotherapist found the cube visually appealing, engaging to hold, and inviting to read. The overall purpose of the concept was understood as a tool to explain how step count data could support coaching within cardiac rehabilitation. The coaching prompts were seen as one of the strongest elements, because they made the use of activity tracker data more concrete and motivating. However, the test also showed that practical questions remain, especially

because The Box is not yet implemented within the physiotherapy workflow. The physiotherapist mainly wanted more clarity on how much time data use would take, what the data platform will show, how the data should be interpreted, and how strongly step count data should influence coaching conversations.

Key feedback points from the user test were:

- **Positive first impression:** The cube was experienced as eye-catching, playful, and inviting. The physiotherapist mentioned that she would pick it up and read it.
- **Clear overall concept:** The poster and cube together helped explain how step counter data could support coaching. The physiotherapist understood the general purpose of the intervention.
- **Coaching prompts were valuable:** The coaching prompts helped clarify why and how step counter data could be used in each phase. They were described as motivating and useful for translating data into coaching.
- **Workflow fit was mostly recognised:** The physiotherapist recognised most phases of the physiotherapy process. However, some steps were not fully aligned with current practice. For example, home training and evaluation preparation are not clearly separate phases in the current workflow.
- **Practical implementation questions remain:** The physiotherapist raised questions about how much time should be spent on the data, what exactly can be seen in The Box, how the data should be interpreted, and how important step count data should be compared to other patient goals.
- **Activity Tracker Data should remain supportive:** The physiotherapist emphasised that the activity tracker should not become a control tool or the main measure of progress. It should support coaching, while still leaving room for individual patient needs, preferences, and barriers.
- **Cube and poster work well together:** The poster provides a quick overview, while the cube supports more detailed exploration. Together, they made the physiotherapist curious and supported understanding.
- **Need to clarify the target user:** The physiotherapist initially questioned whether the cube was meant for physiotherapists. This suggests that the concept should communicate more clearly that physiotherapists are the primary users.
- **Useful locations:** The physiotherapist suggested placing the cube and poster in the office or intake room. A more general message about The Box could also be shown in the training room or waiting area.
- **Limited quick understanding:** Although the general message was easy to scan, fully reading and understanding the concept took more time. This is partly because The Box is not yet implemented, making some elements still abstract.

Overall, the user test showed that Steps2Coach can help create awareness and motivation around the use of activity tracker data. At the ame time, the concept needs further development once the technical and practical conditions for Box data use are in place

8.3 Stakeholder Validation Results

The stakeholder validation (see Appendix U for the full results) with three cardiologists confirmed that Steps2Coach was clear, relevant, and aligned with the broader implementation of The Box and step count data within Basalt's cardiac rehabilitation pathway. The cardiologists understood the concept as a support and onboarding tool for physiotherapists, aimed at helping them integrate step counter data into coaching moments. The physical cube was positively received as a playful and noticeable way to create awareness and keep the topic visible in the physiotherapy work environment. At the same time, the validation highlighted that the concept alone is not sufficient for successful implementation. Its effectiveness strongly depends on whether physiotherapists are technically able, motivated, and supported to use the data in practice.

Key validation points:

- **Concept clarity:** The cardiologists understood the purpose of Steps2Coach as a tool to support physiotherapists in using step count data during cardiac rehabilitation.
- **Fit with broader implementation:** The concept was considered suitable within Basalt's broader ambition to implement The Box and strengthen blended care.
- **Step goals need further guidance:** The cardiologists suggested that step count could become a secondary rehabilitation goal, but realistic step goals should be based on the patient's baseline activity level and require further guidance.
- **Physiotherapist adoption is critical:** A major concern was that the concept will only work if physiotherapists actually use it. Existing variation in blended care use and resistance to digital tools remain important implementation risks.
- **Need for onboarding and behaviour change:** The cardiologists emphasised that physiotherapists need clear explanation, motivation, evidence, and practical support to understand why step count data is relevant.
- **Technical readiness is a precondition:** Clear login instructions and a working technical infrastructure are necessary before the concept can be implemented effectively.
- **Evaluation should be added:** The cardiologists recommended monitoring whether physiotherapists actually use activity tracker data in practice, for example by comparing blended care use across physiotherapists.
- **Future patient-facing version:** A possible future improvement is to develop a patient-facing version, such as a waiting room poster, so that patients can remind physiotherapists too of box data use.

8.4 Summary of Key Findings

The evaluation chapter showed that Steps2Coach was positively received and considered relevant by both the physiotherapist and the organisational stakeholders.

The user test showed that the cube and poster make the use of activity tracker data more visible, engaging, and easier to connect to coaching practice. The coaching prompts were especially valuable because they helped translate activity tracker data into practical coaching support.

The stakeholder validation confirmed that the concept fits Basalt's broader ambition to implement The Box and strengthen blended cardiac rehabilitation. At the same time, both evaluation activities showed that Steps2Coach should be seen as a first step towards implementation. Its success depends on several conditions, including technical access to the Box data platform, clear login instructions, guidance on data interpretation, time allocation within the workflow, and active support for physiotherapist adoption.

Therefore, the concept can support awareness, motivation, and onboarding, but further development and practical testing are needed before its long-term effect on data-informed coaching can be determined.

9 Discussion

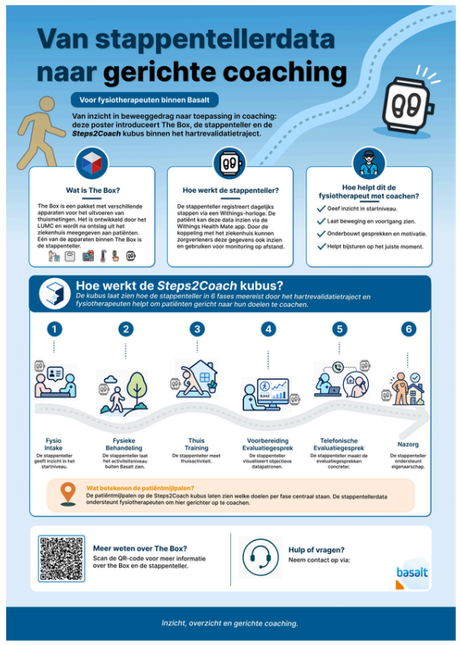
In this chapter, the project is discussed and concluded. The research question is answered by reflecting on the main findings and the final design evaluation. The chapter then discusses the design implications and practical implications of the final design, Steps2Coach, for supporting the onboarding for the activity tracker data in physiotherapy coaching. Finally, the limitations of the project are addressed, followed by recommendations for further development and implementation.

9.1 Conclusion

The research question of this project was:
"How can the cardiac rehabilitation care pathway at Basalt be redesigned to strengthen blended care, supported by data from the Box, in a way that supports physiotherapists in remote coaching?"

This project shows that the pathway can be strengthened by embedding Box data, specifically activity tracker data, as much as possible into existing physiotherapy moments, rather than introducing it as a separate digital tool or additional task. The value of Box data lies in its ability to support physiotherapists within their current workflow, especially during moments where coaching now mainly depends on subjective patient self-report. By showing how activity tracker data can add value during the physio intake, treatment phase, home training, evaluation preparation, evaluation phone calls, and aftercare, physiotherapists can better understand when and how the data supports their coaching role. In this way, the data becomes a practical support for guiding patients towards their goals in each phase, instead of an extra workload. However, this requires that the technical setup first works smoothly.

The final design, **Steps2Coach**, supports this redesign by making clear when, why, and how activity tracker data can be used within the physiotherapy pathway. The cube makes the pathway tangible and helps physiotherapists understand the role of activity tracker data across the six phases, while the poster provides additional context about The Box, the activity tracker, and practical support. Together, these components function as an onboarding tool that helps create awareness and a shared understanding of how activity tracker data can support coaching conversations. In this way, Steps2Coach contributes to a more meaningful integration of Box data by translating data use into concrete coaching moments, rather than presenting the data as an isolated source of information.



Steps2Coach
Van stappentellerdata naar gerichte coaching.

The design goal helped give the project a clear focus. Instead of trying to redesign the full cardiac rehabilitation pathway or solve all technical and organisational implementation barriers, the project focused specifically on supporting Basalt's organisational team in onboarding physiotherapists. This focus was important because the research into the current blended care pathway showed that physiotherapists are not yet consistently motivated or supported to integrate blended care tools into daily practice. Treatment styles differ between physiotherapists, meaning that some make use of available digital tools, while others hardly use them at all. A major contributor to this variation is the lack of structured onboarding into blended care.

Therefore, before Box data can become part of daily physiotherapy practice, physiotherapists need to feel informed, supported, and motivated to use it. A clear onboarding approach is crucial to create a shared understanding of why the activity tracker data is valuable, how it fits within the workflow, and how it can support remote coaching. Steps2Coach responds to this need by focusing on awareness, understanding, and first adoption.

9.2 Interpretation of Key Findings

The thematic analysis revealed several recurring themes within the current blended cardiac rehabilitation pathway at Basalt Leiden. Two themes were particularly relevant for the design direction: blended care is insufficiently defined, introduced, and embedded in the pathway, and remote coaching currently relies too much on subjective self-reporting. These findings showed that the main challenge is not simply the availability of digital tools, but the lack of structure around how these tools are introduced, used, and connected to coaching moments.

The journey maps further translated these themes into concrete design opportunities. They showed the need to introduce blended care more clearly from the start, create more structure and consistency in the use of digital tools, and support physiotherapists in onboarding patients. In addition, the maps highlighted the transition from physical training to home-based training as a vulnerable moment, where patients need more guidance to continue exercising independently.

The evaluation phone calls also emerged as important moments for improvement. These calls have potential for remote coaching, but are currently limited by their short duration, lack of structure, and reliance on patient self-report. Activity tracker data can strengthen these conversations by giving physiotherapists more objective insight into patients' daily movement behaviour. However, this data needs to be translated into practical coaching support, rather than being presented only as numbers.

9.3 Reflection on Steps2Coach

9.3.1 Reflection Based on Design Criteria

UTAUT and COM-B were used to strengthen the design direction and translate the research findings into adoption-focused design criteria. These models helped ensure that the final concept addressed not only what physiotherapists need to know, but also what may influence their ability and willingness to use the activity tracker data.

The final concept can be reflected on through the design criteria as follows:

- **The design should be visually clear, and suitable for explaining the implementation to the physiotherapy team:** During the validation meeting, cardiologists understood the purpose of Steps2Coach as a tool to support physiotherapists in using step count data during cardiac rehabilitation. The concept was also considered suitable within Basalt's broader ambition to implement The Box and strengthen blended care.
- **The design should make organisational support visible by showing that Basalt's organisational team supports the use of activity tracker data in remote coaching:** Steps2Coach uses Basalt's visual identity and includes space for practical contact support. This communicates that the use of activity tracker data is not an individual initiative, but part of a broader organisational direction supported by Basalt.
- **The design should help physiotherapists see the added value of using activity tracker data in remote coaching:** The concept shows how step count data can support physiotherapists in coaching patients towards their goals. During user testing, the physiotherapist stated that the concept could help motivate the use of activity tracker data and clearly communicated its added value. However, some practical questions about data use remained.
- **The design should explain how activity tracker data fits within the existing physiotherapy workflow:** The cube connects activity tracker data to existing moments in the physiotherapy pathway, such as the intake, home training, evaluation phone calls, and aftercare. The physiotherapist recognised these phases during user testing. Although "evaluation preparation" is not currently a separate phase, she confirmed that such a step would be important once Box data is implemented.
- **The design should support practical use of the activity tracker:** Steps2Coach supports first understanding and onboarding, but does not yet fully support practical data use. For full implementation, Basalt still needs to organise technical access, login instructions, time allocation, and training in data interpretation.
- **The design should be low-effort and time-efficient, enabling physiotherapists to quickly understand the key message:** The cube and poster are designed to be visually accessible and easy to scan. During user testing, the physiotherapist appreciated the images and icons and described the concept as eye-catching with a clear general message. However, because The Box is not yet implemented, some elements still required more time to understand in detail.

Overall, Steps2Coach should be seen as a first step towards integrating activity tracker data into blended cardiac rehabilitation at Basalt. The concept supports physiotherapists in understanding how activity tracker data can strengthen remote coaching, but further

implementation work is still needed. The main contribution of this project is therefore a pathway-aligned onboarding tool that makes activity tracker data understandable, visible, and connected to meaningful coaching moments.

9.3.2 Reflection Based on Literature Gap

The literature showed that successful blended or hybrid cardiac rehabilitation requires more than simply adding digital tools to an existing pathway. Studies emphasise the importance of staff engagement, clear monitoring procedures, patient onboarding, technical reliability, and integration into existing care routines.

This directly supports the design direction of Steps2Coach. Rather than presenting activity tracker data as a separate digital component, the concept connects the data to existing physiotherapy moments, such as the intake, home training, evaluation phone calls, and aftercare.

In this way, Steps2Coach responds to the literature gap by focusing on how physiotherapists can be supported in adopting and using patient-generated activity data in daily coaching practice. The design also acknowledges that meaningful integration depends on clear roles, low-effort support, and technical preconditions, such as reliable access to the Box data system. Therefore, Steps2Coach can be seen as a first step towards making blended care more structured, understandable, and actionable within Basalt's cardiac rehabilitation pathway.

9.4 Limitations

Although this project generated a broad range of insights and the final design was positively received by the client, several limitations should be considered when interpreting Steps2Coach. These limitations do not reduce the relevance of the concept, but they do clarify its current scope and the conditions needed for further development and implementation.

First, the research was conducted within the specific context of Basalt Leiden, with a limited number of patients and healthcare professionals involved. Therefore, the findings and final concept are closely connected to this local context and cannot automatically be generalised to other Basalt locations or cardiac rehabilitation settings.

Second, the final design was validated with a few members of Basalt's organisational team, consisting of three cardiologists. This provided valuable input on the relevance of Steps2Coach and its potential to support the broader implementation of The Box within cardiac rehabilitation. However, because physiotherapists are the main users of the concept, the user testing with only one physiotherapist led to limited insight into the practical use and understandability of the cube and poster in daily physiotherapy practice. More testing is therefore needed to understand whether Steps2Coach is useful for physiotherapists with different levels of experience, working styles, and attitudes towards blended care.

Third, the design was limited by the fact that several practical conditions for implementation were not yet in place. Basalt's team does not yet have full access to the Box data platform, meaning physiotherapists do not yet know how the data will be presented, how easy it will be to access, or how it should be interpreted. In addition, logistical questions remain unclear, such as how much time physiotherapists will have to review the data, when this should happen, and how leading the activity tracker data should be in coaching conversations. This means that Steps2Coach can currently support first onboarding and awareness, but cannot yet provide detailed guidance for practical data interpretation.

Fourth, the final concept focuses mainly on physiotherapists and not directly on patients. As a result, the concept may support physiotherapists in understanding and using activity tracker data, but its long-term effect on patient behaviour, ownership, and aftercare cannot be guaranteed. These effects would need to be tested once the activity tracker data is actually implemented in the pathway.

Finally, Steps2Coach does not solve technical or organisational integration barriers. Issues such as login procedures, technical reliability, data access, time allocation, and training still need to be addressed by Basalt before activity tracker data can become part of daily physiotherapy practice. The concept should therefore be understood as a first step towards implementation: it supports understanding, motivation, and onboarding, but the actual long-term effect of the design could not yet be tested within the scope of this project.

9.5 Recommendations

9.5.1 Concept Recommendations

After activity tracker data has been implemented within the physiotherapy workflow, the actual effect of Steps2Coach should be tested in practice. This should focus on whether the concept supports physiotherapists in using the data during coaching, whether it improves understanding of the activity tracker's added value, and whether it helps integrate the data into existing workflow moments. In addition, the concept should be further developed with more guidance on how to interpret activity tracker data, as practical interpretation remains a key condition for use.

The current cube already includes an empty box where a QR code can be added to link to login instructions. This should be developed further, as clear login instructions are crucial to ensure that physiotherapists can access the Box data platform easily and without unnecessary burden. To guide physiotherapists more clearly, the concept could also include suggested time allocations for each phase, indicating how much time should be spent reviewing, discussing, or using activity tracker data during coaching. Finally, a patient-facing version of the Steps2Coach cube and poster could be explored to support patient understanding, motivation, and ownership of activity tracker data during and after rehabilitation.

9.5.2 Activity Tracker Implementation Recommendations

For the broader implementation of activity tracker data, Basalt should first clearly define blended care within the physiotherapy team. The activity tracker should then be introduced

consistently during the physiotherapy intake, for example through an onboarding workshop for physiotherapists. This workshop should include clear instructions on how to access the activity tracker data platform, training on how to interpret the data, and guidance on how to use step count data in coaching conversations.

As mentioned before, the practical conditions for using the activity tracker data should also be in place. Logging into the data platform should be easy and clear, and physiotherapists should know where to find the relevant information. In addition, time should be reserved before evaluation calls for physiotherapists to review and interpret the step count data. It should also be clearly defined how large a role the step count data should play during the coaching conversation, especially in relation to the limited time available during evaluation calls.

Step count goals should be defined carefully. Increasing daily steps by 1,000 or 2,000 could be a realistic starting point, but step count should not become the only measure of progress. It does not capture all forms of patient activity and should therefore function as a secondary rehabilitation goal, alongside existing patient-centred goals such as returning to specific daily activities.

In addition, behaviour change techniques could be used to support adoption and help physiotherapists integrate activity tracker data into daily practice. Another important condition for adoption is clearly explaining the added value of blended care and activity tracker data. This includes sharing evidence on the positive effects of blended care for patients and creating opportunities for physiotherapists to share their experiences, concerns, and feedback during implementation.

9.6 Personal Reflection

Before the start of the graduation project, I set several personal goals in the project proposal (see Appendix V), focusing on deepening my understanding of cardiac rehabilitation, translating research insights into design opportunities, strengthening stakeholder communication, and independently managing the project process.

Reflecting on these goals, the project allowed me to further develop my interest in healthcare-related design within a real rehabilitation context. By exploring the cardiac rehabilitation pathway at Basalt, I gained a deeper understanding of the complexity of healthcare systems and the different needs of patients, healthcare professionals, and organisational stakeholders. The research process helped me translate qualitative insights into structured journey maps, design opportunities, and eventually a concrete concept. I also strengthened my communication and collaboration skills by engaging with multiple stakeholders throughout the project. Managing the project independently, while actively seeking and applying feedback, helped me grow as a designer and become more confident in making design decisions.

Overall, the project confirmed my motivation to contribute to healthcare innovation and showed me how design can create practical value in improving care delivery.

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Appendix

Appendix A: Informed Consent Form Interviews

Delft UniversityofTechnology
HUMAN RESEARCH ETHICS INFORMED CONSENT INTERVIEW

U wordt uitgenodigd om deel te nemen aan het onderzoek **"Het herontwerpen van het hartrevalidatiezorgpad door de integratie van blended care."**. Dit onderzoek wordt uitgevoerd door Louise Kho, masterstudent aan de faculteit Industrieel Ontwerpen van de TU Delft.

Doel van het onderzoek

Het doel van dit onderzoek is om inzicht te krijgen in het huidige zorgpad voor hartrevalidatie bij Basalt, met specifieke aandacht voor het gebruik van blended care. Het onderzoek richt zich op het begrijpen van hoe zorgprofessionals en patiënten het revalidatieproces ervaren, inclusief het gebruik van hulpmiddelen zoals monitoring op afstand. Uw deelname aan deze studie helpt ons bij het begrijpen van het complexe zorgpad en het genereren van nieuwe ideeën voor verbetering van de zorg. Door behoeften, knelpunten en kansen binnen het zorgpad te identificeren, hopen we het dagelijkse werk van zorgprofessionals beter te ondersteunen en uiteindelijk de patiëntgerichte zorg te verbeteren.

Gebruik van gegevens
De in dit onderzoek verzamelde gegevens worden uitsluitend gebruikt voor academische onderzoeksdoeleinden en maken deel uit van een masterthesis aan de TU Delft. Onderzoeksresultaten kunnen worden opgenomen in de uiteindelijke scriptie en in bijbehorende academische presentaties. Alle gegevens worden geanonimiseerd en er wordt geen persoonlijk identificeerbare informatie gedeeld buiten het onderzoeksteam.

Verzameling en bescherming van gegevens
- Persoonlijke gegevens worden uitsluitend verzameld voor doeleinden van geïnformeerde toestemming en administratieve verwerking.
- Audio-opnamen van de interviews worden gebruikt voor analyse.
- De opnames worden in een vroeg stadium getranscribeerd en geanonimiseerd. Geanonimiseerde gegevens worden veilig opgeslagen en zijn alleen toegankelijk voor de onderzoeker en de academische begeleiders.
- Identificeerbare persoonsgegevens worden afzonderlijk opgeslagen en verwijderd zodra deze niet langer nodig zijn.

Hoewel alle mogelijke maatregelen worden genomen om uw gegevens te beschermen, bestaat er altijd een minimaal risico op datalekken. Om dit risico te beperken, wordt gebruikgemaakt van de volgende opslagplek: TU Delft OneDrive

Vrijwillige deelname

Deelname aan dit onderzoek is volledig vrijwillig. U kunt op elk moment stoppen met uw deelname, zonder opgave van reden en zonder enige consequenties. Indien u besluit zich terug te trekken, worden uw gegevens waar mogelijk verwijderd.

Indien u vragen heeft over dit onderzoek, kunt u contact opnemen met de onderzoeker, Louise Kho, via l.w.l.kho@student@tudelft.nl. Dit onderzoek wordt uitgevoerd in het kader van een masterthesis aan de TU Delft.

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICPANT TASKS AND VOLUNTARY PARTICIPATION		
1. Ik heb de informatie over het onderzoek gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	☐	☐
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	☐	☐
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent: ● Een interview (circa 30 minuten) ● Een audio-opname (die direct wordt verwijderd na het transcriberen) ● Een transcriptie van de audio-opname (geanonimiseerde text)	☐	☐
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
4. Ik begrijp dat deelname aan dit onderzoek minimale risico's met zich meebrengt. Deze kunnen bestaan uit lichte ongemakken tijdens het interview of een gevoel van terughoudendheid bij het bespreken van ervaringen met betrekking tot hartrevalidatie of professionele praktijk. Ik begrijp dat deze risico's worden beperkt doordat deelname volledig vrijwillig is, dat ik vragen mag overslaan of het interview op elk moment zonder gevolgen mag beëindigen, en dat mijn antwoorden vertrouwelijk worden behandeld en op geanonimiseerde en algemene wijze worden gerapporteerd. Deelname of niet-deelname heeft geen invloed op mijn zorg, werk, of professionele beoordeling.	☐	☐
5. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, evenals aan deze gegevens gekoppelde onderzoeksdata (zoals audio-opnames), waarbij een minimaal risico bestaat dat mijn identiteit bekend zou kunnen worden.	☐	☐
6. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk: ● Anonimisatie van de data ● Veilige data opslag ● Het verwijderen van de audio-opname na transcriptie	☐	☐
7. Ik begrijp dat de persoonlijke data die over mij verzameld wordt, vernietigd wordt na transcriptie en anonimisatie van de data.	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		
8. Ik begrijp dat na het onderzoek de geanonimiseerde informatie gebruikt zal worden voor een master afstudeerproject.	☐	☐

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
9. Ik geef toestemming om mijn antwoorden, ideeën of andere bijdragen anoniem te quoten in resulterende producten.		
D: (LONGTERM) DATA STORAGE, ACCESS AND REUSE		
10. Ik begrijp dat de geanonimiseerde interviewtranscripten en notities die ik in het kader van dit onderzoek verstrek, **niet** zullen worden opgeslagen in een data-archief voor toekomstig onderzoek of onderwijsdoeleinden. De gegevens worden uitsluitend gebruikt voor dit master afstudeerproject.	☐	☐
11. Ik begrijp dat toegang tot de onderzoeksgegevens uitsluitend beperkt is tot de onderzoeker en de academische begeleiders, en dat de gegevens veilig worden opgeslagen en verwijderd in overeenstemming met het Data Management Plan.	☐	☐

Signatures

_____ _____ _____
Naamdeelnemer Handtekening Datum

Ik, **de onderzoeker**, verklaar dat ik de informatie en het instemmingsformulier correct aan de potentiële deelnemer heb voorgelezen en, naar het beste van mijn vermogen, heb verzekerd dat de deelnemer begrijpt waar hij/zij vrijwillig mee instemt.

Louise_____ _____
Naam onderzoeker Handtekening Datum

Contactgegevens van de onderzoeker voor verdere informatie:
Louise Kho, l.w.l.kho@student.tudelft.nl

Appendix B: Informed Consent Form Walk-Alongs

Delft University of Technology
HUMAN RESEARCH ETHICS INFORMED CONSENT MEELOOPDAG

U wordt uitgenodigd om deel te nemen aan het onderzoek **"Het herontwerpen van het hartrevalidatiezorgpad door de integratie van blended care."**. Dit onderzoek wordt uitgevoerd door Louise Kho, masterstudent aan de faculteit Industrieel Ontwerpen van de TU Delft.

Doel van het onderzoek

Het doel van dit onderzoek is om inzicht te krijgen in het huidige zorgpad voor hartrevalidatie bij Basalt, met specifieke aandacht voor het gebruik van blended care. Het onderzoek richt zich op het begrijpen van hoe zorgprofessionals en patiënten het revalidatieproces ervaren, inclusief het gebruik van hulpmiddelen zoals monitoring op afstand.
Tijdens de meeloopdag zal de onderzoeker werkprocessen en interacties binnen het hartrevalidatieteam observeren om beter inzicht te krijgen in hoe het zorgpad in de praktijk verloopt. Uw deelname aan deze studie helpt ons bij het begrijpen van het complexe zorgpad en het genereren van nieuwe ideeën voor verbetering van de zorg. Door behoeften, knelpunten en kansen binnen het zorgpad te identificeren, hopen we het dagelijkse werk van zorgprofessionals beter te ondersteunen en uiteindelijk de patiëntgerichte zorg te verbeteren.

Gebruik van gegevens
De in dit onderzoek verzamelde gegevens worden uitsluitend gebruikt voor academische onderzoeksdoeleinden en maken deel uit van een masterthesis aan de TU Delft.
Onderzoeksresultaten kunnen worden opgenomen in de uiteindelijke scriptie en in bijbehorende academische presentaties. Alle gegevens worden geanonimiseerd en er wordt geen persoonlijk identificeerbare informatie gedeeld buiten het onderzoeksteam.

Verzameling en bescherming van gegevens
- Persoonlijke gegevens worden uitsluitend verzameld voor doeleinden van geïnformeerde toestemming en administratieve verwerking.
- Tijdens observaties zullen geen patiëntgegevens worden genoteerd en zal de onderzoeker zich richten op algemene werkprocessen.
- Tijdens de observaties kan de onderzoeker notities maken over werkprocessen, ervaringen en interacties binnen het zorgpad. Er worden **geen** audio- of video-opnames gemaakt tijdens deze observaties. De verzamelde gegevens worden in een vroeg stadium geanonimiseerd. Geanonimiseerde gegevens worden veilig opgeslagen op een veilige TU Delft project data opslagplek en zijn alleen toegankelijk voor de onderzoeker en de academische begeleiders.

Vrijwillige deelname

Deelname aan dit onderzoek is volledig vrijwillig. U kunt op elk moment stoppen met uw deelname, zonder opgave van reden en zonder enige consequenties. Indien u besluit zich terug te trekken, worden uw gegevens waar mogelijk verwijderd.

Indien u vragen heeft over dit onderzoek, kunt u contact opnemen met de onderzoeker, Louise Kho, via l.w.l.kho@student@tudelft.nl. Dit onderzoek wordt uitgevoerd in het kader van een masterthesis aan de TU Delft.

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICPANT TASKS AND VOLUNTARY PARTICIPATION		
1. Ik heb de informatie over het onderzoek gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	☐	☐
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	☐	☐
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent: ● Een meeloopdag. ● Notities van de observaties tijdens de meeloopdag.	☐	☐
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
4. Ik begrijp dat deelname aan dit onderzoek minimale risico's met zich meebrengt. Deze kunnen bestaan uit lichte ongemakken doordat de onderzoeker aanwezig is tijdens mijn werkzaamheden of doordat ik mij mogelijk bewuster voel van mijn handelen tijdens de observatie. Ik begrijp dat deze risico's worden beperkt doordat deelname volledig vrijwillig is en dat ik op elk moment kan aangeven dat de observatie wordt gestopt of dat bepaalde situaties niet worden geobserveerd, zonder gevolgen. De observaties worden vertrouwelijk behandeld en op geanonimiseerde en algemene wijze gerapporteerd. Deelname of niet-deelname heeft geen invloed op mijn zorg, werk of professionele beoordeling.	☐	☐
5. Ik begrijp dat mijn deelname betekent dat de onderzoeker observaties kan doen van mijn werkzaamheden en hierover onderzoeksnotities kan maken. Deze notities worden geanonimiseerd en bevatten geen direct identificeerbare persoonsgegevens.	☐	☐
6. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk: ● Anonimisatie van de data. ● Veilige data opslag.	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		
7. Ik begrijp dat na het onderzoek de geanonimiseerde informatie gebruikt zal worden voor een master afstudeerproject.	☐	☐
8. Ik geef toestemming dat observaties en eventuele uitspraken tijdens de meeloopdag in geanonimiseerde vorm kunnen worden gebruikt of geciteerd in de resultaten van het onderzoek.	☐	☐
D: (LONGTERM) DATA STORAGE, ACCESS AND REUSE		

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
9. Ik begrijp dat de geanonimiseerde observatienotities die in het kader van dit onderzoek worden gemaakt, niet zullen worden opgeslagen in een data-archief voor toekomstig onderzoek of onderwijsdoeleinden. De gegevens worden uitsluitend gebruikt voor dit masterafstudeerproject.	☐	☐
10. Ik begrijp dat toegang tot de onderzoeksgegevens uitsluitend beperkt is tot de onderzoeker en de academische begeleiders, en dat de gegevens veilig worden opgeslagen en verwijderd in overeenstemming met het Data Management Plan.	☐	☐

Signatures

_____ _____ _____
Naamdeelnemer Handtekening Datum

Ik, **de onderzoeker**, verklaar dat ik de informatie en het instemmingsformulier correct aan de potentiële deelnemer heb voorgelezen en, naar het beste van mijn vermogen, heb verzekerd dat de deelnemer begrijpt waar hij/zij vrijwillig mee instemt.

Louise_____ _____
Naam onderzoeker Handtekening Datum

Contactgegevens van de onderzoeker voor verdere informatie:
Louise Kho, l.w.l.kho@student.tudelft.nl

Appendix C: Informed Consent Form Focus-Group

Delft University of Technology
HUMAN RESEARCH ETHICS INFORMED CONSENT FOCUS GROEP

U wordt uitgenodigd om deel te nemen aan het onderzoek **"Het herontwerpen van het hartrevalidatiezorgpad door de integratie van blended care."**. Dit onderzoek wordt uitgevoerd door Louise Kho, masterstudent aan de faculteit Industrieel Ontwerpen van de TU Delft.

Doel van het onderzoek

Het doel van dit onderzoek is om inzicht te krijgen in het huidige zorgpad voor hartrevalidatie bij Basalt, met specifieke aandacht voor het gebruik van blended care. Het onderzoek richt zich op het begrijpen van hoe zorgprofessionals en patiënten het revalidatieproces ervaren, inclusief het gebruik van hulpmiddelen zoals monitoring op afstand. Uw deelname aan deze studie helpt ons bij het begrijpen van het complexe zorgpad en het genereren van nieuwe ideeën voor verbetering van de zorg. Door behoeften, knelpunten en kansen binnen het zorgpad te identificeren, hopen we het dagelijkse werk van zorgprofessionals beter te ondersteunen en uiteindelijk de patiëntgerichte zorg te verbeteren.

In deze fase van het onderzoek zal een focusgroep plaatsvinden waarin het voorgestelde ontwerp of implementatieplan wordt besproken en geëvalueerd met stakeholders. De focusgroep is bedoeld om feedback te verzamelen op de haalbaarheid, bruikbaarheid en toegevoegde waarde van het voorstel.

Gebruik van gegevens
De in dit onderzoek verzamelde gegevens worden uitsluitend gebruikt voor academische onderzoeksdoeleinden en maken deel uit van een masterthesis aan de TU Delft.
Onderzoeksresultaten kunnen worden opgenomen in de uiteindelijke scriptie en in bijbehorende academische presentaties. Alle gegevens worden geanonimiseerd en er wordt geen persoonlijk identificeerbare informatie gedeeld buiten het onderzoeksteam.

Verzameling en bescherming van gegevens
- Persoonlijke gegevens worden uitsluitend verzameld voor doeleinden van geïnformeerde toestemming en administratieve verwerking.
- Audio-opnamen van de interviews worden gebruikt voor analyse. De focusgroep zal worden opgenomen met een offline audio-opnameapparaat van de TU Delft. De opnames worden in een vroeg stadium getranscribeerd en geanonimiseerd. Na transcriptie en controle van de transcripties worden de originele audio-opnamen verwijderd.
- Geanonimiseerde gegevens worden veilig opgeslagen en zijn alleen toegankelijk voor de onderzoeker en de academische begeleiders. Identificeerbare persoonsgegevens worden afzonderlijk opgeslagen en verwijderd zodra deze niet langer nodig zijn.

Hoewel alle mogelijke maatregelen worden genomen om uw gegevens te beschermen, bestaat er altijd een minimaal risico op datalekken. Om dit risico te beperken, wordt gebruikgemaakt van de volgende opslagplek: TU Delft project data opslagplek.

Vrijwillige deelname

Deelname aan dit onderzoek is volledig vrijwillig. U kunt op elk moment stoppen met uw deelname, zonder opgave van reden en zonder enige consequenties. Indien u besluit zich terug te trekken, worden uw gegevens waar mogelijk verwijderd.

Indien u vragen heeft over dit onderzoek, kunt u contact opnemen met de onderzoeker, Louise Kho, via l.w.l.kho@student@tudelft.nl. Dit onderzoek wordt uitgevoerd in het kader van een masterthesis aan de TU Delft.

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
A: GENERAL AGREEMENT – RESEARCH GOALS, PARTICPANT TASKS AND VOLUNTARY PARTICIPATION		
1. Ik heb de informatie over het onderzoek gelezen en begrepen, of deze is aan mij voorgelezen. Ik heb de mogelijkheid gehad om vragen te stellen over het onderzoek en mijn vragen zijn naar tevredenheid beantwoord.	☐	☐
2. Ik doe vrijwillig mee aan dit onderzoek, en ik begrijp dat ik kan weigeren vragen te beantwoorden en mij op elk moment kan terugtrekken uit de studie, zonder een reden op te hoeven geven.	☐	☐
3. Ik begrijp dat mijn deelname aan het onderzoek de volgende punten betekent: ● Een focusgroep. ● Een audio-opname (die direct wordt verwijderd na het transcriberen). ● Een transcriptie van de audio-opname (geanonimiseerde text).	☐	☐
B: POTENTIAL RISKS OF PARTICIPATING (INCLUDING DATA PROTECTION)		
4. Ik begrijp dat deelname aan dit onderzoek minimale risico's met zich meebrengt. Deze kunnen bestaan uit lichte ongemakken tijdens de focusgroep of een gevoel van terughoudendheid bij het bespreken van ervaringen of het geven van feedback op het voorgestelde ontwerp of implementatieplan met betrekking tot hartrevalidatie of professionele praktijk. Ik begrijp dat deze risico's worden beperkt doordat deelname volledig vrijwillig is, dat ik vragen mag overslaan of mijn deelname aan de focusgroep op elk moment zonder gevolgen kan beëindigen, en dat mijn bijdragen vertrouwelijk worden behandeld en op geanonimiseerde en algemene wijze worden gerapporteerd. Deelname of niet-deelname heeft geen invloed op mijn zorg, werk of professionele beoordeling.	☐	☐
5. Ik begrijp dat mijn deelname betekent dat er persoonlijke identificeerbare informatie en onderzoeksdata worden verzameld, evenals aan deze gegevens gekoppelde onderzoeksdata (zoals audio-opnames), waarbij een minimaal risico bestaat dat mijn identiteit bekend zou kunnen worden.	☐	☐
6. Ik begrijp dat de volgende stappen worden ondernomen om het risico van een databreuk te minimaliseren, en dat mijn identiteit op de volgende manieren wordt beschermd in het geval van een databreuk: ● Anonimisatie van de data. ● Veilige data opslag. ● Het verwijderen van de audio-opname na transcriptie.	☐	☐
7. Ik begrijp dat de persoonlijke data die over mij verzameld wordt, vernietigd wordt na transcriptie en anonimisatie van de data.	☐	☐
C: RESEARCH PUBLICATION, DISSEMINATION AND APPLICATION		

PLEASE TICK THE APPROPRIATE BOXES	Yes	No
8. Ik begrijp dat na het onderzoek de geanonimiseerde informatie gebruikt zal worden voor een master afstudeerproject.	☐	☐
9. Ik geef toestemming om mijn antwoorden, ideeën of andere bijdragen anoniem te quoten in resulterende producten.	☐	☐
D: (LONGTERM) DATA STORAGE, ACCESS AND REUSE		
10. Ik begrijp dat de geanonimiseerde interviewtranscripten en notities die ik in het kader van dit onderzoek verstrek, **niet** zullen worden opgeslagen in een data-archief voor toekomstig onderzoek of onderwijsdoeleinden. De gegevens worden uitsluitend gebruikt voor dit master afstudeerproject.	☐	☐
11. Ik begrijp dat toegang tot de onderzoeksgegevens uitsluitend beperkt is tot de onderzoeker en de academische begeleiders, en dat de gegevens veilig worden opgeslagen en verwijderd in overeenstemming met het Data Management Plan.	☐	☐

Signatures

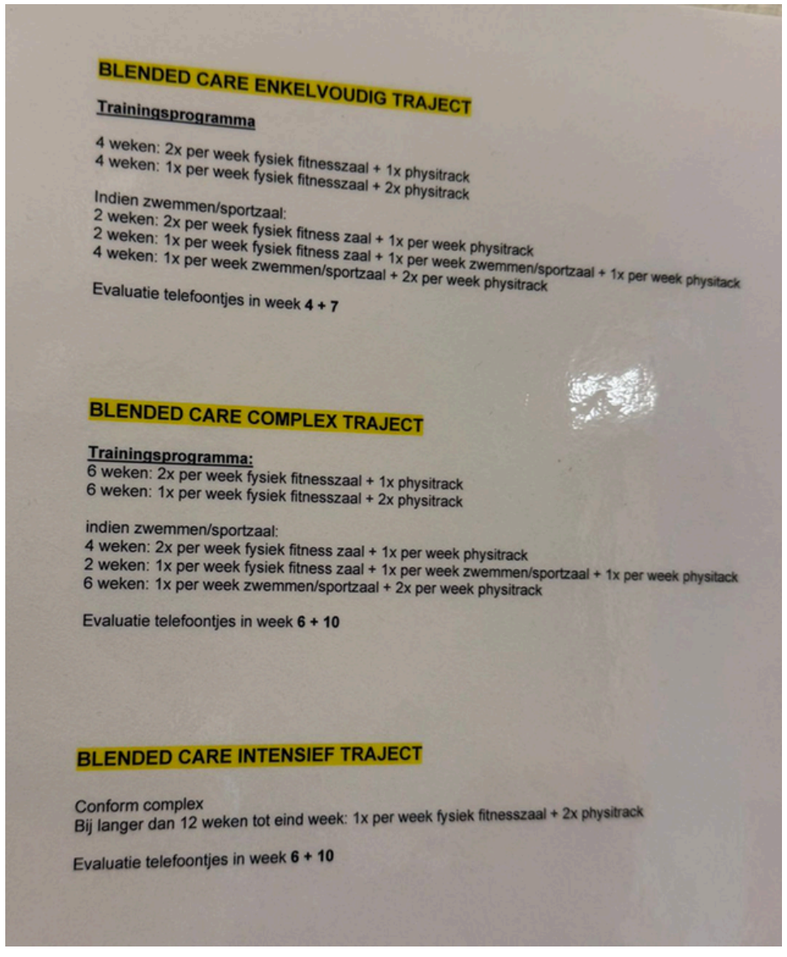
_____ _____ _____
Naamdeelnemer Handtekening Datum

Ik, **de onderzoeker**, verklaar dat ik de informatie en het instemmingsformulier correct aan de potentiële deelnemer heb voorgelezen en, naar het beste van mijn vermogen, heb verzekerd dat de deelnemer begrijpt waar hij/zij vrijwillig mee instemt.

Louise_____ _____
Naam onderzoeker Handtekening Datum

Contactgegevens van de onderzoeker voor verdere informatie:
Louise Kho, l.w.l.kho@student.tudelft.nl

Appendix D: Physiotherapy Trajectory Sheet



BLENDED CARE ENKELVOUDIG TRAJECT

Trainingsprogramma

4 weken: 2x per week fysiek fitnesszaal + 1x physitrack
4 weken: 1x per week fysiek fitnesszaal + 2x physitrack

Indien zwemmen/sportzaal:
2 weken: 2x per week fysiek fitness zaal + 1x per week physitrack
2 weken: 1x per week fysiek fitness zaal + 1x per week zwemmen/sportzaal + 1x per week physitack
4 weken: 1x per week zwemmen/sportzaal + 2x per week physitrack

Evaluatie telefoontjes in week **4 + 7**

BLENDED CARE COMPLEX TRAJECT

Trainingsprogramma:
6 weken: 2x per week fysiek fitnesszaal + 1x physitrack
6 weken: 1x per week fysiek fitnesszaal + 2x physitrack

indien zwemmen/sportzaal:
4 weken: 2x per week fysiek fitness zaal + 1x per week physitrack
2 weken: 1x per week fysiek fitness zaal + 1x per week zwemmen/sportzaal + 1x per week physitack
6 weken: 1x per week zwemmen/sportzaal + 2x per week physitrack

Evaluatie telefoontjes in week **6 + 10**

BLENDED CARE INTENSIEF TRAJECT

Conform complex
Bij langer dan 12 weken tot eind week: 1x per week fysiek fitnesszaal + 2x physitrack

Evaluatie telefoontjes in week **6 + 10**

Appendix E & F: Interview Guides

Onderzoeker: Louise Kho
Participant: Zorgmedewerker
Introductie:
Allereerst, welkom en heel erg bedankt dat u even tijd heeft om met mij te praten!

Mijn naam is Louise Kho en ik ben masterstudent Industrial Design Engineering (Medisign) aan de TU Delft. Momenteel werk ik aan mijn afstudeeropdracht in samenwerking met Basalt Revalidatie. Mijn opdracht richt zich op het herontwerpen van het blended care zorgpad binnen de hartrevalidatie, met specifieke aandacht voor de inzet van data uit the Box en de integratie daarvan in de dagelijkse klinische workflow.

Het doel van dit interview is om een beter beeld te krijgen van uw rol binnen de hartrevalidatie en (eventueel) uw ervaringen met het huidige blended care-zorgpad. Hieruit hoop ik graag inzichten te krijgen voor eventuele mogelijkheden om blended care en data van the Box beter te integreren in het huidige hartrevalidatiezorgpad om zorgverleners beter te ondersteunen in hun werk en om ervoor te zorgen dat patienten meer gemotiveerd blijvens tijdens en na het revalidatietraject.

Vindt u het goed als ik tijdens ons gesprek een audio-opname maak die ik later zal transcriberen? De audio-opname wordt direct na het transcriberen verwijderd. Alleen de transcriptie wordt bewaard binnen de TU Delft.

Het gesprek zal ongeveer 30 minuten duren, dus als het nodig is dan zal ik u mogelijk onderbreken, om zeker te zijn dat alle vragen worden besproken.

Nogmaals, heel erg bedankt dat u tijd voor mij heeft om even te praten! Uw inzichten zijn erg waardevol voor mijn onderzoek! Ik zal de audio-opname nu starten.

Interviewvragen
Huidige hartrevalidatiezorgpad:

1. Kunt u kort iets vertellen over uw rol in het hartrevalidatietraject?
   a. Wat zijn de belangrijkste handelingen die u uitvoert?
   b. In welke fases van het hartrevalidatietraject speelt u vooral een rol?

Blended Care:
Mijn opdracht richt zich natuurlijk op de integratie van Blended Care in het hartrevalidatiezorgpad, dus ik ben vooral benieuwd naar uw kennis en ervaringen omtrent Blended care…

2. Op welke momenten in het hartrevalidatiezorgpad wordt blended care ingezet in uw werk?
   a. Welke digitale tools/ applicaties/websites zijn vast onderdeel van uw werk (in blended care pad)?
      i. Online modules/Video's/Physitrack
      ii. Zijn die optioneel of verplicht?
   b. Bestaat er een duidelijke "blended care route" binnen het traject?
      i. Of verschilt dit per patiënt?
   c. Zou u zeggen dat de introductie van Blended Care uw werkzaamheden ondersteunt/verlicht?
      i. Of vraagt het momenteel juist extra tijd/administratie?
3. Wat gebeurt er momenteel met blended care patiënten in de nazorgfase?
4. Ervaart u momenteel knelpunten in uw werk, met name rondom de integratie van Blended Care?
   a. Wat werkt er momenteel wel goed?

Patientmotivatie
5. In welke fase merkt u vooral een daling in patientmotivatie?
   a. Hoe merkte u dit?
6. Merkt u een verandering in patientmotivatie sinds de introductie van Blended Care?

The Box/stappenteller
7. Bent u op de hoogte over (de stappenteller van) "the Box"?
   a. Zo niet, korte uitleg geven…..
8. Denkt u dat het integreren van data van de stappenteller een goede toevoeging zal zijn aan uw werk/het hartrevalidatiezorgpad?
   a. Zo niet, wat zou er aan gedaan kunnen worden zodat dit uw werk wel zou ondersteunen?
   b. Wat zouden criteria zijn zodat u data van de stappenteller zou willen gebruiken in uw werk?
9. Wat zijn eventuele zorgen die u heeft wanneer data van the box wordt geïntegreerd in uw werk/het hartrevalidatiezorgpad?
10. In welke fases van het zorgpad denkt u dat de stappenteller data het beste geïmplementeerd kan worden?
    a. Alleen tijdens telefoongesprekken?
11. Wanneer zou u actie ondernemen o.b.v de data van de stappenteller?

Verdere wensen
12. Stel, in een ideale situatie, zou Blended Care perfect werken, hoe zou het er dan volgens u eruit zien?
    a. Welke verbeteringen ziet u graag in de integratie van Blended Care?
    b. Wat voor rol speelt Blended Care dan nog in de nazorgfase?
13. Heeft u verder nog ideeën/wensen/input over het hartrevalidatiezorgpad en/of Blended Care?

Onderzoeker: Louise Kho
Participant: Hartrevalidatie Patient
Introductie:
Allereerst, welkom en heel erg bedankt dat u even tijd heeft om met mij te praten (en dat ik eventueel even met u mocht meekijken)!

Mijn naam is Louise Kho en ik ben masterstudent Industrial Design Engineering (Medisign) aan de TU Delft. Momenteel werk ik aan mijn afstudeeropdracht in samenwerking met Basalt Revalidatie. De opdracht richt zich op het herontwerpen van het blended care zorgpad binnen de hartrevalidatie, met specifieke aandacht voor de inzet van data uit the Box en de integratie daarvan in de dagelijkse klinische workflow.

Het doel van dit interview is om een beter beeld te krijgen van uw ervaringen binnen het hartrevalidatietraject en (eventueel) uw ervaringen met het huidige blended programma. Hieruit hoop ik graag inzichten te krijgen voor eventuele mogelijkheden om blended care en data van the box beter te integreren in het huidige hartrevalidatie zorgpad.

Tijdens ons gesprek zal ik een audio-opname maken die ik later zal transcriberen. De audio-opname wordt direct na het transcriberen verwijderd. Alleen de transcriptie wordt bewaard binnen de TU Delft.

We hebben maximaal 30 minuten voor dit gesprek, dus als het nodig is dan zal ik u mogelijk onderbreken, om zeker te zijn dat alle vragen worden besproken.

Nogmaals, heel erg bedankt dat u tijd voor mij heeft om even te praten! Uw inzichten zijn erg waardevol voor mijn onderzoek! Vindt u het goed als ik nu de audio-opname start?

Interviewvragen:

Context & situatie

1. Kunt u kort iets vertellen over waar u zich momenteel in het revalidatietraject bevindt?
   a. Hoe lang heeft uw revalidatietraject ongeveer geduurd / hoe lang gaat het nog duren?

Ervaring met het zorgpad

2. Kunt u uw ervaring met het revalidatietraject bij Basalt beschrijven, van begin tot nu?
   a. Hoe verliep de aanmelding?
   b. Hoe heeft u de intake bij de arts ervaren?
   c. Hoe heeft u de intake bij de andere behandelaren ervaren?
   d. Hoe heeft u de behandelingen zelf ervaren (bijv. fysiotherapie, andere disciplines)?
   e. Hoe heeft u de informatie- en groepsmodules ervaren?

Blended care (algemeen)

(korte uitleg indien nodig)
"Bij Basalt wordt hartrevalidatie deels fysiek en deels digitaal aangeboden, dit noemen we blended care."

3. Is dit concept (combinatie van fysiek en digitaal) goed aan u uitgelegd aan het begin?
4. Hoe heeft u deze combinatie van fysiek en digitaal ervaren?
   a. Bent u tevreden over de verdeling tussen fysieke en digitale onderdelen? Waarom wel/niet?

Digitale onderdelen (specifiek)

5. Heeft u gebruik gemaakt van digitale tools zoals Physitrack?
   a. Hoe heeft u dat ervaren?
   b. Wat werkte goed en wat minder goed voor u?

Motivatie & gedrag

6. Hoe heeft u uw motivatie tijdens het traject ervaren?
   a. Waren er momenten waarop uw motivatie minder werd? Kunt u daar iets over vertellen?
   b. Wat hielp u om gemotiveerd te blijven?
   c. Wat had u eventueel kunnen helpen om gemotiveerd te blijven?

Nazorg & toekomst

7. Hoe voelt u zich richting het einde (of na afronding) van het revalidatietraject?
8. Bent u van plan om de leef- en bewegingsadviezen voort te zetten? Waarom wel/niet?
   a. Wat zou u nodig hebben om dit vol te houden?

Data & monitoring

(context geven)
"Tijdens telefonische gesprekken baseert de fysiotherapeut zich nu vooral op wat u zelf vertelt over uw beweging."

9. Hoe ervaart u deze manier van begeleiden?
10. Hoe zou u het vinden om bijvoorbeeld een stappenteller te dragen, waarbij de fysiotherapeut uw beweging op afstand kan zien?
    a. Wat zou u prettig of juist minder prettig vinden aan zo'n oplossing?
    b. Hoe zou dit volgens u het beste ingericht kunnen worden?

Reflectie & verbeterpunten

11. Wat zou u graag willen verbeteren aan het revalidatietraject bij Basalt?
    a. Zijn er dingen die u mist in de huidige begeleiding?
12. Heeft u nog andere wensen of opmerkingen die u graag wilt delen?

Appendix G: Walk-Along Observation Notes

Walk-Along Day 1

Who: Cardiologist
Where: Basalt
What: Intake Cardiologist
When: 10-03-26

Notes Intake Cardiologist

- Before intake cardiologist checks the questionnaires filled in by the patient
  - Scans quickly through the questionnaires and makes notes of important insights
  - In HiX the cardiologist can see whether the patient is eligible for the blended care programme
- During intake
  - The cardiologist asks questions regarding important life events
  - Questions based on the questionnaires insights will be asked, more in-depth
  - Cardiologist takes notes during consultations in HiX
  - Important note: nothing about blended care is explained
- After intake
  - Patients will conduct a CPET right after the intake
  - The results will be discussed right after the CPET

Walk-Along Day 2

Who: Cardiologist, CPET Technician & Physiotherapist (during the walk-along day the same patient is being observed throughout the different intakes)
Where: Basalt
What: Intake Cardiologist, CPET, CPET Results, Intake Physiotherapist, Patient Case Discussion
When: 16-03-26

Notes Intake Cardiologist:

- 30 mins
- Questions are asked regarding important life events
- Patient will conduct a CPET right after the intake
- The cardiologist explains what is to be expected during the CPET

Notes CPET:

- 1 hour (15 min cycling)
- The CPET technician guides the patient during the CPET
- During the CPET the cardiologist quickly comes in to do some check-ups on the patient
- The patient cycles for about 15 mins and during this the CPET technician measures several things
- Right after the CPET the patients is asked to rate how exhausted they feel
- The CPET results are printed out and the CPET technician hands it over to the cardiologist

Notes CPET Results:
30 min
Before the patient comes in the cardiologist quickly scans through the results
Then, during the discussion with the patient, the cardiologist discusses interesting insights
The cardiologist askes the patient's goals, and discusses a plan

-
  - Based on the intake and CPET results the cardiologist recommends which physicians to see
  - The cardiologist also refers to the social worker to discuss more practical things (e.g.: transport to Basalt, being able to do part of the treatment remotely)

Notes Intake Physiotherapist:

- 30 min
- The cardiologist goes to the Physiotherapist to quickly discuss the patient's case and their treatment plan (who they will see)
- The physiotherapist discusses the patient's (physical) goals and quickly discusses a plan
- Important note: nothing about blended care or physitrack is being mentioned

Notes Patient Case Discussion:

- 1-2 hours
- The physiotherapist and cardiologist discusses different patients who are currently in rehab
  - They discuss each patient's progress, and important notes that were documented in HiX

Appendix H:Thematic Analysis Output

Step 2: Healthcare Provider Interview Transcripts

Healthcare provider / Basalt worker	Role in the current pathway	Experiences with blended care	Barriers, needs, and opportunities for improvement	Potential use of Box / activity tracker data
Cardiologist 1 – Basalt	Triages incoming referrals, decides timing and complexity, conducts intake and result discussions, reviews exercise test outcomes, discusses goals and determines the rehabilitation programme. Also helps decide whether patients enter the blended trajectory.	Blended care is mainly embedded in the physical rehabilitation trajectory. It is seen as the default unless there are contraindications such as low digital skills, language barriers, very low capacity, or complex medical situations. Information modules are offered physically and online, but some modules should remain physical because of peer contact and deeper interaction.	Sees a needfor more personalised and flexiblecare insteadofa one-size-fits-all trajectory.The formal pathway ends after rehabilitation, while long-term activity maintenance remains a challenge. Personalisation is limitedby funding, workflow,and the mindsetof professionals.	Strongly sees added value. Basalt currently relies too much on subjective patient input. Step data could provide objective insight into actual activity, correct overestimation, and support more personalised coaching and aftercare.
Cardiologist 2 – Basalt	Conducts medical intakes, assesses exercise test results, determines exercise restrictions, helps define the rehabilitation plan, and sees patients at the beginning and end of the trajectory. Interim consults only happen when needed.	Blended care plays a limited direct role in medical work. Telephone consults are used pragmatically when planning requires it, but physical assessment remains necessary. The heart failure module is partly blended with preparatory material and shorter physical sessions.	Patients do not always watch preparatory videos, which means basic information must still be repeated during physical sessions. Home exercise remains invisible. There is also a need for interpretation standards before step data can be used meaningfully.	Step data could help identify patients who need extra support or who are not progressing as expected. The cardiologist mainly sees the data as useful for physiotherapists , but also potentially valuable during medical consults when discussing progress or treatment effects.
Physiotherapist / team coordinator – Basalt	Works as both treating physiotherapist and team coordinator. Physiotherapists guide physical training, use Physitrack, conduct telephone check-ins, and discuss how patients can continue exercising after the programme.	Blended care was introduced in 2023 and is now becoming the norm. Some physiotherapists were initially resistant, but are becoming more positive, especially about telephone consults. Blended care is seen as useful for aftercare conversations and patient ownership.	Current telephone consults rely mostly on subjective input and do not use standard questions. Digital modules sent by email are often not completed. Barriers include time, logging in, digital skills among professionals, patient surprise, and fear of being monitored. Needs include standard questions,	Most relevant for this role. Step data could show whether patients move too little or too much, reveal mismatches between perceived and actual activity, and support coaching. A weekly block to review step data for multiple patients may fit better than checking data before every consult.
Ergotherapist – Basalt	Supports patients with load-capacity balance, fatigue, recognising boundaries, daily activity planning, work-related functioning, and practical adaptations. Uses COPM during intake and follow-up to evaluate functional progress. Mostly involved in complex or intensive trajectories.	Blended care is currently limited. Group sessions are mainly physical because interaction is better in person. Therapieland is being explored as an additional layer for instructions and assignments, not as a full replacement. The heart failure PEP module is being made partly blended.	training, clear patient introduction, and minimal extra workload. A key barrier is uneven preparation: if some patients watch the preparatory video and others do not, the group session becomes difficult to facilitate. Paper assignments may sometimes work better than digital ones because they support reflection and can involve family members.	Potentially useful. Activity data could be compared with patients' day schedules or activity diaries to understand daily load patterns, fatigue, and boundary awareness. The ergotherapist would prefer reviewing this between group sessions rather than during the session itself.
GZ psychologist – Basalt	Provides psychological screening, intake, and treatment for anxiety, depression, trauma-related complaints, EMDR, and emotional adjustment. Referrals come through questionnaires, physician intake, social work, training observations, or patient request.	Therapieland is already used, but mainly based on individual therapist judgement. It is currently more of an addition than a true replacement for sessions. The psychologist sees potential in a more structured blended sequence: face-to-face session, home module work, feedback moment, and follow-up.	There is no scheduled time to give digital feedback. Module uptake can be very low if patients are not properly introduced. Patients need clear explanation of purpose, guided first use, reminders, and technical support. Multiple digital platforms may overwhelm patients.	Not directly applicable in the interview. The psychologist did not describe a direct use for Box data, although activity patterns could indirectly relate to motivation, anxiety, or recovery confidence.
Social worker – Basalt	Supports practical issues, work resumption, household help, transport, partner/family support, smoking cessation, and lower-threshold mental support. Screens questionnaires and can influence whether a patient follows an 8-week, 12-week, or intensive trajectory.	Blended care is present through the heart failure module. Social work is open to e-health and Therapieland but has limited experience with it. Telephone consults are used occasionally, mostly for practical flexibility.	Patients already receive many questionnaires and information. Digital modules require monitoring, but professionals currently lack protected time for this. Blended care should be tailored to the type of help request: practical questions may work by phone, while emotional support often benefits from	Not directly applicable. No concrete Box use was described for social work.

			visual or physical contact.	
Dietician – Basalt	Provides nutrition-related intake and guidance for overweight, underweight, diabetes, prehabilitation, and dietary behaviour change. Some patients receive one information consult, others receive follow-up treatment. Also contributes to the heart failure module.	The heart failure nutrition module is partly blended: patients receive a preparatory film and then attend a one-hour session. The digital Eetmeter can be used before intake, but many patients do not complete it. Therapieland has limited nutrition-related content.	Patients rarely send questions before the module. Emails may go to spam or get lost in information overload. If patients do not prepare, the shorter session becomes rushed. The dietician needs more time per patient and better nutrition-specific digital tools, such as food diaries or behaviour-change modules.	Not directly applicable. The dietician did not describe a specific use for step-counter data.
Verpleegkundig specialist – LUMC	Coordinates the LUMC perioperative pathway. For planned surgery patients, the pathway starts before surgery with the Box, questionnaires, and Physitrack. Postoperatively, patients are followed up through video or physical consults, and LUMC monitors medical values	LUMC already uses blended monitoring with the Box and Physitrack. The Box supports patient insight into health values and enables video follow-up when patients are digitally capable.	Barriers include digital ability, language barriers, device access, and role boundaries between LUMC and Basalt. Medical responsibility must remain clear to avoid conflicting medication decisions. Step data also needs interpretation because not all activity is captured and	Highly relevant. The verpleegkundig specialist sees step data as fitting Basalt's rehabilitation role. Basalt access would reduce reliance on subjective reporting and allow physiotherapists to personalise activity coaching. Step goals should be patient-specific.
Blended care coordinator – Basalt	Supports implementation of blended care, pathway thinking, professional adoption, training, and monitoring. Looks at how digital care can become structurally embedded instead of dependent on individual professionals.	Blended care is not yet clearly embedded in the pathway. Professionals do not naturally think in terms of care pathways, and digital care is often not visible in the existing pathway map. Information delivery is seen as the easiest and most valuable part to blend.	Blended care should be introduced at intake as part of treatment, not as an optional extra. Implementation requires culture change among both patients and professionals. Barriers include existing habits, resistance to top-down implementation, unclear definitions, login/access issues, consent, and lack of measurable use. Needs include hands-on team training, concrete instructions, and dashboards to monitor use.	The Box should be visible in the intake workflow, including whether a patient has the Box and whether Basalt may view the data. Permission should be explicit. The activity tracker raises questions about autonomy and feeling monitored, so introduction and framing are crucial.

	especially during the first three months.		patients may not always wear the tracker.	
Cardiologist / founder of the Box – LUMC	Involved in the development and broader vision of the Box. Focuses on long-term monitoring, lifestyle, prevention, and integration across the cardiac pathway.	The Box is already used for long-term monitoring after myocardial infarction and operations. Peer learning and community remain important. Digital care should not replace all human contact.	Patients are overwhelmed with information, so the pathway needs better retention tools, such as structured digital education or quizzes. There is a need for an integrated pathway across prehabilitation, admission, rehabilitation, one-year follow-up, and lifestyle interventions.	Step count is seen as the most relevant Box data for rehabilitation because it measures direct activity behaviour. Basalt or LUMC could set step targets, and physiotherapists could adjust them in consultation with Basalt cardiologists.
Care manager – Basalt	Has an organisational view on capacity, workflow, treatment variation, implementation, and care quality. Focuses on making increasing patient numbers manageable while maintaining quality.	COVID accelerated blended care and showed that more could be done remotely. Basalt is seen as relatively advanced, but cardiac rehabilitation still requires careful monitoring. The heart failure module is blended and under evaluation.	There is too much variation between physiotherapists. Blended care needs clearer frameworks while still allowing professional judgement. Barriers to Box use are mostly organisational: time, login steps, planning, and workflow. Protected data-review blocks may reduce the burden.	Objective data can challenge patient overestimation and support motivational interviewing. The care manager expects physiotherapists to accept the Box more easily if it clearly benefits patients and supports their work.

Step 2: Patient Interview Transcripts

Patient	Short description of their situation	Experiences with blended care	Barriers, needs, and opportunities for improvement	Potential use of Box / activity tracker data
Patient 1	Patient isnear the end ofthe rehabilitation trajectory and expects to finish withina few weeks. The patient followed physical training, had contact with social work, and participated in a stress-related group course. The patient is generally very positive about Basalt and feels well supported.	Blended care was not experienced as a clearly explained concept, but the patient did receive home exercises and remote support from the physiotherapist. The patient mainly values the physical part of rehabilitation, especially the structure, personal contact, and peer support. Group sessions were experienced as highly valuable because they created recognition, motivation, and emotional support. Physitrack was not clearly used; the patient received drawings and written descriptions of exercises instead.	The patient experienced Basalt as flexible, well-coordinated, and low-effort: appointments were adjusted, preferences were taken into account, and communication between professionals felt smooth. A small improvement point was that when a group session could not continue because there were too few participants, this should have been communicated beforehand. The patient strongly values predictability, clear planning, and not having to arrange things independently. Peer contact should be preserved because it supports motivation and emotional recovery.	The patientisnot in favourofbeing monitored through an activitytracker because it feels like controland raises privacy concerns. They already track steps on their phone and would be willingtoshow this datafithe physiotherapist asks. Thepatient can seevaluefor other patients, especially those who needcloser monitoring, but would prefer voluntary sharing rather than continuous remote access. If activity tracking is used, it should be clearly explained, framed positively, and ideally integrated into a device people already use, suchasan Apple Watch.

Patient 2	Patient is around the middle/end phase of the trajectory and has about one month left. The patient follows physical training, social work, ergotherapy, swimming, and information sessions. The patient has limited energy and is learning to recognise boundaries instead of pushing through.	The patient strongly prefers physical care because being at Basalt creates safety, structure, and motivation. Home exercises through Physitrack were received, but with minimal explanation. The patient looked at the platform but had not really started using it yet. The patient expects it may become more useful after the Basalt trajectory ends, when the regular structure falls away. Physical information sessions and peer contact were experienced as helpful.	The start of the trajectory felt confusing and unsafe. The patient did not receive a clear overview of the plan, duration, locations, or what to expect. The app and portal did not always provide complete or consistent information, and the names in the schedule did not always match the professionals present. The patient would benefit from a clearer onboarding, written overview, location guidance, names/photos of professionals, and more predictable communication. The transition from two physical sessions to one session felt sudden. The patient would have liked the trajectory to last longer, because they were only just starting to understand their boundaries. There is also a need for aftercare options, such as continued access to warm-water swimming or a supported exercise group.	The patient is sceptical about step tracking. A phone step counter previously encouraged the patient to walk faster so the steps would register, which led to feeling unwell. Remote monitoring based on steps alone would not reflect the full context of the day, such as fatigue, household tasks, or other appointments. The patient would not like being judged or contacted based only on low step counts. A possible alternative could be online group exercise with familiar peers, because the patient is more motivated by group structure than by individual monitoring.
Patient 3	Patient is near the end of a three-month rehabilitation trajectory after a stroke and open-heart surgery with two bypasses. The patient also has ongoing contact with LUMC for cardiology and neurology. The patient had a relatively good physical baseline before the event and is already returning gradually to fitness, table tennis, and cycling.	The patient is positive about Basalt and experienced the intake, training, group sessions, and partner support as helpful. The patient uses MyBasalt to check appointments, reports, questionnaires, and other documents. The patient does not describe much use of Basalt-specific blended care, but already uses LUMC digital monitoring. The patient is open to digital support, especially if it connects with existing monitoring rather than adding another separate system.	The patient felt that the pathway is mostly focused on cardiac rehabilitation, while their situation also involved neurological issues. There is a need for more attention to complex patients who do not fully fit the standard cardiac profile. The patient wondered whether all physiotherapists were aware of their full medical history and specific risks, especially blood pressure concerns after the stroke. The guidance was experienced as positive but somewhat generic and protocol-based. The patient would appreciate more personalised check-ins, clearer feedback from physiotherapists, and attention to individual risk factors during training.	The patient already uses the LUMC app/Box, including blood pressure, ECG, heart rate, activity, and step data. They would have no objection to Basalt viewing this data and see it as potentially useful, especially because blood pressure is an important concern. The patient prefers that Basalt connects to the existing LUMC app rather than introducing a separate app. Remote access could be useful during the first months after discharge or during the transition back to independent exercise and the local fitness club.

Step 3: Healthcare Provider Themes

Theme	Explanation of the theme / main tension	Stakeholders who mentioned this theme
1. Blended care is the ambition, but not yet consistently embedded **(The blended care pathway is still fragmented and lacks standardisation)**	Blended care is described as the intended norm, especially in the physical rehabilitation trajectory, but its implementation differs across disciplines. Some professionals use digital tools structurally, while others use them as an add-on or not yet at all. This creates a gap between the organisational ambition and daily practice.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, GZ Psychologist, Social Worker, Care Manager, Blended Care Coordinator
2. Digital tools only work when patients are properly introduced and guided **(The blended care pathway is still fragmented and lacks standardisation)**	Several professionals mentioned that patients often do not open videos, emails, modules, or digital forms. Digital material can save time and support self-management, but only if patients understand why it matters and how to use it. Otherwise, professionals still need to repeat the information during physical sessions.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, Ergotherapist, GZ Psychologist, Social Worker, Dietician, LUMC Cardiologist / Box founder, Blended Care Coordinator
3. Remote coaching is valuable, but currently relies too much on subjective input	The evaluation phone calls are currently short and mainly based on what patients say about how they are doing and how much they exercise. Physiotherapists see value in adding step-count data, but they also said that objective data should be well integrated into the conversations and that it should be clear how to use it meaningfully in coaching.	Physiotherapist / Team Coordinator,
4. Box/activity tracker data is promising, but needs clear workflow integration **(Remote coaching currently relies too much on subjective self-report)**	Step data is widely seen as useful, especially for physiotherapists, because it can reveal actual activity behaviour. However, professionals also mentioned practical barriers: access to the data, login steps, time to review it, interpretation standards, consent, and who is responsible for acting on the data. The main challenge is not only having the data, but embedding it into the workflow.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, Ergotherapist, LUMC Nurse Specialist, LUMC Cardiologist / Box founder, Care Manager, Blended Care Coordinator
5. Physios differ in their level of engagement with and confidence in blended care	The interviews suggest that not all physiotherapists are equally positive about blended care. Some already see clear benefits, while others are more hesitant or feel that too much face-to-face care has been removed, which leads to differences in how strongly blended care is supported and applied in practice.	Physiotherapist / Team Coordinator, Care Manager, Blended Care Coordinator
6. More patient ownership is needed	Physiotherapists see home exercise as valuable, but difficult to sustain because it depends on patients building their own routine. This creates a tension between encouraging self-management and recognising that many patients still need active support.	Cardiologist 1, Cardiologist 2, Ergotherapist, GZ Psychologist, Social Worker, LUMC Cardiologist / Box founder, Blended Care Coordinator
7. Standardisation is needed, but care mustremain **personalised (One-size-fits-all blended care does not work)**	The pathway relies on standard trajectories, protocols, modules, and planning structures. At the same time, professionals want more flexibility to adjust care based on patient goals, progress, capacity, needs, and activity data. This creates a tension between efficiency and individual tailoring.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, Social Worker, Dietician, Care Manager, Blended Care Coordinator

8. Digital inclusion, autonomy, and privacy need careful attention **(one-size-fits-all blendedcare does not work)**	Several stakeholders mentioned that not all patients are suitable for digital care due to age, language, digital skills, energy, access to devices, or low health literacy. Activity tracking also raises questions about consent and whether patients may feel monitored. Blended care therefore needs careful framing and patient choice.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, GZ Psychologist, Social Worker, LUMC Nurse Specialist, Blended Care Coordinator
9. The transition to aftercare is still a vulnerable point in the journey	Aftercare remains a vulnerable phase, as long-term behaviour change is difficult to maintain once the structured programme ends. Caregivers observe frequent relapse, as patients lose the structure and guidance provided during rehabilitation.	Cardiologist 1, Cardiologist 2, Physiotherapist / Team Coordinator, LUMC Nurse Specialist, LUMC Cardiologist / Box founder, Care Manager

Step 3: Patient Themes

Theme	Explanation of the theme / main tension	Stakeholders who mentioned this theme
1. The physical on-site program feels safer and easier to engage with than exercising alone at home	Patients experience on-site rehabilitation as structured, supervised, and reassuring. Exercising at home is described as more difficult because it competes with fatigue, household tasks, uncertainty, and the absence of direct professional support or peer presence.	Patient 1, Patient 2, Patient 3
2.Peer contact is a major source of motivation	Patients value being with others who have gone through similar experiences. Contact with peers helps them feel understood, less alone, and more motivated, while also giving them a space to exchange coping strategies and normalize their recovery process.	Patient 1, Patient 2, Patient 3
3. Blended care is experienced more as separate tools thanas a clear **(Patient onboarding into blended care is weak, so digital components are often underused.)**	Patients did not always recognise blended care as a clearly explained concept. Some received home exercises, drawings, Physitrack, or digital monitoring, but these were not always introduced as part of one coherent blended care trajectory. This creates a gap between the organisational idea of blended care and the patient's lived experience.	Patient 1, Patient 2, Patient 3
4. Digitaltools need better explanation andonboarding **(Patient onboarding into blended care is weak, so digital components are often underused.)**	Digital tools only seem useful when patients understand what they are for, how to use them, and when they should use them. Patient 2 received Physitrack but with little explanation, while Patient 1 received drawings rather than clear Physitrack use. Patient 3 was comfortable with the LUMC app because it was already part of their monitoring. The tension is that digital tools can support self-management, but without proper introduction they may become confusing or unused.	Patient 1, Patient 2, Patient 3
5.Clarity and expectation management at the start of the pathway are often insufficient	Several patients struggled to understand what the trajectory would look like, how long it would last, who they would see, and what was expected from them. This lack of clarity created confusion and uncertainty, especially in the early stages of rehabilitation.	Patient 1, Patient 2, Patient 3
6. Activity tracking can support coaching, but may also feel like surveillance **(Remote data monitoring evokes mixed reactions and highlights privacy concerns)**	Patientshaddifferentattitudestowardremote activitytracking.Patient1wasuncomfortablewith continuousmonitoringandassociateditwith control,althoughtheywouldvoluntarilyshowstep dataifasked.Patient2feltsteptrackingcouldbe misleadingandmightcreatepressure.Patient3 wasopentoBasaltviewingexistingLUMCdata. Thetensionisbetweenthevalueofobjective dataforcoachingandthepatient'sneedfor privacy,autonomy,andcontextualunderstanding.	Patient 1, Patient 2, Patient 3
7. Step data alone does not capture the full recovery context **(Remote data monitoring evokes mixed reactions and highlights privacy concerns)**	Patientsindicatedthatstepsdonotautomatically explainhowsomeoneisdoing.Alowstepcount maybeduetofatigue,householdtasks, appointments,orrecoveryneeds.Patient2even hadanegativeexperiencewheretryingtomake thephonecountstepsencouragedoverexertion. Thisshowsthatactivitydatamustbeinterpreted togetherwithpatientcontext,notusedasa simple performance measure.	Patient 1, Patient 2, Patient 3
8. Readiness for aftercare differs greatly between patients	Somepatientsfeelconfidentcontinuing independentlyafterrehabilitation,whileothers feeltheprogramendsjustwhentheyare beginningtounderstandtheirlimitsandbuilda routine. This suggests that the transition to aftercare is not equally manageable for everyone.	Patient 1, Patient 2, Patient 3
9. Patients want rehabilitation to fit their personal situation rather than a standard protocol	The interviews show that patients differ in physical abilities, preferences, confidence, and broader health context. They appreciate it when care is adapted to what suits them, such as alternative exercise formats or more attention to additional conditions, rather than being treated through one fixed approach.	Patient 1, Patient 2, Patient 3

Appendix I: The Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

Legend

Phase 1
Phase 2
Phase 3

Fully Physical Care=
The treatment/service is provided fully physically (with no option to do it offline)

Fully Digital Care=
The treatment/service is provided fully digitally (with no option to do it offline)

Blended Care (structured)=
A deliberately structured integration of face-to-face and digital treatment components, in which both elements are designed to complement and reinforce each other.

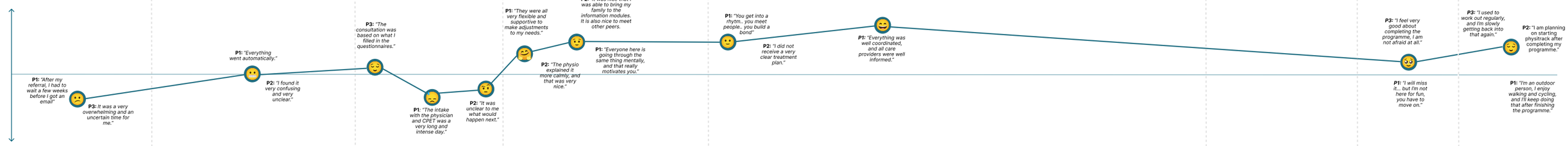
Hybrid Care (fragmented)=
Physical and digital treatment are offered as parallel or interchangeable options, without a deliberately structured integration into one coherent pathway.

Chronologically
Simultaneously

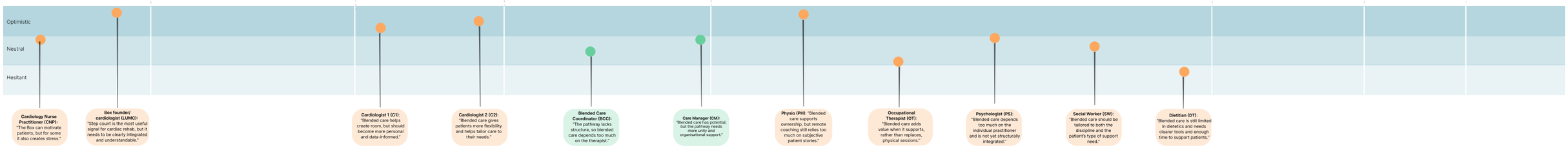
- Care Providers (9)
- Organizational Team Basalt (2)
- Patients (average, 3)

Phase	Hospital Discharge & Referral	Sign-up	Intake Physician	Intake Practitioners	Treatment	Evaluation	Completion	Aftercare
Subphases	Hospital Discharge; Patient Information; Digital Referral & Waiting Time	Patient Sign-up; Triage; Patient Invitation & Digital Questionnaires; Questionnaire Scoring	Intake Physician; CPET; Result	Intake Practitioners; Information Modules (• General Info • Heart Failure • ICD • Women's Heart • Sexual Health); New PCD (Patient Case Discussion)	**Basic Programme:** I. Physiotherapist; II. Occupational Therapist (1x); III. Psychologist (1x); IV. Social Worker (1x); V. Dietitian (1x); Physician (1x); PCD (in week 6) **Complex Programme:** I. Physiotherapist; II. Occupational Therapist (≤4x); III. Psychologist (≤4x); IV. Social Worker (≤4x); V. Dietitian (≤4x); Physician (≤4x); PCD (every 4 weeks) **Intensive Programme:** I. Physiotherapist; II. Occupational Therapist (≤4x); III. Psychologist (≤4x); IV. Social Worker (≤4x); V. Dietitian (≤4x); Physician (≤4x); PCD (every 4 weeks); Physician Consult (week 18); I,II,III,IV,V & Physician (≤2x); Final PCD	Progress Questionnaire; CPET; Final Evaluation	Draft Discharge Letter; Completion Discharge Letter	Periodic Check-ups Hospital; Self-Management & Monitoring
Duration	1-2 weeks	2-4 weeks	2 hours	30-60 min; 4-6 weeks (once a week 1-2 hours); ~2 hours	Basic: 8 weeks Complex: 12 weeks Intensive: >12 weeks	2 hours	~1 day	Lifelong
Location	Hospital	Basalt (Rehabilitation Centre)/ At Home	Basalt (Rehabilitation Centre)	Basalt (Rehabilitation Centre)/ At home	Basalt (Rehabilitation Centre)/ At Home	Basalt (Rehabilitation Centre)	Basalt (Rehabilitation Centre)	At Home
Actors	Patient Treating Cardiologist (Hospital) Cardiology Nurse Practitioner	HLR Receptionist/ Medical Secretary; HLR Receptionist Cardiologist; Patient HLR Receptionist; Social Worker	Patient Cardiologist/ Physician Assitant; Patient CPET Technician; Patient Cardiologist/ Physician Assistant	Patient Physician & Physiotherapist Social Worker (if applicable) Occupational Therapist (if applicable) Psychologist (if applicable)	Patient Physiotherapist & Physician Social Worker (if applicable) Occupational Therapist (if applicable) Psychologist (if applicable)	Patient Medical Secretary; Patient CPET Technician; Patient Cardiologist/ Physician Assistant	Cardiologist/ Physician Assitant; Medical Secretary	Patient Treating Cardiologist (Hospital) Cardiology nurse practitioner GP
Touchpoints	• The patient is stable enough and gets discharged from the hospital. • Patients receive the Box for one year to get monitored by their treating cardiologist (only patients from LUMC). • The treating cardiologist recommends CR to the patient and informs the patient about it. • The treating cardiologist sends a digital referral letter to Basalt.	• The digital referral letter is received by the HLR Receptionist/ Medical Secretary. • The digital referral letter gets assessed and advice is given on the type of program and start date. • Patients either get a consult with a Cardiologist (complexer cases) or Physician Assistant. • An appointment is being made and the patient is asked to fill in digital questionnaires. • De questionnaires are being reviewed and an indication for the treatment plan will be given • All patients are eligible for CR, except in case of contra-indication: e.g. severe depression	• During the first consult with the physician, life events and future steps are discussed. • The physician shortly explains the goal of the CPET, which will be executed right after the consult. • Patients will execute a CPET for baseline measurement of functioning of the heart. • After the CPET patients are asked to rate how exhausting it was. • The CPET results will be discussed and advice will be given on future steps and treatment. • All Blended path, except contra-indications: • Low-ses/ Language-barriers • Reduced physical capacity/ Inpatients	• Based on the treatment plan, patients will have an intake with various practitioners. • The goals of the rehabilitation will be discussed. • Patients can follow multidisciplinary informationmodules. • The modules are given in group settings. • The general info module is hybrid • The heartfailure module is blended (partially online, followed by an offline group meeting. • After intake with the physician and all applicable practitioners, a suitable programme will be chosen for the patient (basic, complex or intensive)	• All patients get physical guidance from a physiotherapist. • The courses/ workouts take place in various forms: gym, swimming, physitrack. • During group sessions, the occupational therapist helps finding balance between activity and capacity: managing fatigue, recognizing limits, restructure daily activities to better match physical capabilities • The psychologist guides patients in improving their psychological well-being. • They give patients exercises on paper or via Therapieland. • The social worker guides patients in: practical assistance, support for relatives and mental well-being (lower threshold compared to psychologist) • Guides overweight/ underweight patients • Guides patients (before going into surgery) • Let's patients fill in 'eetmeter' and based on this guide patients to adapt healthier diets • Reporting in Hix • Consultations to discuss progress and questions. • Multidisciplinary discussion between the physician and (applicable) practitioners to discuss progress of patients. • Consultations to discuss progress and questions. • Physician and Practitioners treatment as described before. • Final multidisciplinary discussion between the physician and (applicable) practitioners to discuss progress of patients.	• The medical secretary sets up the questionnaire • At the end of the program patients are asked to fill in validated questionnaires to measure progress. • Patients will execute a CPET to measure progress of functioning of the heart. • After the CPET patients are asked to rate how exhausting it was. • During the final consultation the goals are evaluated. • Advice for aftercare is given to the patient.	• A draft for the discharge letter is being made. • The letter is send to the medical secretary for further processing.	• The patient has periodic check-ups with the treating cardiologist. • The patient continues the healthy lifestyle habits. • The patient is being monitored by the first line care.
Data Flow	• What: Referral Letter, BGZ • System: HIX Multimedia Sign-up Form	• What: Referral Letter, BGZ • System: HIX • System: HIX (order to HLR receptionist) • Data: HIX Questionnaires, Questmanager "Intakequestionnaire Cardiac Rehabilitation", Op-int registration research • System: Questmanager &	• Data: medical history and current medical status, medication, informed consent, treatment limitations • System: HIX • Data: BMI, lab, blood pressure, heart rate, ECG and CPET results • System: HIX • Data: personal goals patient • System: HIX	• Data: I) physical activity goals/ limitations; II) COPM; III) mental state; IV) patients goals; V) diet and goals • System: HIX (B-form and documentation) • System: HIX (order) • Data: treatmentgoals in B-forms and discuss documentation patient intakes • System: HIX (C-form and documentation)	• Data: type of training & performance level • System: HIX (FIT form) • System: HIX (documentation) • System: HIX (documentation) • Data: Quit Smoking Course • System: HIX (documentation) • System: HIX (documentation) • System: HIX (documentation) • Data: treatment goals B-forms • System: HIX (documentation)	• Data: treatment goals B-forms • System: HIX (documentation) • System: HIX (documentation) • System: HIX (documentation) • Data: questionnaires HIX, Questmanager "Discharge questionnaire CR" • System: Questmanager & HiX • Data: Physical data and CPET performance • System: HIX • Data: treatment goals, results CPET before and after treatment, C-forms and documentation • System: HIX	• Data: documentation • System: HIX • Data: documentation • System: HIX	
Digital Tools			• Phonecalls • Phonecalls	• Phonecalls • Heartfailure module: online multidisciplinary educational videos (sent via email) and physical group discussions afterwards. • General Info module: patients can follow educational videos both online and offline	• Physitrack • Evaluation Phonecalls • Teams Group Session • Therapieland (Psycho-education) • Phonecalls • Phonecalls • Phonecalls			

Patient Emotions



Stakeholder Experiences



Pain Points	• Vulnerable transition time for patients • Patients get overwhelmed with information • Waiting time before rehabilitation	• Some patients don't (fully) fill in the questionnaires	• Strong need to see patients physically during intakes • Too little information on expectations/ rehab program • Logistical challenges in planning the intake day • Long and intense day for patients • Feeling of exhaustion and discomfort during CPET • Some patients are digitally less skilled/ have language barrieres have reduced physical capacity (not qualified for Blended Care)	• Concept of Blended Care is not introduced as clearly to each patient • Lack of patient motivation to watch videos • 2 hours of info→summarized in 1 hour • Loss of group interaction/support during digital sessions • Patient overlook the emails with the videos • There is no dedicated time to monitor online modules • Lack of questions from patients based on module videos • Standard care does not always fit patient's needs	• There is too much variation in treatment style • Inconsistent use of Physitrack leads to fragmented care • Strong desire from patients for group sport sessions • Unclear instructions on the use of digital tools • Patients find it easier to learn through practical experience rather than digital • Exercises on paper are more intuitive and interactive than digital exercises • Therapieland is underused: there is no integrated structure in treatment style • Every patient needs different type of education even within a discipline (e.g.: sleep problems, quit smoking, stress, etc.) • Lack of clarity around features and ongoing development in Therapieland leads to uncertainty in use • Lack of visual context during phone calls limits effective dietary guidance. • Patients experience difficulty filling in the 'eetmeter'	• Emotional difficulty of approaching the end • Patient has finally found structure and does not feel ready to quit the program yet.	• Loss of structure • People may expect full recovery • Patients are not allowed to keep using the sport facilities after ending the program	• Privacy concerns when data is being monitored • Unclear instructions/ planning on what to do next
Stakeholder Needs	• Connect patients with community for peert support • A well-integrated blended care journey: pre-rehab, hospital, rehab, GLI • Proper patient education during waiting time (make sure that info sticks)		• Strong need to see patients physically during intakes • Too little information on expectations/ rehab program • Logistical challenges in planning the intake day • A more personalized blended care approach, instead of one size fits all • strong blended care introduction at intake • At least one part of the intake should remain physical	• Digitalize all information-heavy modules • Women's heart module should remain physical • Reduce in-person information sessions	• Objective data, now only dependent on subjective data for evaluation • Education for physiotherapists on the use of digital tools • Support for therapists how to log in, clear data explanation • Clear protocols on physio treatment, more unity • Satisfied and motivated caregivers • Objective date (activity tracker), to give more insights into actual activity levels/more personalized advice • Patients to watch the videos from the info modules • Align blended care in a multidisciplinary manner • Make sure all psychologists make us of Therapieland in a structured way • More use of e-health for more structure & professionalism • Intake should be kept physical • More modules (related to food and diet) in Therapieland • Video consults instead of phone calls • Objective data (activity tracker) to identify risk patients • Balance between flexible, home-based rehabilitation and maintaining meaningful contact with peers			
Current Initiatives				• Heartfailure module videos via Therapieland instead via email	• Implementation of data from The Box 'activity trackers' • Heartfailure module videos			
Design Opportunities	• Recommend patients educative applications • Connect patients to community peer support programs	• Informational folder about Blended Care and what to expect • Include which platforms/systems are used at Basalt and what to find where • And the added value of Blended Care • Include questions about digital experience in digital questionnaires	• Use one shared semi-structured onboarding script • Explain Blended Care physically and (add video/brochure to help recall) • Discuss rehab plan face-to-face and provide a summary of the overall rehab plan and next-steps (e.g.: summary on paper, in HiX application) • The summary could be very general and the patient could deviate from the general plan, but it could help patients with their expectation management • Make the intake day Blended (e.g.: intake consult+CPET→ physical and results discussion→ phonecall)	• Use one shared semi-structured onboarding script • Explain Blended Care physically and (add video/brochure to help recall) • Discuss rehab plan face-to-face and provide a summary of the overall rehab plan and next-steps (e.g.: summary on paper, in HiX application) • The summary could be very general and the patient could deviate from the general plan, but it could help patients with their expectation management • Multidisciplinary meetings to discuss the concept/definition of Blended Care (1-2 times per year) • Make all information modules into videos, but make sure to always add a physical component (peer contact, group discussions after watching te videos). • Make sure to emphasize the importance of watching the videos (patients should not think that it is something 'extra', but it should be seen as something necessary.) • Set goals physically, reflect on them digitally	• A more structurized Blended Care Pathway for the Psychology • Keep peer contact physical where needed (group exercises) • Gradually decrease amount of physical group sessions, and turn them into online group sessions to discuss physical progress together • Reflect on the use of Physitrack during physical group sessions • Fooddiary in Therapieland • Use objective (activity tracker) data for phone evaluation • Clearly explain to patients the added value • Batch review patient data for efficiency • Use objective data to spot stagnation earlier→ adjust intensity or duration more personally • Folder/informational video about Physitrack and the importance of exercising at home		• Continuation/aftercare plan for patients • Stimulate peer contact→ exercise together	

Appendix J: The Physiotherapy-focused Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

Physiotherapy-Focused Blended Cardiac Rehabilitation Journey Map at Basalt Leiden

Legend

Phase 2 — Chronologically

Phase 3 — Simultaneously

Physiotherapists (average, 2 physios total)

Patients (average, 3 patients total)

Phase	**Intake Physiotherapist**		**Patient Discussion**	**Physical Treatment Part 1**		**Evaluation 1**	**Physical Treatment Part 2**			**Evaluation 2**	**Aftercare**	
Subphases	Patient Transfer	Intake Physiotherapist	New Patient Case Discussion	Training Hall Basalt (2x/week)	Physitrack (1x/week)	Swimming Programme (if applicable)	Evaluation Phonecall 1	Training Hall Basalt (1x/week)	Physitrack (2x/week)	Swimming Programme (if applicable)	Evaluation Phonecall 2	Continued Recovery & Exercising	Self Management & Monitoring
Duration	5 min	30 min	~2 hours	Basic: 4 weeks Complex: 6 weeks Intensive: 6 weeks			15 min	Basic: 4 weeks Complex: 6 weeks Intensive: until the end			15 min	Lifelong	
Location	Basalt		Basalt	Basalt/ At Home			Basalt/ At Home	Basalt/ At Home			Basalt/ At Home	At Home	
Actors	Physiotherapist Cardiologist	Patient Physiotherapist	Physiotherapist Cardiologist Other applicable caregivers	Patient Physiotherapist Other Peers			Patient Physiotherapist	Patient Physiotherapist Other Peers			Patient Physiotherapist	Patient Primary Care	
Touch points	• After the physician intake, the physician shares important patient information with the physiotherapist. • The physiotherapists asks the patient questions regarding current physical activities and their goals. • The physiotherapist explains the use of Physitrack • After the intake the physiotherapists asks the planner to schedule the evaluation phonecalls with the patients.		• Multidisciplinary discussion. • After intake with the physician and all applicable practitioners, new patients will be discussed	• The patient receives treatment according to their assigned plan: basix, complex, intensive. • The training consists of group training sessions at Basalt and at home exercises through Phisitrack. • There is also option for patients to follow a swimming program.		• The physiotherapist discusses with patients how the treatment plan is going. • If necessary, adjustments to the treatment plan are made.	• The patient receives treatment according to their assigned plan: basix, complex, intensive. • The training consists of group training sessions at Basalt and at home exercises through Phisitrack. • There is also option for patients to follow a swimming program.			• The physiotherapist discusses with patients how the treatment plan is going. • Advice on next steps after rehabilitation are discussed.	• The patient continues the healthy lifestyle habits. • The patient is being monitored by the first line care.	
Stakeholder Emotions	**PH1:** *"Some patients are not aware that blended care is the standard."* **PH2:** *"During the intake we clearly explain to patients what they can expect during the programme."* **P3:** *"They explained the treatment plan very clearly to me."* **P2:** *"The physio explained it more calmly, which was nice, but I still didn't get a clear plan."*		**PH1:** *"Together with the cardio we decide on the best treatment for the patient."*	**PH1:** *"Since the introduction of blended care, I notice less relapse among patients."* **P1:** *"I like exercising together in the hall, you get to build a bond with others."* **P2:** *"You learn to listen to your body, that's really nice. Though, it does feel like they expect you to already know things "* **PH2:** *"I have mixed feelings about blended care/Physitrack. It feels like more and more is being stripped away."* **P3:** *"Because my situation is a bit different, it would give me more confidence if they would monitor my data a bit more."*		**PH1:** *"They (other physio's) are starting to like the telephone consultations more and more."* **PH2:** *"With an evaluation phone call, you can help patients earlier."* **P1:** *"When the physio called, I could ask for things to do at home."* **P2:** *"The physio told me that they would send me something, and that was it, no further instructions."*	**PH1:** *"Patients need to take more ownership."* **P1:** *"They sent drawings with descriptions of exercises to do at home, and those were clear to me. If it were videos, I'd watch them... maybe that would be easier"* **PH2:** *"If people don't train at home, it comes at the expense of the treatment."* **P2:** *"From two 2x/week to one, I found that a pity, you've only just built some routine. At home you just don't exercise that quickly."*		**PH1:** *"There are no standardized questions... and only subjective data."* **PH2:** *"In practice, you speak to the patient twice for 15 minutes. It would be nice to actually have more time to monitor the patient. "*	**PH1:** *"Now with blended care, we discuss more what patients can do after their trajectory."* **P2:** *"For me it could have lasted longer. Now it's only starting to click."* **PH2:** *"It would be interesting and motivating to know whether blended care is actually good for the patient."* **P3:** *"I' see the future hopefully. The programme has helped me to get into my old routine."*	

Pain Points	• Information overload
	• Fragmented and confusing intake
	• (Physio) treatment plan unclear to patients
	• Patients may feel unsure whether the physio team knows their full background/additional conditions
	• No clear, shared structure for what should be discussed about blended care
	• No (clear) instructions on the use of physitrack
	• Some physio's don't see the added value of giving a 'blended' treatment
	• Not every patient is suitable for blended care
			• Variation in how blended care is applied and interpreted by different professionals/ physios
			• Not all Physiotherapist properly explain the use of Physitrack
			• Patients do not always understand why they are placed into a certain trajectory
				• The standard treatment/circuit may not suit everyone
				• Uncertainty about planning, grouping, and changes
				• Inconsistent introduction and guidance of home exercises
				• Less confidence and motivation when exercising independently
				• Blended care depends on patient adherence
				• Concerns from Physios about reduced physical support
				  • Limited visibility into patient adherence
						• Follow-up actions may be unclear after the call
						  • Unclear/ unstructured intstructions on home-exercises
						• Limited time during evaluation phonecalls
						• No allocated time to monitor Physitrack data
						• Based on subjective reports
						• No shared format or structured questions/topics that are being discussed
							• Reduction in group sessions/ physical trainings could feel abrupt, when they are only just building routine
							  • loss of structure and contact
							• Unclear instructions on the use/purpose of Physitrack
							• At-home exercise leads to motivation drop without structure
							• Patients may feel overly monitored if data use is introduced poorly
							• When pathway shifts toward less physical contact, physios worry whether patients stay motivated enough
							  • Uncertainty about whether fewer in-person sessions are equally as good for the patient
									• No feeling of real closure with Physio
									• Limited time for in-depth evaluation during phone calls
									• No allocated time to monitor Physitrack data
									• Reliance on subjective patient input
									• Lack of structure in evaluation conversations
									• Difficulty addressing low activity without discouraging patients
										• Patients differ strongly in readiness
										• Continuation options such as safe group exercise, swimming, or warm-water alternatives are limited
										• Recovery is influenced by other factors, such as: work pressure and daily demands
										• Risk of relapse after the programme	

Stakeholder Needs	• More clarity and personalization
	• Explicit discussion of limitations, preferences and goals
	• Reassurance that physio team is aware of patient's full history and risk factors
	• Less variation in treatment/intake style between different physiotherapists
			• Better alignment across the team on when and how blended care should be used
			• More consistency in the pathway regardless of which physio the patient sees
			• Clear communication of why the patient gets a certain trajectory and what the expectations are
				• More visible room for tailoring within physio: hall sports, circuit, swimming, etc.
				• Clearer communication about location, grouping, and what to expect
				• Better onboarding for home exercise
				  • More reassurance and support when patients are expected to exercise independently at home
				• Support for helping patients build routine and intrinsic motivation
				• A balance between efficiency and sufficient supervision/support.
				• Better ways to monitor adherence to home exercises
						• End the call with clear agreements about the next phase
						• Enough time to go beyond a brief check-in and actually coach and monitor the patient
						• More structure in evaluation phonecalls
						• More objective input during calls
							• Stronger support for patient self-management
							• More engaging and supported home exercise experience
							• Patient-centered and meaningful use of data
							• Maintain clinical quality while increasing patient ownership
							• Better insight into effectiveness of blended care
									• Clear closure of the physio relationship
									• More time or better workflow if objective data is added
									• Complete view of patient activity (steps, strength training)
									  • Clear translation from data to action
									  • Guidance for motivational conversation based on activity data.
										• Differentiated aftercare approach:
										  • Independent continuation for those who are ready
										  • Continued/structured group support for those who are not ready yet
										• A clear, practical handover plan
										  • to local physio or self-management routine
										• Better support for long-term self-management and maintaining healthy habit after the trajectory
										• More engaging feedback from digital tools, clear communication about why data is being used and the effects of it	

Design Opportunities	• A more **standard intake script** for blended care
	  • Questions/reassurance of patient's risk factors
	  • Clear blended care explanation
	  • Clear expectation setting about how the trajectory will taper from more physical to more home-based care.
	  • Clear explanation of the purpose of home exercise
	  • Clarify the purpose of monitoring the activity tracker data
	• A clear (visual) **personalized start plan with milestones**: what the patient will do, how often, why, important milestones and what might change later
	• **Rehab Onboarding Kit**
			• A **clear and aligned treatment plan per trajectory**, while allowing room for **individual personalization**
			  • Clear agreements on which parts of the treatment are standard and which parts could be personalized
			• A **multidisciplinary blended care discussion** (e.g.: every 3 months)
			  • To ensure alignment of the blended care definition
				• Enough meaningful in-person contact early in the pathway to **build motivation and routine**
				  • Focus on motivational behaviour change: motivational interviewing, social support
				• **Clearer onboarding for home exercises**
				  • Create a guided first-time setup for home exercises with clear instructions and expectations
				  • Introduce a structured onboarding moment for home exercises (what, why, how, when)
				• **Strengthen peer interaction during physical sessions** and enable continued contact during home exercise
				  • Enable **peer coaching groups or buddy systems** for shared support during home exercise
				• Time for Physios to **coach patients through digital tools**
						• Introduce **online peer sessions** for practical and motivational support;
						• and use evaluation calls for **individual coaching and monitoring**
						  • Check progress of the patients
						  • Adapt the plan based on earlier barriers
						• Provide a **standard evaluation phonecall format**
						• Allocated time to **monitor objective data**: activity tracker, Physitrack activity
							• Enable **peer coaching groups or buddy systems** for shared support during home exercise
							• Make the **impact of blended care visible for physios** through patient progress and outcomes
							  • Offer periodic summaries (e.g. monthly) of blended care results
							  • Visualise how blended care compares to traditional care outcomes
							  • Create a simple dashboard showing key research findings and outcomes
							• Provide **guidance for interpreting activity data** using weekly or monthly trends instead of daily values
							• Time for Physios to **coach patients through digital tools**
									• Provide a **standard evaluation phonecall format**
									  • Make readiness for discharge explicit
									  • Discuss confidence in continuing independently
									  • Provide support tools options after discharge
									  • Continuation plan
									• Allocated time to **monitor objective data**: activity tracker, Physitrack activity
										• Offer **different aftercare routes** per patient type
										• Format with (independent) **continuation plan**
										  • Which the Physio could fill in based on each patient's needs
										  • A **motivating aftercare approach** that gives patients more ownership
										• Offer patients to sign up for **peer support groups for aftercare**
										  • To continue supporting each other
										  • To continue exercising together	

Appendix K: Journey Maps Validation Process Guide

Summary of the steps that will be taken:

1. Introduction
2. The participant is guided through the zoomed-out journey map, focusing on validating the overall structure, phases, and transitions of the cardiac rehabilitation pathway.
3. The key insights related to this journey map are presented and discussed to assess their recognizability and relevance.
4. The participant is then guided through the physiotherapy-focused journey map to provide additional context on how physiotherapy is embedded within the broader pathway.
5. The corresponding key insights for the physiotherapy-focused journey map are shared and briefly discussed.
6. The overarching themes resulting from the thematic analysis are presented to evaluate whether they reflect the participant's experience and understanding of the current blended care pathway.
7. The current design goal is explained to provide insight into the intended direction of the project.
8. An open discussion is facilitated in which the participant is asked to share their thoughts, reflections, and feedback on the presented journey maps, insights, and design direction, with a focus on their validity, completeness, and relevance.

Intro

- Heel erg bedankt dat je vandaag tijd voor me hebt.
- Voor mijn opdracht ben ik me bezig gaan houden op allereerst, het huidige gehele blended care traject binnen de hartrevalidatie in kaart te brengen
- Vervolgens ben ik meer gaan inzoomen op de fysiotherapie gedeelte, aangezien mijn project zich vooral focust op implementatie van the Box
- Ik heb hiervoor verschillende mensen allemaal gesproken en ik heb deze inzichten samengevoegd in journey maps: eentje die focust op het gehele traject en eentje die focust op de fysiotherapie
- **Doel**: Voor vandaag zou ik graag in het kort door mijn journey maps willen gaan, om voornamelijk te valideren of deze in grote lijnen kloppen.
- Ik dacht dat het fijn zou zijn om dit met jou te gaan valideren, aangezien jij als cardioloog een goed breed overzicht hebt over het gehele traject

Blended Care Zorgpad

- Hoelees jedemap
- Legenda
- Fases
- Belangrijkste knelpunten

Fysio-focus Zorgpad

- Hoelees jedemap
- Legenda
- Fases
- Belangrijkste knelpunten

Vragen over Journey Maps

- Klopt de algemene structuur van het zorgpad zoals ik die hier heb weergegeven?
- Zijn de fases logischen in de juiste volgorde weergegeven, of mist er een belangrijke stap?
- Kloppen de rollen vande cardioloog, fysiotherapeut, andere behandelaren en patiënt in grote lijnen?
- Zijn er onderdelen dieonjuist of te zwart-wit zijn weergegeven?
- Klopt hoe ik de overgangen tussen intake, behandeling, evaluatie, afronding en nazorg heb weergegeven?
- Laat deze map volgens u de belangrijkste uitdagingen in het huidige traject zien?
- Is er iets wat ik vanuit cardiologisch perspectief nog mis of verkeerd interpreteer?

Thema's/Design Focus

- Ik heb vijf overkoepelende thema's geïdentificeerd, maar ik ben van plan om mij te focussen op thema 1 en thema 4.
- Thema 4 is relevant omdat Basalt al van plan is om activiteitsdata van de Box te implementeren. Mijn project richt zich daarom minder op de vraag óf deze data gebruikt moet worden, maar vooral op hoe deze integratie in de praktijk ondersteund kan worden.
- Thema 1 lijkt belangrijk omdat het huidige blended care-zorgpad nog niet duidelijk genoeg is gedefinieerd, geïntroduceerd en ingebed. Als deze basis niet helder is, kan de implementatie van Box-data ook inconsistent worden.
- Daarom wil ik mij in mijn ontwerp richten op het verbeteren van de onboarding van Box-activiteitsdata, met name voor fysiotherapeuten, zodat zij weten hoe, wanneer en waarom zij deze data kunnen gebruiken binnen remote coaching.
- Vraag: Denkt u dat dit een logische en relevante focus is? Herkent u deze thema's vanuit uw perspectief?

Extra Vragen:

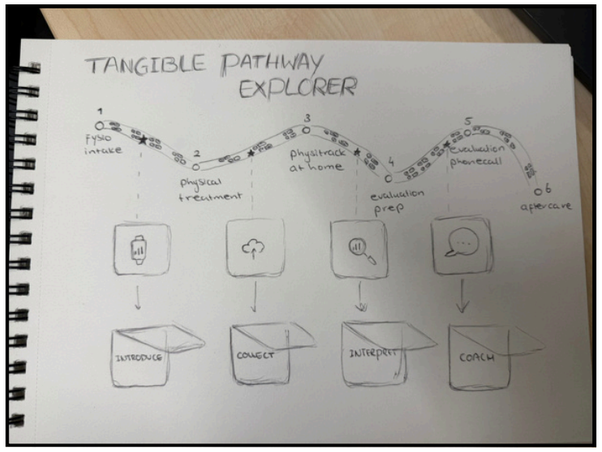
- Is er momenteel iets van een brochure/folder over Blended Care binnen Basalt?
- Krijgen fysiotherapeuten momenteel tijd in hun rooster om patiënten te monitoren via physitrack?
- Denk je dat de fysiotherapeuten van Basalt het beste in overleg met de cardiologen streefwaardes van aantal stappen per patient kunnen bepalen of kunnen de fysiotherapeuten dit het beste zelf bepalen?
- "Welke informatie uit activiteitsdata zou volgens jou echt waardevol zijn binnen hartrevalidatie?"
  - Momentopnames, gemiddeldes over de week
- Wie zijn idee/initiatief was het om the Box in het zorgpad te integreren?

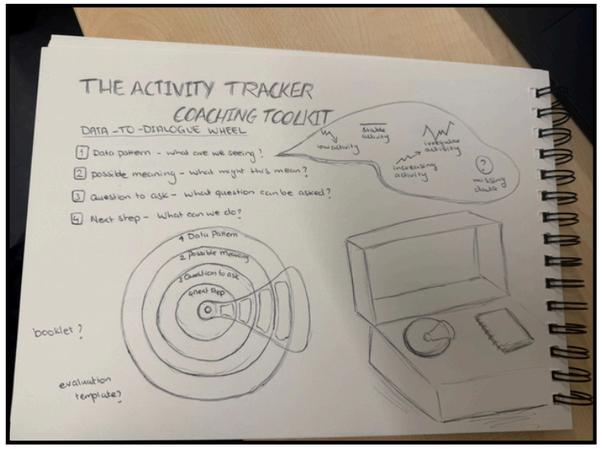
Appendix L: Journey Maps Validation Results

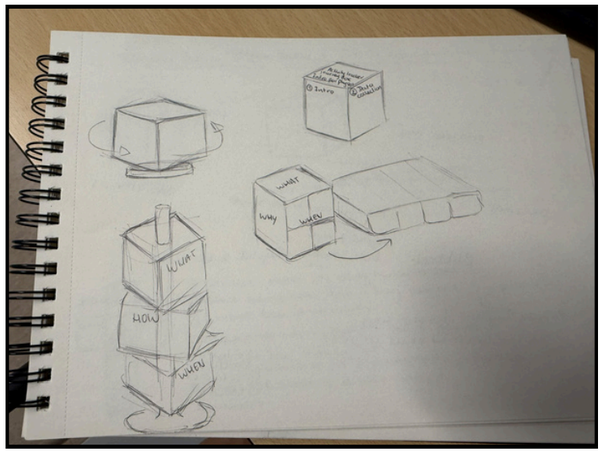
Key insights from the validation meeting:

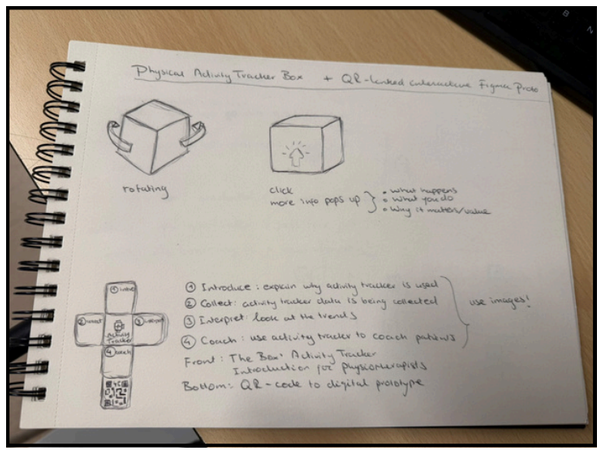
- Use the official rehabilitation phases: phase 1, phase 2, and phase 3, instead of "before, during, after rehabilitation."
- Aftercare should be framed as phase 3 rehabilitation, not as something separate from the care pathway.
- The Box is especially relevant in phase 3, because it can support continued activity and monitoring after the formal rehabilitation trajectory.
- The journey map correctly shows that the pathway is not fully chronological; several steps overlap in practice.
- The physical training often starts early, even before the full programme has been finalised after the patient discussion.
- The final patient trajectory is usually decided after the new patient discussion, based on the different intakes and patient goals.
- Blended care was originally mainly developed for the physiotherapy part of the pathway.
- There are also blended possibilities in psychology, for example through Therapieland, but these are currently used only to a limited extent.
- The intake day is experienced as intensive by patients because several appointments are combined on one day.
- There may be opportunities to make the intake phase more blended or hybrid, for example by doing the intake and cycling test on location and the results discussion by phone.
- A major bottleneck is that Visrack is not consistently introduced to patients.
- Patients often do not know what Visrack is or how they are expected to use it.
- The current blended care trajectory is therefore well designed on paper, but not yet sufficiently embedded in practice.
- Before implementing the Box, the existing blended care process needs to be strengthened.
- The most important leverage point is the onboarding and mindset of physiotherapists.
- Physiotherapists need clearer guidance on the value of blended care, Visrack, and future step counter data.
- The Box implementation should avoid repeating the same issue: introducing a tool without sufficient practical integration.
- Step counter data should mainly be used to look at daily activity patterns and trends, rather than only fixed step targets.
- Step goals should be personalised, based on the patient's starting point and progress.
- A follow-up implementation meeting with key stakeholders was recommended to align on how to improve blended care and prepare for Box implementation.

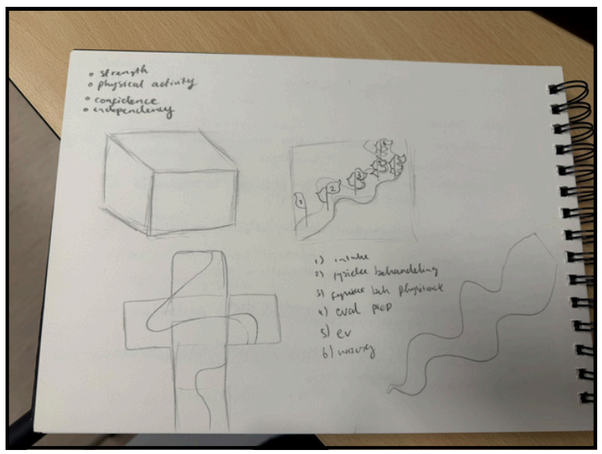
Appendix M: Ideation Sketches

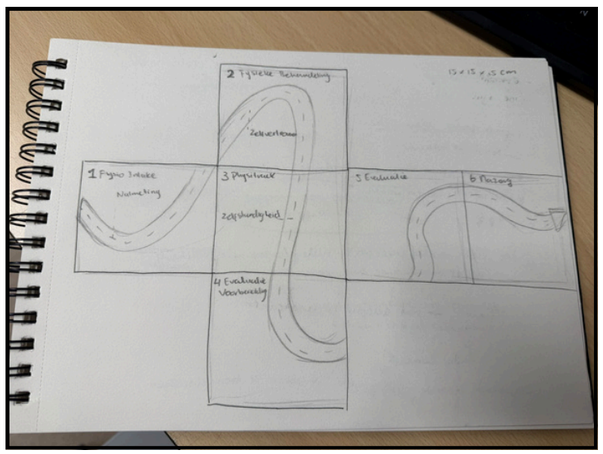








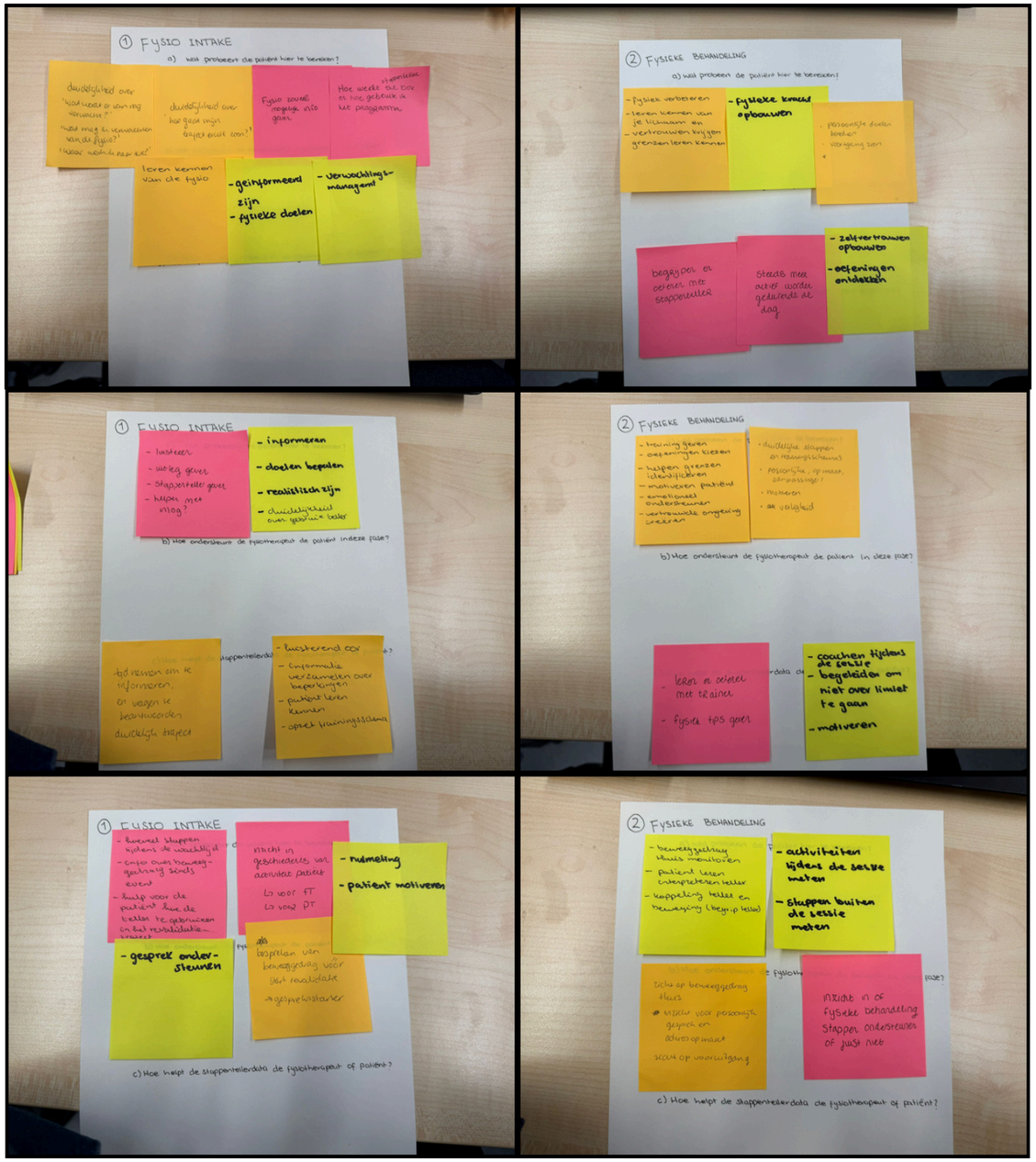




Appendix N: Co-creation Outputs

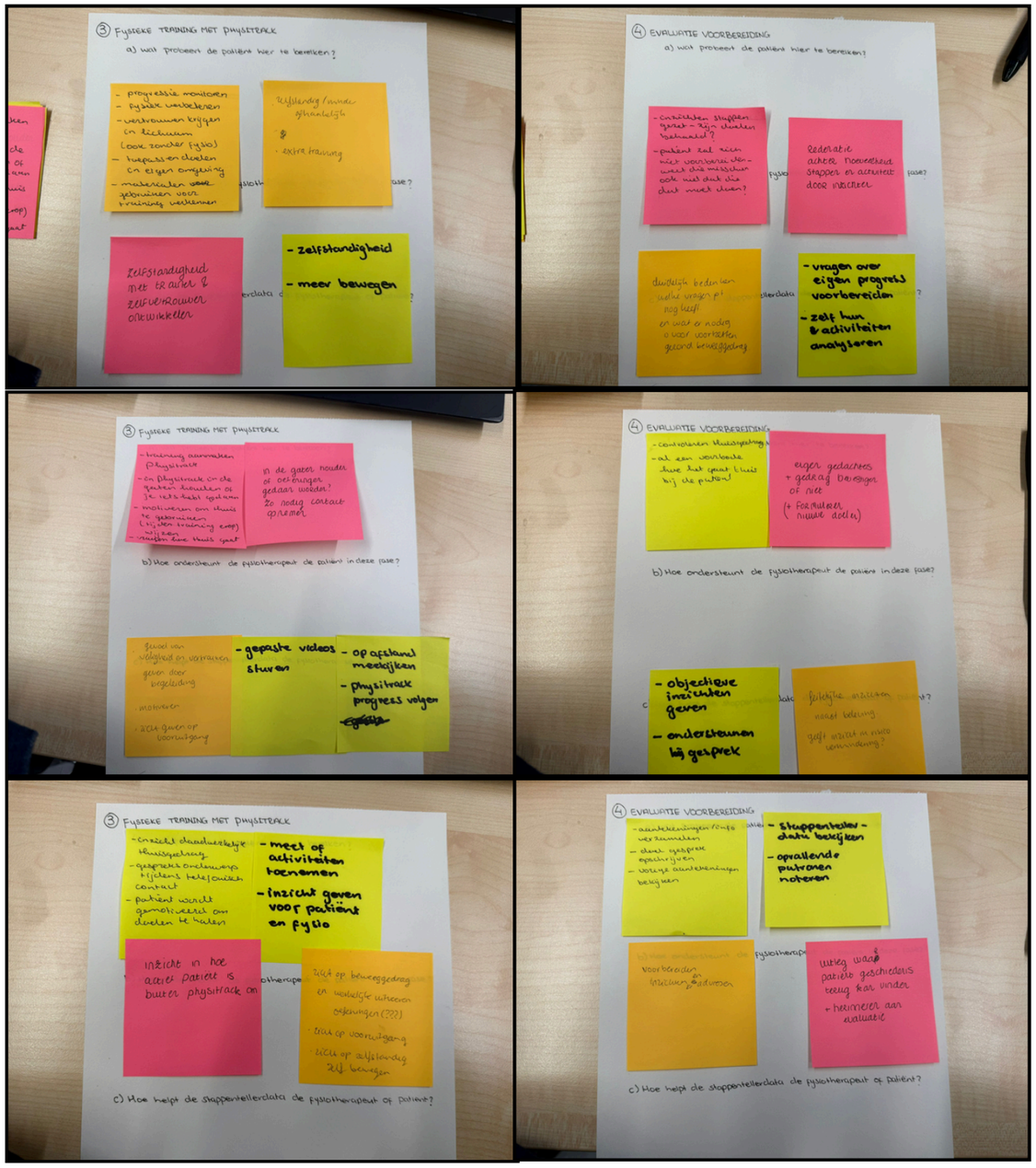
Step 1:

Fase 1 & 2



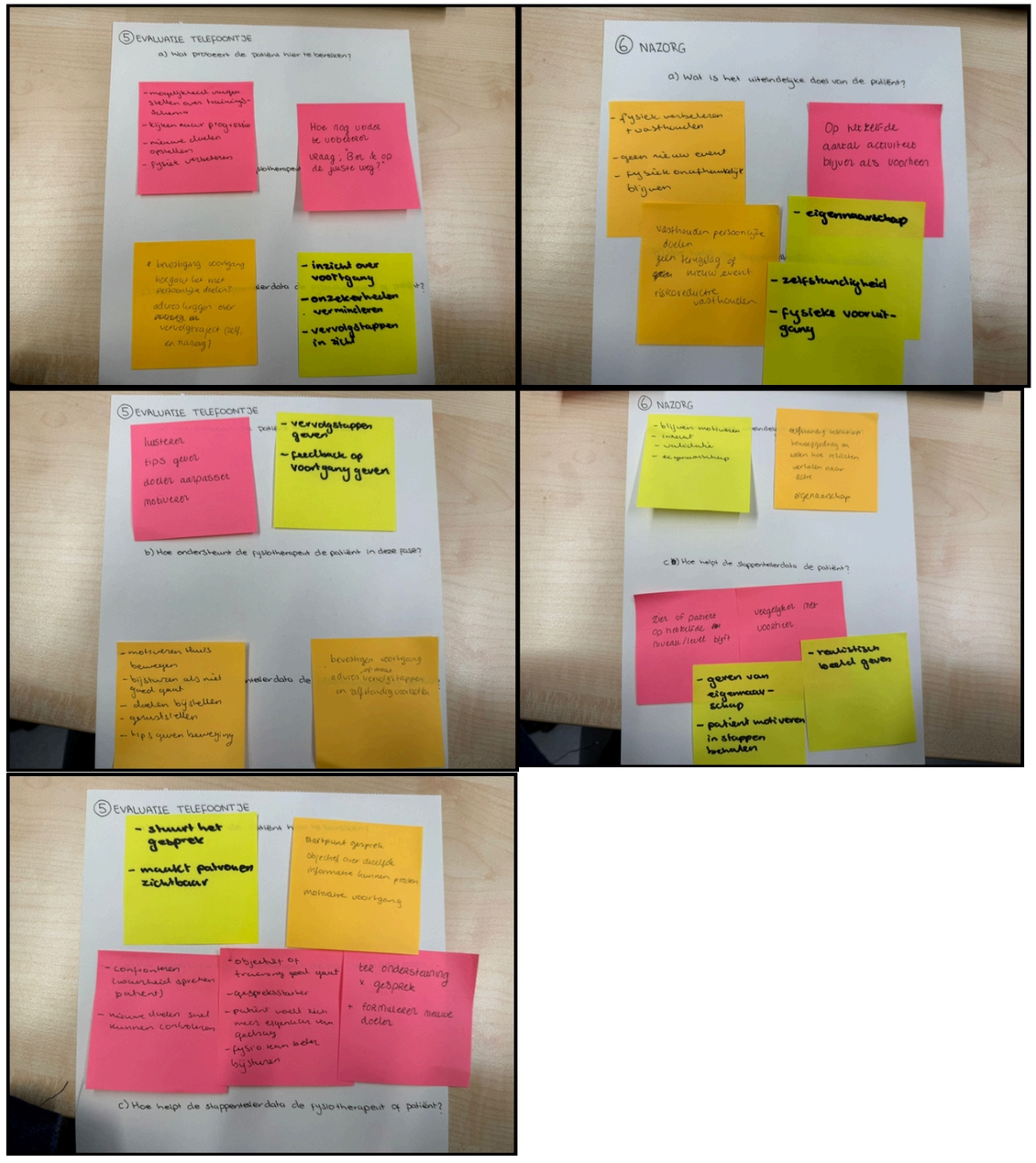
Step 1:

Fase 3&4



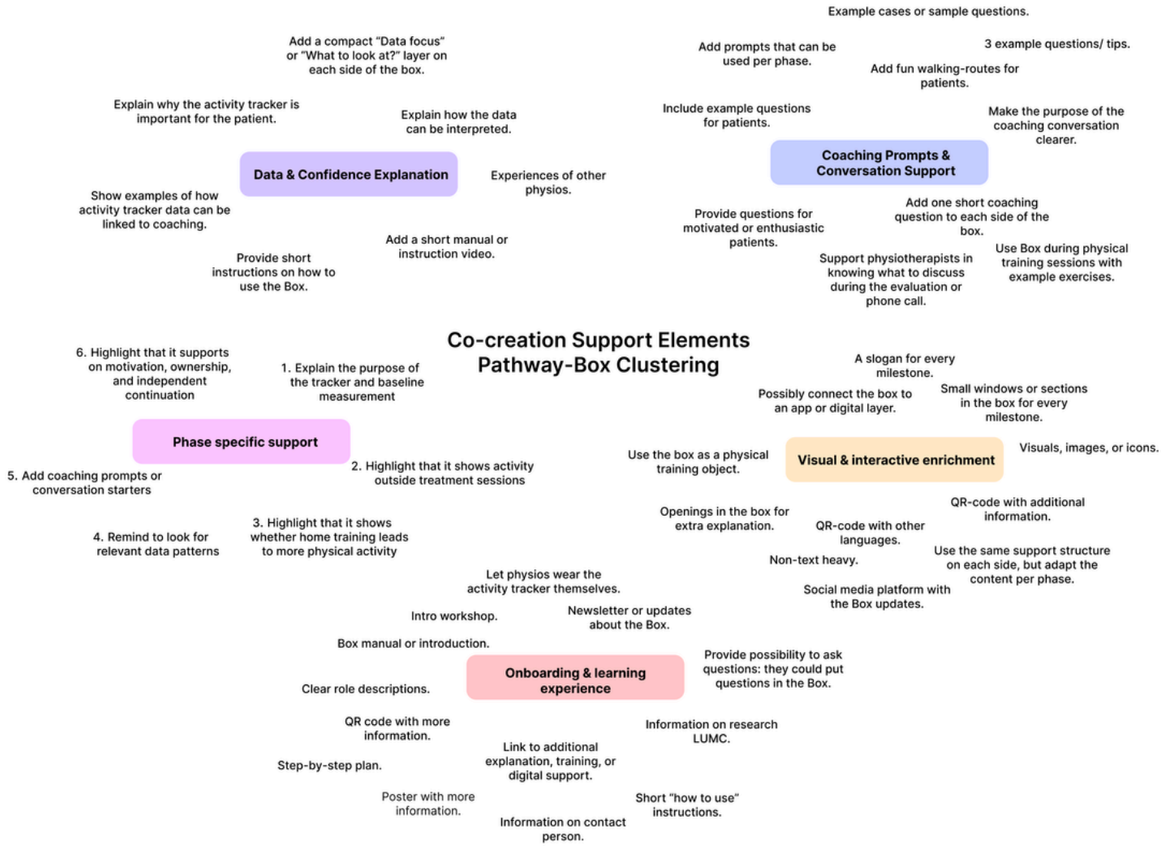
Step 1:

Fase 4&5

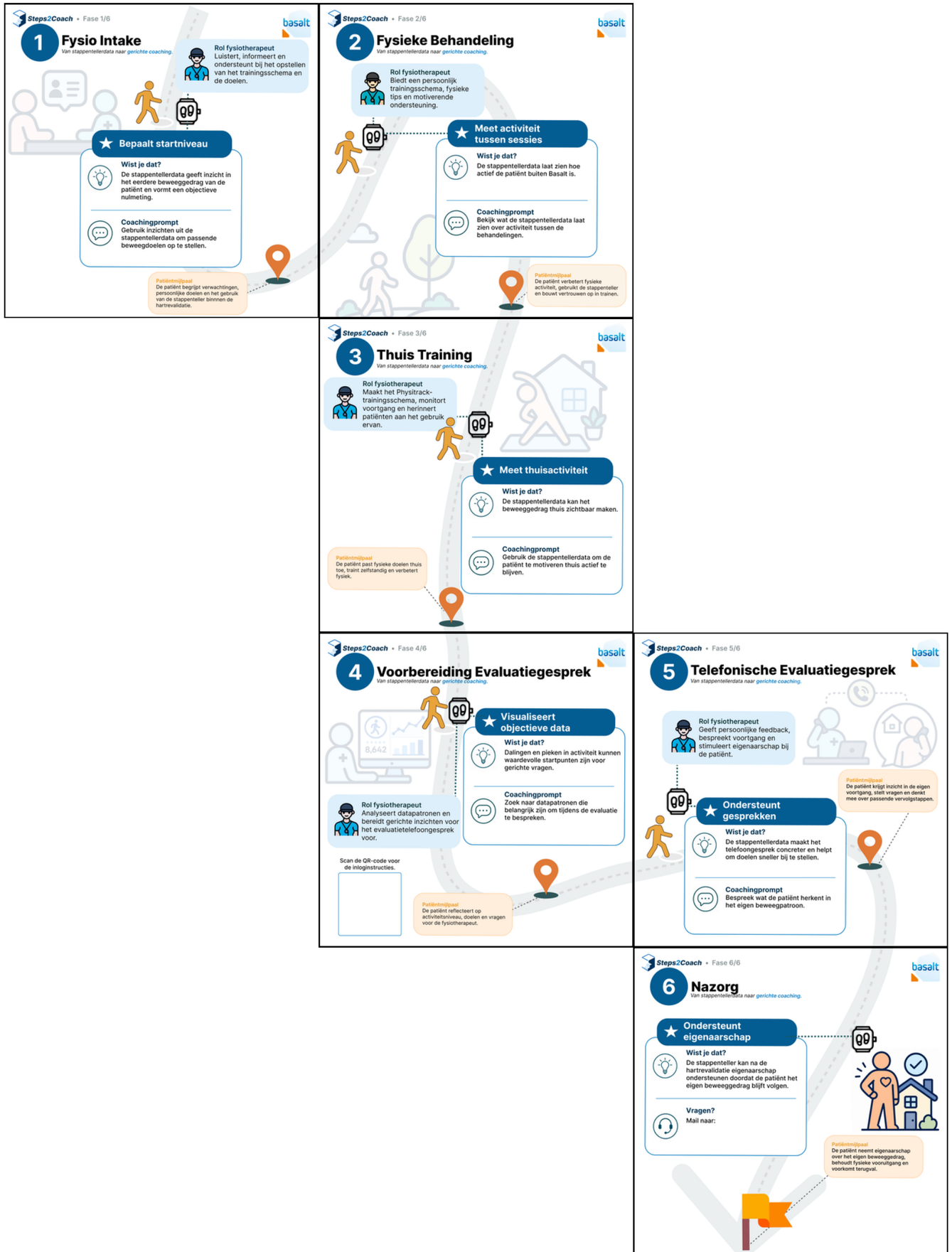


Step 2&3

Appendix O: Co-creation Outputs Clustering



Appendix P: Steps2Coach Cube All Sides



Appendix Q: Steps2Coach Poster

Van stappentellerdata naar gerichte coaching

Voor fysiotherapeuten binnen Basalt

Van inzicht in beweeggedrag naar toepassing in coaching: deze poster introduceert The Box, de stappenteller en de ***Steps2Coach*** kubus binnen het hartrevalidatietraject.

Wat is The Box?

The Box is een pakket met verschillende apparaten voor het uitvoeren van thuismetingen. Het is ontwikkeld door het LUMC en wordt na ontslag uit het ziekenhuis meegegeven aan patiënten. Eén van de apparaten binnen The Box is de stappenteller.

Hoe werkt de stappenteller?

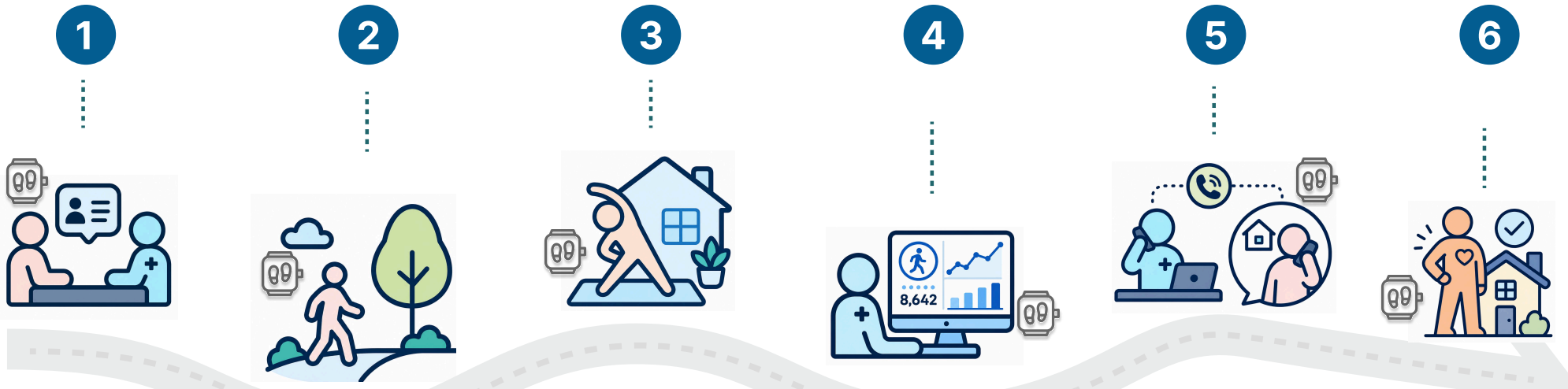
De stappenteller registreert dagelijks stappen via een Withings-horloge. De patiënt kan deze data inzien via de Withings Health Mate app. Door de koppeling met het ziekenhuis kunnen zorgverleners deze gegevens ook inzien en gebruiken voor monitoring op afstand.

Hoe helpt dit de fysiotherapeut met coachen?

- Geef inzicht in startniveau.
- Laat beweging en voortgang zien.
- Onderbouwt gesprekken en motivatie.
- Helpt bijsturen op het juiste moment.

Hoe werkt de *Steps2Coach* kubus?

De kubus laat zien hoe de stappenteller in 6 fases meereist door het hartrevalidatietraject en fysiotherapeuten helpt om patiënten gericht naar hun doelen te coachen.



1 Fysio Intake
De stappenteller geeft inzicht in het startniveau.

2 Fysieke Behandeling
De stappenteller laat het activiteitsniveau buiten Basalt zien.

3 Thuis Training
De stappenteller meet thuisactiviteit.

4 Voorbereiding Evaluatiegesprek
De stappenteller visualiseert objectieve datapatronen.

5 Telefonische Evaluatiegesprek
De stappenteller maakt de evaluatiegesprekken concreter.

6 Nazorg
De stappenteller ondersteunt eigenaarschap.

Wat betekenen de patiëntmijlpalen?
De patiëntmijlpalen op de Steps2Coach kubus laten zien welke doelen per fase centraal staan. De stappentellerdata ondersteunt fysiotherapeuten om hier gerichter op te coachen.

Meer weten over The Box?

Scan de QR-code voor meer informatie over the Box en de stappenteller.

Hulp of vragen?

Neem contact op via:

basalt

Inzicht, overzicht en gerichte coaching.

Appendix R: User-testing Process Guide (Steps2Coach)

Doel van de test
Het doel van deze test is om te evalueren of de Steps2Coach kubus en poster duidelijk, bruikbaar en passend zijn voor fysiotherapeuten. Omdat de stappentellerdata nog niet is geïmplementeerd in de huidige workflow, wordt de test uitgevoerd als een korte cognitive walkthrough. De fysiotherapeut wordt gevraagd om hardop mee te denken over hoe het ontwerp in de praktijk gebruikt zou kunnen worden.

1. Focus op de Kubus

Laat de fysiotherapeut daarna de kubus bekijken en kort door de zes fases lopen.

Vragen:

- Is de opbouw in zes fases begrijpelijk?
- Herken je deze fases binnen het fysiotherapieproces?
- Is duidelijk hoe stappentellerdata per fase kan ondersteunen?
- Helpen de “Wist jedat” en coachingprompt om de data beter te vertalen naar coaching?
- Welke kant van dekubus vind je het meest bruikbaar?
- Welke kant is nogonduidelijk of kan beter?

2. Focus op de Poser

Laat de fysiotherapeut eerst de poster bekijken.

Vragen:

- Wat is volgens jou het doel van deze poster?
- Is duidelijk wat the Box en de stappenteller zijn?
- Is duidelijk hoe stappentellerdata kan helpen bij coaching?
- Wat is nog onduidelijk of mist op de poster?

3. Poster en kubus samen
Vragen:

- Werken de poster en kubus goed samen?
- Zou je begrijpen hoe je deze tool moet gebruiken zonder extra uitleg?
- Op welk moment zou deze tool het meest nuttig zijn: intake, voorbereiding, evaluatiegesprek, teamoverleg of iets anders?
- Waar zou de kubus/poster het beste geplaatst kunnen worden?

4. Korte beoordeling op stellingen
Laat de fysiotherapeut elke stelling scoren van 1 tot 5.
1 = helemaal mee oneens, 5 = helemaal mee eens.

Stelling	Score
Het ontwerp helpt mij de toegevoegde waarde van stappentellerdata te begrijpen.	
Het ontwerp laat duidelijk zien hoe stappentellerdata past binnen het fysiotherapieproces.	
Het ontwerp helpt om stappentellerdata te vertalen naar coaching.	
Het ontwerp is snel en makkelijk te begrijpen.	
Het ontwerp voelt bruikbaar binnen de dagelijkse praktijk.	

5. Afsluiting
Vragen:

- Wat is het sterkste onderdeel van het ontwerp?
- Wat is het belangrijkste verbeterpunt?
- Zou dit ontwerp fysiotherapeuten kunnen helpen om stappentellerdata duidelijker en consistenter te gebruiken?

Afsluiting:
“Bedankt voor je tijd en feedback. Dit is erg waardevol om het ontwerp verder te verbeteren en beter te laten aansluiten op de praktijk.”

Appendix S: Stakeholder Validation Process Guide (Steps2Coach)

Deelnemers: 3 cardiologen betrokken bij implementatie van The Box
Duur: 30 minuten
Doel: Valideren of het concept duidelijk is, de implementatie richting fysiotherapeuten ondersteunt, en voldoende laat zien dat de organisatie achter het gebruik van activiteitstrackerdata staat.

1. Introductie
Korte introductie project
“Mijn afstudeerproject richt zich op het verbeteren van de blended care hartrevalidatie bij Basalt, met specifieke aandacht voor hoe activiteitstrackerdata uit The Box betekenisvol kan worden geïntegreerd in de fysiotherapieworkflow. Uit mijn onderzoek kwam naar voren dat fysiotherapeuten vooral behoefte hebben aan duidelijkheid: wat is de rol van de data, wanneer gebruik je het, en hoe vertaal je het naar coaching?”

Doel van de meeting
“Vandaag wil ik mijn concept, Steps2Coach, kort met jullie valideren. Het doel is om te bespreken of de kubus en poster duidelijk genoeg zijn om fysiotherapeuten te ondersteunen bij de implementatie van activiteitstrackerdata. Ik ben vooral benieuwd naar jullie gezamenlijke feedback op de inhoud, positionering en implementatiewaarde.”

2. Korte conceptintroductie
Uitleg:
“Steps2Coach bestaat uit twee onderdelen: een fysieke kubus en een ondersteunende poster. De kubus laat in zes fases zien hoe stappentellerdata kan meereizen door het fysieke hartrevalidatietraject. De poster geeft extra context over The Box, de stappenteller en hoe de data fysiotherapeuten kan ondersteunen in coaching.”

3. Focus op de kubus
Laat de digitale kubus zien

Vragen:

1. **Eerste indruk**
   - Wat is jullie eerste indruk van de kubus?
   - Ishet doel van de kubus duidelijk?
2. **Inhoud en fases**
   - Zijn de zes fases logisch gekozen voor het fysiotherapietraject?
   - Mist er volgens jullie een belangrijk moment waarop activiteitstrackerdata relevant is?
3. **Rol van de fysiotherapeut**
   - Helpt de kubus volgens jullie om de rol van de fysiotherapeut binnen blended care duidelijker te maken?
   - Zou dit fysiotherapeuten kunnen helpen om patiënten beter uit te leggen waarom de stappenteller wordt gebruikt?
4. **Gebruik van data in coaching**
   - Maakt de kubus duidelijk hoe stappentellerdata kan worden vertaald naar coaching?
   - Zijn de coaching prompts en “Wist je dat”-stukjes volgens jullie waardevol genoeg?
5. **Implementatie**
   - Zou deze kubus kunnen helpen bij het uitleggen van de implementatie aan het fysiotherapieteam?
   - Wat moet volgens jullie worden aangepast om de kubus overtuigender of praktischer te maken?

4. Focus op de poster

Vragen:

1. **Duidelijkheid**
   - Is de poster visueel duidelijk en snel te begrijpen?
   - Geeft de poster genoeg context over The Box en de stappenteller?
2. **Organisatorische ondersteuning**
   - Laat de poster voldoende zien dat het gebruik van activiteitstrackerdata wordt ondersteund door de organisatie?
   - Zou het toevoegen van een contactpersoon of verwijzing naar LUMC/Basalt helpen om vertrouwen en ondersteuning zichtbaar te maken?
3. **Samenhang met de kubus**
   - Werken de poster en kubus goed samen?
   - Is duidelijk wat de poster toevoegt ten opzichte van de kubus?

5. Korte beoordeling op criteria

Laat de cardiologen kort reageren op deze stellingen. Dit kan mondeling, bijvoorbeeld met: **eens / deels eens / oneens**.

Stelling	Reactie
De kubus en poster zijn visueel duidelijk engeschikt om de implementatie aan het fysiotherapieteam uit te leggen.	
Het concept maakt duidelijk hoe activiteitstrackerdata past binnen het fysiotherapietraject.	
Het concept maakt de toegevoegde waarde van activiteitstrackerdata voor coaching duidelijk.	
Het concept laat voldoende zien dat de organisatie het gebruik van activiteitstrackerdata ondersteunt.	
Het concept lijkt haalbaar en laagdrempelig om in de praktijk te introduceren.	

6. Afsluiting
Slotvragen:

- Wat is volgens jullie de grootste kracht van het concept?
- Wat is het belangrijkste verbeterpunt vóór implementatie?
- Wat zou fysiotherapeuten volgens jullie het meest helpen om activiteitstrackerdata daadwerkelijk te gebruiken?

Afsluiting:
“Bedankt voor jullie tijd en feedback. Dit is erg waardevol om het concept verder aan te scherpen en beter te laten aansluiten op de implementatie van The Box binnen Basalt.”

Appendix T: User-Testing Notes (Steps2Coach)

Datum: 15-6-26
Participant: Fysiotherapeut
Locatie: Basalt
Duur test: 1uur
Onderzoeker: Louise Kho

Eerste indruk
Wat valt de tester als eerste op?

- De fysio vindt de instructies met plaatjes prettig
- The Box uitleg is duidelijk
- Termen van horloge zegt haar nog niks-> maar na implementatie van the Box binnen het hartrevalidatietraject zal dit (hopelijk) duidelijk worden
- Stappenteller is een klein ondersteunend iets, en is niet alles
- Dingen die de fysio zich afvraagt: Hoeveel tijd ben je eraan kwijt? Hoeveel tijd moet je erin stoppen, en hoeveel heb je eraan?
- De fysio vraagt zich af of de kubus ook bedoeld is voor fysio's?

Eerste reactie op het concept:

Algemene houding en quotes:

Positief en nieuwsgierig

“Oh wat leuk, een kubus.”

“Heeft de route nog een bepaalde logica? Oh ik zie de route nu, wat grappig”

“Die coachingprompts zijn wel leuk, dat werkt wel motiverend”.

“De kubus is ook leuk om vast te houden, als ik dit zo zou zijn dat zou ik hem wel oppakken en willen lezen.”
“Ik ben wel benieuwd wat er gebeurd als ik de QR code op de poster scan”.

1. Steps2Coach kubus

Begrijpelijkheid van de zes fases:

1) De fysio had enkele vragen: “Hoe definieer je een nulmeting?”
   a) Is de nulmeting (vanaf moment dat patiënt the box heeft, voor de start van de revalidatie). Dus bij de intake moet je tijd erin stoppen. Welk moment pak je als de nulmeting?
   b) De fysio benadrukt dat het geen controlemiddel moet zijn.
   c) Voordat je gesprek ingaat, zou je de data al kunnen inzien (ideale situatie). Je zou het gesprek anders in kunnen gaan, bespreken wat je hebt gezien. Misschien win je daarmee tijd in het gesprek.
2) De fysio vindt deze stap duidelijk. “Dit is wat ze hier bij Basalt doen.”
3) De fysio benadrukt dat momenteel de fysiotherapeuten tijdens de trainingssessie weinig patiënten vragen over het thuis trainen, ze erkent dat fyios meer moeten motiveren tussendoor. Monitoren physitrack, dat gebeurt pas later. Gokken welke oefeningen passen bij de patiënt, vrij algemene oefeningen.
4) Alleen als patiënten komen met onduidelijkheden over physitrack dan krijgen ze nieuwe oefeningen, fysio gaan niet actief achterna. Sterk benadrukken dat tijd blokken voor die voorbereiding belangrijk is.
5) Als je geluk hebt dan wat tijd om data te bekijken. Ze werken met blokken van 5 kwartier. Stappentellerdata kan helpen om harde data te hebben. De vraag is, hoe groot gaat stappentellerdata zijn in het gesprek? Format met vragen voor evaluatiegesprek, en dan benadrukken hoe groot het is tov tijd die je hebt. Wat zie je allemaal in the Box?
6) Deze stap is duidelijk.

Herkenbaarheid binnen het fysiotherapie proces

Stap 3&4 gebeuren meer chronologisch, 3 is niet een aparte stap.

In het intake gesprek bepaal je al physitrack programma of je dat wel/niet doet.

Duidelijkheid van stappentellerdata per fase

Ja wel duidelijk, anders wel logisch hoe je het moet invullen.

Reactie op “Wist je dat” en coachingprompt Wel duidelijk

Meest bruikbare element van de kubus

Die coachingprompts verduidelijkt het meer, waarom je het kan inzetten. Het helpt in de motivatie om te gebruiken.

Onduidelijk / verbeterpunt:

- De fysiotherapeut benadrukte dat enkele stappen niet helemaal realistisch gerepresentateerd zijn met de werkelijkheid. Stap 3 & 4 gebeuren bijvoorbeeld meer chronologisch en niet na elkaar.
- De fysiotherapeut had een beetje twijfels of de kubus ook bedoeld was voor de fysiotherapeuten.

2. Supporting poster

Wat denkt de deelnemer dat het doel van de poster is?

- Uitleggen aan fysiotherapeuten hoe je de stappenteller kunt gebruiken om het gesprek aan te gaan. Hoe het bewegen/inspannen gaat.
- De fysio vindt de patiënt mijlpalen onduidelijk in eerste instantie, maar ze snapt dat ze naar de kubus moet kijken (hier wordt dit verduidelijkt).
- De fysio zegt nieuwsgierig te zijn om te zien wat er gebeurt als ze de QR-code scant.
- De fysio zegt dat de poster in plaatjes verduidelijkt, wat data van the box/stappenteller kan betekenen.

Wat mist of kan beter?

- Wat precies aan data krijg je te zien?
- Hoe ik praktijk? Dit is een ondersteunend iets.
- The Box is nog vaag/ nog niet concreet.
- Hoe gaan we ermee om in de praktijk?
- Hoeveel tijd kost het/wat levert het je op.
- Stappenteller is 1 ding, wat mag iemand/ wat vind iemand leuk. Wat zijn redenen als het niet lukt.
- Als iemand wat anders zegt dan wat je meet, wat doe je dan?
- Weerstand: hoe erg moet je controleren, of mensen echt doen wat ze zeggen. Dit kan ondersteunend zijn.
- Hoe belangrijk is stappentellerdata voor coaching, tov de tijd die je ervoor hebt.
- Je moet naar individuele patienten kijken, iedereen anders.

3. Kubus en poster samen

Werken de poster en kubus goed samen?

- “Zeker, het maakt je nieuwsgierig.”
- Poster fijn in een keer overzicht en de kubus is ondersteunend.

Is het concept begrijpelijk zonder extra uitleg?

- “Ja, dat denk ik wel.”

Wat is de beste plek om de poster + kubus te plaatsen?

De fysio vindt de kantoor ruimte en Intake ruimte een goede locatie voor poster+kubus (patienten kunnen ook zien dan).

- In trainingszaal scherm met mededelingen, iets met digitale tekst met plaatje, of wachtkamer. Algemene mededelingen toegang stappenteller van the Box.

4. Score op stellingen

1 = helemaal mee oneens, 5 = helemaal mee eens

Stelling	Score	Korte toelichting
Het ontwerp helpt mij de toegevoegde waarde van stappentellerdata te begrijpen.	4	
Het ontwerp laat duidelijk zien hoe stappentellerdata past binnen het fysiotherapieproces.	4	
Het ontwerp helpt om stappentellerdata te vertalen naar coaching.	4	Die coachingprompts helpen goed, in welke fase wat
Het ontwerp is snel en makkelijk te begrijpen.	3	
Het ontwerp voelt bruikbaar binnen de dagelijkse praktijk.	4	

5. Afsluiting

Sterkste onderdeel van de interventie

- De fysiotherapeut vindt de vorm van de kubus erg leuk, het valt op. De coaching prompts zijn ook erg fijn en werken motiverend.

Belangrijkste verbeterpunt

- Praktische ondersteuning. Hoe gebruik je de data in praktijk? Hoeveel tijd moet je hieraan besteden? Hoe groot moet het onderwerp zijn t.o.v tijd die je hebt?
- Duidelijker maken dat de kubus ook bedoeld is voor fysiotherapeuten. (Op de poster staat dit duidelijk vermeld en op de kubus niet)

Kan dit ontwerp helpen om stappentellerdata duidelijker en consistenter te gebruiken?

- Het kan zeker helpen om fysiotherapeuten meer te motiveren en meer bewustzijn te creeren.
- Maar, er zijn nog een hoop technische en praktische dingen die momenteel nog niet op zijn plek zitten. Die dingen moeten eerste geregeld worden voordat stappentellerdata daadwerkelijk gebruikt kan worden.

Overige opmerkingen

nvt

Appendix U: Stakeholder Validaiton Results (Steps2Coach)

Datum: 04-06
Participants: 3cardiologen
Locatie + duur: online via Teams, 30 min
Onderzoeker: Louise Kho

Overall Summary

- The overall goal of **Steps2Coach** was understood by the cardiologists: it was recognised as a support tool to help physiotherapists start using step counter data within cardiac rehabilitation.
- The concept was seen as fitting within the broader direction of **blended care** and the implementation of **The Box** at Basalt.
- The physical cube was positively received. The cardiologists described it as a playful and noticeable way to bring the topic of step counter data to the attention of physiotherapists.
- The concept was seen as potentially useful for many patients, especially because daily movement remains important beyond supervised training sessions.
- Step counter data was seen as relevant not only for patients who are inactive, but also for patients who go to the gym or train once or twice a week, because they may still be inactive during the rest of the week.
- The cardiologists linked the use of step counter data to **patient ownership**, especially after rehabilitation, as patients may continue monitoring their activity behaviour independently.

Feedback on step goals

- The cardiologists raised the point that **step count goals need to be carefully defined**.
- Step goals could function as a **secondary rehabilitation goa**l, alongside existing patient-centred goals such as returning to specific daily activities.
- A goal **such as increasing daily steps by 1,000 or 2,000 steps was mentioned as a potentially realistic starting point**, depending on the patient’s baseline activity level.
- The cardiologists noted that the step counter will not be equally valuable for every patient, because not every patient’s activity is mainly walking-based.
- More research or guidance is needed on what realistic and meaningful step goals are for different patient groups.

Fit with implementation

- The concept supports the desired transition from short-term rehabilitation towards longer-term monitoring, motivation, and behaviour change.
- The cardiologists emphasised that cardiac rehabilitation should not only be seen as 12 weeksof physical training, but as **a transition phase towards sustainable self-management.**
- Step counter coaching should be seen as one part of a broader coordination and coaching role within rehabilitation.

Main risks and concerns

- The success of the concept strongly depends on whether physiotherapists actually use it.
- The cardiologists expressed concern that, if physiotherapists do not change their behaviour, the cube may simply remain in the physiotherapy room without influencing practice.
- Existing variation between physiotherapists is a key implementation risk. Some physiotherapists may already use blended care often, while others may rarely or never apply it.
- Resistance to digital tools remains an important barrier. One example mentioned was that Physitrack is sometimes still provided on paper, which undermines the purpose of the digital tool.
- The cardiologists stressed that changing patient behaviour first requires changing physiotherapist behaviour.

Recommendations for implementation

- Add an evaluation point to monitor whether physiotherapists actually use step counter data in practice.
- Evaluate differences between physiotherapists, for example by checking whether some physiotherapists consistently use blended care while others do not.
- Identify barriers among physiotherapists before or during implementation, especially around digital tools, perceived workload, and confidence in blended care.
- Do not focus too much on the strongest resistors. Instead, focus on early adopters and the middle group of physiotherapists who are more likely to move along.
- Provide clear onboarding, including why step counter data matters, how it supports patients, and what is expected from physiotherapists.
- Share evidence about the value of blended care and remote monitoring with the physiotherapy team to increase motivation and trust.
- Consider an inspiring presentation or workshop for physiotherapists about blended care, step counter data, and the broader vision behind this transition.

Technical and practical conditions

- The technical infrastructure must work before the concept can be implemented properly.
- Clear login instructions are essential. Physiotherapists need to know exactly how to access the step counter data.
- A patient-facing version should only be introduced once physiotherapists are able to use the system properly; otherwise, patients may ask questions that physiotherapists cannot answer yet.
- The concept should be introduced in a concrete way, ideally with a physical cube rather than only as an abstract recommendation.

Feedback on complex/intensive pathways

- The cardiologists noted that blended care seems more clearly embedded in simpler trajectories, but may fade into the background in more complex or intensive trajectories.
- More attention is needed to how step counter data and remote coaching fit into complex and intensive rehabilitation pathways.
- The number and timing of evaluation calls may need to be reconsidered, especially for patients in longer or more intensive trajectories.
- Intensive patients may need more moments of reflection and coordination, not only around physical activity but also around their overall rehabilitation progress.

Additional concept suggestions

- A future patient-facing version could be developed, for example a poster in the waiting room encouraging patients with The Box to ask their physiotherapist about the step counter.
- This could create motivation from both sides: physiotherapists are reminded to use the data, while patients are encouraged to bring it up.
- More physiotherapists should be invited to the final project presentation, because the concept is ultimately designed for them.
- Involving physiotherapists in the presentation may also reduce the feeling that the intervention is being decided for them.

Overall conclusion

- The concept was validated as clear, relevant, and aligned with Basalt’s broader direction towards blended care and The Box implementation.
- The strongest value of Steps2Coach lies in making step counter data visible, tangible, and easier to connect to physiotherapy coaching.
- The main limitation is that the concept alone will not guarantee implementation; it needs to be supported by technical readiness, clear onboarding, behaviour change strategies, and evaluation of physiotherapist adoption.

Appendix V: Project Proposal

Project Proposal form
IDE Master Graduation Project

Inthis proposalthe agreements made betweenstudent and supervisory team about the student's IDE Master Graduation Project are set out. This document needs to be prepared for the Kick-off meeting and should be submitted in MyCase.

Name student _L_o_u_i_s_e _K_h_o **Student number** ___6_3_0_8_8_4_8_

Project title _Redesigning the Cardiac Rehabilitation Journey through the Integration of Blended Care

Please state the title of your graduation project (above). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

MSc programme ■ Design for Interaction ☐ Integrated Product Design ☐ Strategic Product Design

☐ Other *(in case of a double degree outside IDE):* ___ __ _____ ___ ___ ___ __

Introduction

Describe the context of your project in the box below; What is the domain in which your project takes place? Who are the main stakeholders and what interests are at stake? Describe the opportunities (and limitations) in this domain to better serve the stakeholder interests. (max 250 words)

Cardiovascular disease (CVD) remains a substantial public health challenge in the Netherlands, affecting an estimated of 1.8 million people in 2024. Despite ongoing medical advances, heart disease continues to impose significant long-term burdens on patients, healthcare professionals, and the healthcare system. For patients, a cardiac condition often leads to physical, mental, and social challenges, accompanied by uncertainty about daily functioning and recovery (Hart- en Vaatziekten I Leeftijd en Geslacht I Totaal, 2024) .

Cardiac rehabilitation (CR) is an evidence-based intervention that supports recovery, reduces the risk of recurrent cardiac events, and improves quality of life. CR is delivered according to established guidelines (see figure 1 for the Cardiac Rehabilitation Guidelines). It is typically delivered by a multidisciplinary team including cardiologists, physiotherapists, occupational therapists, dietitians, and psychologists. However, fewer than 40% of eligible patients participate in formal cardiac rehabilitation programmes. Barriers such as travel distance, time constraints, and declining motivation contribute to this gap between recommended and actual participation (Harteraad, 2019). At the same time, the Integraal Zorgakkoord highlights that demand for care is expected to increase, while the availability of healthcare professionals will not grow at the same pace, increasing pressure on rehabilitation services (Directie Communicatie, 2022).

This graduation project takes place within the domain of cardiac rehabilitation at Basalt and focuses on optimising the existing blended care pathway. Blended cardiac rehabilitation is already offered through a combination of centre-based sessions, online training modules, and remote contact moments such as telephone consultations. The aim of this project is therefore to strengthen and further integrate Blended Care through the use of data from the Box (Treskes et al., 2017) .
The Box (see figure 2) includes, among other tools, a step counter that provides insight into patients' actual physical activity behaviour in daily life. These data can support healthcare professionals in monitoring progress and aim to increase patients' sense of ownership and sustained behaviour change, particularly after rehabilitation. In addition, this project explicitly addresses the role of aftercare within the blended care pathway, responding to the challenge that physical activity levels often decline after cardiac rehabilitation.

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Introduction (continued): space for images

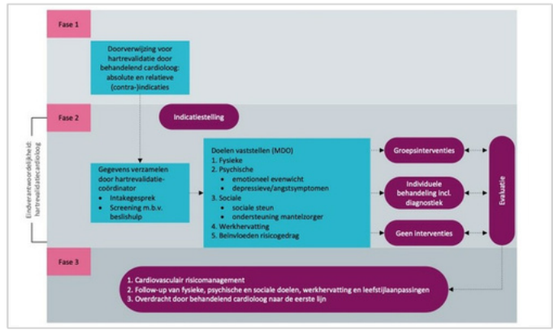


Figure 1: Cardiac Rehabilitation Guidelines (Nederlandse Vereniging voor Cardiologie & Kennisinstituut van de Federatie van Medisch Specialisten, 2026)

Figure 2: The Box (Directie Communicatie, 2022)

Problem Definition

What problem do you want to solve in the context described in the introduction, and within the available time frame of 100 working days? (= Master Graduation Project of 30 EC). What opportunities do you see to create added value for the described stakeholders? Substantiate your choice. (max 200 words)

At Basalt, cardiac rehabilitation is delivered by a multidisciplinary team and requires close involvement of physiotherapists, physicians, and other healthcare professionals. However, the growing demand for rehabilitation care, combined with limited clinical capacity, places increasing pressure on care providers. Basalt already offers blended cardiac rehabilitation, including remote coaching through online modules and contact moments, alongside centre-based sessions. However, opportunities remain to further optimise this approach and better align it with the care pathway. The introduction of the Box, which includes a step counter and other measurement tools, creates opportunities to address this challenge. By providing objective insight into patients' daily physical activity behaviour, these data can be used to support more personalised and timely remote coaching. When meaningfully integrated into the care pathway, data from the Box may not only support healthcare professionals in monitoring and guiding patients from a distance, but also enhance patients' sense of ownership and control over their recovery process. Strengthening this data-informed approach may therefore contribute to sustained motivation and behaviour change during rehabilitation and in the aftercare phase.
The main research question addressed is: "How can the cardiac rehabilitation care pathway at Basalt be redesigned to strengthen blended care and remote coaching, supported by data from the Box, in a way that supports healthcare professionals, enhances patient ownership, and contributes to sustainable behaviour change during rehabilitation and aftercare?"
Opportunities lie in visualising bottlenecks in the current care pathway, clarifying roles between clinicians and data teams, and designing pathway-aligned solutions that support patient motivation, improve efficiency, and enable data-informed, patient-centred care across both rehabilitation and aftercare.

Assignment

This is the most important part of the project brief because it will give a clear direction of what you are heading for. Formulate an assignment to yourself regarding what you expect to deliver as result at the end of your project (1 sentence. As you graduate as an industrial design engineer, your assignment will start with a verb (Investigate/Design/Validate/Create), and you may use the format:
*(Investigate/Design/Validate/Create)((**w**hat willbethe deliverable→prototype/roadmap/process/intervention /approach/guideline/strategy/…) **to** (what should it do →(create/understand/evaluate/validate/improve/execute/analyse/…)(the objective → experience/value/process/product/…) **for** (whom → target group/client/…) **in** (what context).*

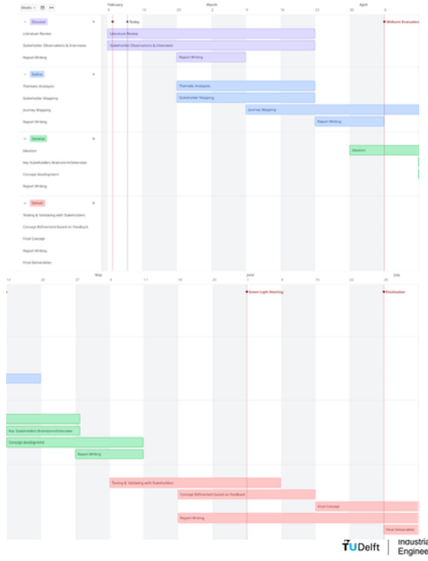
Redesigning the blended cardiac rehabilitation care pathway that integrates exercise behaviour data and clinical workflows to support patient self-management and sustained motivation, while enabling healthcare professionals to effectively use the Box and incorporate data-informed coaching into their daily practice within cardiac rehabilitation at Basalt.

Explain your project approach to carrying out your graduation project and what research and design methods you plan to use to generate your design solution (max 150 words).

This graduation project will follow a Double Diamond structure: Discover, Define, Develop, and Deliver. The project will start with a context analysis to understand the current cardiac rehabilitation care pathway at Basalt, including interviews and literature review about protocols and existing use of blended care tools. Stakeholder mapping will be conducted to identify key actors such as patients, physiotherapists, rehabilitation physicians, and data analysts. Qualitative data will be collected through semi-structured interviews and observations to gain insight into experiences, needs, and bottlenecks in daily practice, including the use of blended care tools and remote coaching during rehabilitation and aftercare. The collected data will be analysed and synthesised into a care journey map that visualises the full pathway across different roles and transitions, including the handover to aftercare. Based on these insights, design opportunities will be explored and translated into a future-state blended care pathway. Concepts will be iteratively developed and refined through feedback moments with stakeholders. The final outcome will be a validated design proposal that aligns data use, remote coaching, and clinical workflows to support sustained patient engagement and the daily work of healthcare professionals.

Pro ject planning

*To make visible how you plan to spend your time, you must make a planning for the full project. You are advised to use a Gantt chart format to show the different phases of your project, deliverables you have in mind, meetings and in-between deadlines. Keep in mind that all activities should fit within the given run time of 100 working days. Your planning should include the **Kick-off**, **Midterm Evaluation**, **Green Light** and **Finalisation (ceremony)**. Please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any (for instance because of holidays or parallel course activities). Add (an image of) the planning in the box below. If it is not readable, you can add the planning as an attachment to My Case along with this Proposal.*



Motivation and personal ambitions

Explain why you wish to start this project, what competencies you want to prove or develop (e.g. competencies acquired in your MSc programme, electives, extra-curricular activities or other). Optionally, describe whether you have some (max 5) personal learning ambitions which you explicitly want to address in this project, on top of the learning objectives of the Graduation Project itself. You might think of e.g. acquiring in depth knowledge on a specific subject, broadening your competencies or experimenting with a specific tool or methodology (200 words max).

I have a strong personal interest in healthcare-related design and I love to contribute to this domain. As a Medisign specialisation student, a lot of the courses I have followed focus on healthcare contexts and human-centred design. This project provides an opportunity to apply this knowledge within a real-world rehabilitation setting. I am particularly motivated by the complexity of healthcare challenges, which are expected to increase due to population growth and rising demand for care. I find it valuable to work closely with diverse stakeholders, to empathise with their needs, and to translate these insights into thoughtful design solutions. Designing for healthcare feels especially meaningful, as design decisions can directly contribute to improving patient experiences and care quality. Beyond this project, I aspire to remain involved in healthcare innovation and contribute to improving care delivery after my studies.

Personal goals:
- Gain in-depth insights into the current cardiac rehabilitation process
- Translate research insights into a clear and structured care journey map
- Identify bottlenecks and convert them into concrete design opportunities
- Strengthen communication skills when collaborating with stakeholders
- Independently plan, manage, and take responsibility for my graduation project
- Actively seek and apply feedback to work iteratively and grow as a designer
- Being able to make an impact and to bring added value in improving the healthcare system

Master Thesis | Design for Interaction | Louise Kho | June 2026