IMPROVING PATIENT WELLBEING IN THE WILHELMINA CHILDREN'S HOSPITAL THROUGH A DESIGN CONCEPT FOR THE ACTIVITY ROOM

Design for Interaction | Master thesis

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Preface

Dear reader,

By completing this report, I have reached the final milestone of my life as a student. Before you lies the thesis of my graduation project for the MSc Design for Interaction at the Technical University of Delft.

This project is enabled by the opportunity given by the Wilhelmina Children's hospital in Utrecht. I want to express my gratitude for the chance to work in such a meaningful and engaging facilitation. Throughout the entire project, I experienced a great deal of freedom to be in the hospital and get in touch with patients or staff. People were always willing to help me in my project, which enabled me to get in touch with so many interesting people. I would personally like to thank Jet, Ed, Ewout, Dorothee, and all members from the medical pedagogic staff for the help and support throughout the entire project. Jet, you immediately made me feel welcome in the hospital by helping me organise sessions and arranging practical (but important) issues, but also with your openness and constructive feedback. Ed, thank you for having a practical view on the project and your flexibility to always be present during meetings. Ewout, thank you for always letting me do sessions with the children, set up my prototypes in different places, and for guiding me with your opinion and view during the project. Dorothee, thank you for helping me to reach out to MPZ and children in the hospital. Lastly, I would like to express my gratitude towards all the members of the MPZ, who helped me greatly during context research with pleasant openness and enthusiasm.

I want to express a special appreciation towards the members of the children's council, with whom I did a generative research session, an idea generation session and who helped me evaluate to my concepts. This group of children and adolescents has truly amazed me: the dynamic in the group is open and respectful to each other and the members feel a responsibility to have a voice for all children in the WKZ. Each individual of the children's council speaks about their experiences in the hospital in an incredibly mature way. I can genuinely say that I enjoyed the sessions and learned so much from these children and adolescents. Also, I want to express my gratitude to the people organising and managing the children's council, Milou, Angeline, and Aline, for giving me time on the agenda during assemblies and for reaching out to the children when I asked for feedback.

I want to thank my coaches from within the Industrial Design faculty, Mathieu and Pieter Jan. I can honestly say that I always felt inspired and motivated after our meetings, which repeatedly gave me new energy throughout the project. I experienced a relaxed and pleasant dynamic during out meetings. Mathieu, your insight on designing and executing (testing) sessions with children was very helpful. Thank you for you extensive feedback with detailed remarks; it helped me to be critical and prepare thoroughly for sessions with children. Pieter Jan, thank you for making me think and communicate the goal and insights in my project explicitly. You regularly gave me the tools to clarify an abstract thinking process.

Lastly, I am grateful for my dear friends and family who supported and helped me during the project. They gave me the space to focus on my graduation project when needed, but also were a great distraction when I required a break. A special thanks to both my parents, who corrected the crooked sentences in my text and allowed me to make a total mess of their house when I used EPS foam to make my prototype.

I enjoyed this graduation journey and I am happy that I can share it with this report.

Emma

Executive summary

Yearly, roughly 350.000 child hospitalizations take place in the Netherlands, of which about a third consists of those of newborn babies (Volksgezondheidenzorg.info, 2021). Also, statistics show that 27% of Dutch children had a chronic disease in 2019. These chronic illnesses vary from frequently occurring diagnoses like asthma to rare and progressive diseases. However, the life expectancy for children who suffer from a chronic illness continues to increase considerably. This results in a focus on long-term effects of disease and the quality of life for diagnosed children (Van de Putte, E. M., & Van der Ent, C. K., 2019).

In collaboration with the Wilhelmina Children's hospital, I explored and defined the meaning of wellbeing in a pediatric hospital. The hospital initiated the project as an assignment to redesign the activity room: the children's theatre. I used the room as an opportunity to facilitate design solutions according to the research outcomes. A *Vision for future designers* who work in a similar context is part of the end result, aiming to guide designers into possible solutions areas when they are designing for patient wellbeing in a pediatric hospital. In this report I will refer to the redesigned room as the Waterval, because this is possibly the new name for the children's theatre.

Discover

Three factors - social relationships, physical environment and daily routine or activities - were identified in literature to drastically change during child hospitalization. The exploration of their effect on wellbeing was therefore used as a base point for the generative research sessions. I conducted context research activities with four different groups in the WKZ: children in the children's theatre, parents in the Ronald McDonald living room, the MPZ and the members of the children's council.

Define

The literature study and the context research in the hospital were used to propose the design brief, consisting of the problem statement, the interaction vision, the design goal and directions, and the first version of the *Vision for future designers*. The problem statement showed design possibilities regarding the control patients have over their body, environment and activities and regarding patient's desire for social interaction with their peers from home.
The design goal is to give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital, which will be enhanced by stimulation of social involvement among patients within the hospital.

Develop

I organised an idea generation session with the children's council with the goal to validate the design directions and use their expertise in concept development with this participatory approach. The results of the session were concrete ideas, which I abstracted to design categories and underlying values. The categories and values of the ideas were used to ideate further, while still resonating with the wishes and needs of the patients.
Concept development was an iterative process, which led to two initial concepts. The concepts were tested in the hospital and evaluated by the children of the children's council. The tests resulted in an additional goal for the final concept: the design should encourage independent and exploring behaviour from children.

Deliver

'Mozaïek' is the final concept for this project: it covers a large part of the wall in the room with three octagonal cutouts that have blocks in them. When the blocks are removed from the wall, the octagon serves as a sitting area. Between the octagons are grids with holes, in which colourful sticking shapes can be placed that contribute to the creative and personal expression of children in the room. Like with the Memomuur, drawings and other creations from the children can be

displayed with clips and shelves.
I conducted a final concept test by placing a prototype of Mozaïek in the main hall of the WKZ during five working days. During the test, I observed many different interactions that children, MPZ staff, and parents had with each other and with the prototype. The results of the test were used to reevaluate and finalise the *Vision for future designers*.

Conclusion

The test showed that Mozaïek can fulfill the first part of the design goal, *giving patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital*, by triggering children to play and explore independently. Also, the children show a great variety in the way that they interact with the prototype. The concept allows them to create their own environment, taking control over the environment they want to be in at that moment.
The second part of the design goal, *social involvement among patients within the hospital will be stimulated, which will enhance the control patients experience*, was meant to make up for the loss of interaction hospitalized children experience with their peers from home. The concept stimulated social involvement between two children who did not know each other: they interacted with each other via the prototype. Also, the concept allows children to leave behind a personal trace in the room, by changing something in the environment or by making a creation on the wall. This can also be seen as a social interaction, albeit more indirect, between children in the Waterval.

Table of contents

Reading guide

Glossary

WKZ	Wilhelmina Children's hospital (in Dutch: Wilhelmina Kinderziekenhuis)
MPZ	Medical pedagogic mentors (in Dutch: medisch pedagogische zorg)

Chapters

A new chapter can be recognized by the green page shown below

Introductions

Each chapter and subchapter starts with an introduction, which can be recognised by *an italic font.*

Important statements

Important statements, like for example the design goal, are written in a

larger blue font, like this.

Summary

Each chapter is closed with a summary, as shown below.

1

Introduction to the project

This chapter introduces the project assignment and the context of the project: the Wilhelmina Children's hospital (Wilhelmina Kinderziekenhuis, WKZ) in Utrecht. It also describes the methods used throughout the project and acknowledges the people who participated in the research and design evaluation.

1.1 Introduction

Yearly, roughly 350.000 child hospitalizations take place in the Netherlands, of which about a third consists of those of newborn babies (Volksgezondheidenzorg.info, 2021). Also, statistics show that 27% of Dutch children had a chronic disease in 2019. These chronic illnesses vary from frequently occurring diagnoses like asthma to rare and progressive diseases. However, the life expectancy for children who suffer from a chronic illness continues to increase considerably. This results in a focus on long-term effects of disease and the quality of life for diagnosed children (Van de Putte, E. M., & Van der Ent, C. K., 2019).

The context of this graduation project lies within the exploration and facilitation of the wellbeing of patients and their family in a hospital environment. Wellbeing is a broad term, but generally defined as the quality of life, which is improved when someone can fulfill personal and social goals (Statham, J., & Chase, E., 2010).

The project is initiated by the Wilhelmina Children's hospital in Utrecht. The hospital facilitates medical care for children (except for oncology, which is treated in a separate healthcare facility) and newborn babies and their parents. The pediatric hospital generally has a relaxed and playful ambiance on the one hand, but still remains a place where children's illness is present, which is obviously a sad reality. Patients endure distressing experiences because of medical procedures or by staying in a strange environment. Parents experience fear, worry and a a lack of control over the situation. Altogether, these situations can result in significant amounts of stress within a family, which can endanger positive family relationships (Massimi, M., Dimond, J. P., & Le Dantec, C. A., 2012). The Wilhelmina Children's hospital therefore wants to enable patients and their family to experience relaxation and distraction in the hospital environment. In this context I went a step further: I explored patient and family member wellbeing and designed concepts that contributed to wellbeing improvement in a hospital environment.

Initial project brief

The WKZ has a children's theatre, that is currently used to establish social interaction among patients and family members and distraction from hospitalization by means of organised activities for children. For this project, the WKZ initiated this project because they want to redesign the children's theatre. The new design should allow the room to be multifunctional for different activities, both related to children and other in-hospital use. Also, the hospital made the suggestion in advance of the project to include day care for patients' brothers and sisters to relieve parents of some stress when they have a conversation with the doctor of their hospitalized child. The space of the children's theatre was used as an opportunity to implement my research outcomes that can contribute to the wellbeing of patients and their family.

As the outcome of this project, I developed a vision of how the wellbeing of hospitalized children and their family can be facilitated in a hospital environment. This vision will serve as guidance for future designers in a similar context. I delivered a concept for the new children's theatre with this vision implemented in the design. The hospital follows themes for each floor of the hospital and the theme of the ground floor, where the children's theatre is located, is water. Therefore, the hospital has already established a name for the new children's theatre: Waterval. When talking about the *new design* of the children's theatre, I will therefore appoint it as the Waterval.

1.2 Being a patient in the WKZ

This subchapter gives insight into the routine and organisation for children and family members inside the hospital, apart from medical related activities.

The Wilhelmina Children's hospital in Utrecht is one of the eight pediatric hospitals in the Netherlands. The WKZ is part of the academic hospital UMC Utrecht, to which patients will make the transition after their eighteenth birthday.

The children's theatre, located inside the WKZ hospital is mainly meant to serve as a place of leisure and distraction from the hospital environment for hospitalized patients. The room contains theatre seats that can be extended from the wall and theatre curtains that can darken the place like an actual theatre. Once a week an activity takes place in the theatre, of which a bingo, an art session or a baking activity are occurring examples. In addition, the theatre is also used by hospital staff for workshops, staff drinks or other events. Figures 1 and 2 show the current design of the children's theatre.
Popular activities in the children's theater reach a relatively high attendance (around twenty children), whereas other events have an attendance of only a couple of patients. The children are made aware of the weekly activity by medical pedagogic mentors (MPZ) and posters throughout the hospital.

The MPZ serve as companions for patients and their family throughout hospitalization, being there as support during medical procedures and accompanying patients inside the hospital. Hospitalized patients are not allowed to move independently inside the building, so they are always accompanied by their parents or the MPZ.
Parents have the opportunity to be continuously present during the hospitalization of their child. Some hospital rooms have an extra bed, so a parent can stay with the child. Otherwise, parents have the opportunity to stay and sleep in the Ronald McDonald house, which is close to the hospital. During the day, the Ronald McDonald living room, which is located inside the WKZ, can be used to relax or wait during medical procedures. The living room has a comfortable and homely ambiance, with the aim of offering parents the opportunity to get out of the hospital environment for a while.

Figure 1:
Children's theatre

Figure 2:
Children's theatre

1.3 Approach of the project

In this subchapter, I will discuss the approach of the project for the Wilhelmina's Children's hospital. The method used throughout the entire project is the Double Diamond method (Council, D., 2007), shown in figure 3. Here, I describe my research and design activities during each of the phases of the Double Diamond.

Discover
During the first phase, *Discover*, I did research to narrow down the concept of wellbeing in a pediatric hospital by means of a literature research focused on children. The outcomes of this literature were used as a starting point for the generative research sessions I designed and coordinated in the Wilhelmina Children's hospital with patients, staff and parents. In this research, I aimed to acquire qualitative data from many different groups of people in the hospital: children who where present at an activity in the children's theatre, parents with a hospitalized child, staff of the MPZ and members of the children's council, which is a group of fourteen (ex-)patients, aged 10 to 21, who represent the patients of the WKZ. Throughout the project, the children's council played the role of an informant (Druin, A., 2002), with multiple touch points and input sessions.

Define
In the *Define* phase, I used the gathered insights from the previous phase to formulate a problem statement, design goal and directions, interaction vision and a first version of the *Vision for future designers*. This vision is reevaluated after the testing sessions in phase four, *Deliver*.

Develop
In the *Develop* phase, I used the design directions as a starting point for concept ideation. Also, I organised a second session with the children's council, focused on idea generation based on the phrased design directions. The development phase includes physical prototype tests with children in the WKZ and online concept evaluation with

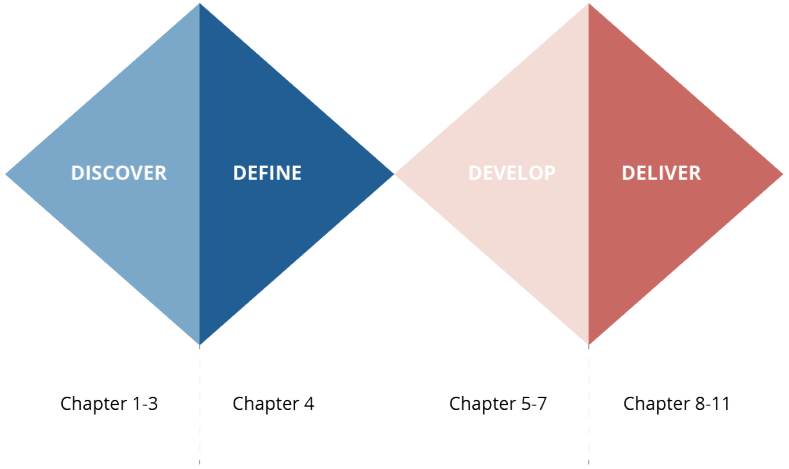


Figure 3: Double Diamond in this project

the members of the children's council. The testing sessions were all prepared with a detailed testing plan, including research questions, setup preparation and a list of questions to ask. However, I experienced that testing with children does not always go as planned and therefore I took an adaptable approach. I still continued to prepare the tests in the same detailed way, because this also helped me to already envision certain scenarios that could happen.

Deliver
In Chapter 8, I propose a final concept design, which is tested with an extensive physical test in the WKZ. The test insights result in final alterations of the concept and the finalization of the Vision for future designers that I set up in the Define phase. Lastly, I conclude the project by connecting the final test results to the research outcomes and pose recommendations for further development of the design.

SUMMARY

Chapter 1: Introduction to the project

The project is initiated by the WKZ in Utrecht as an assignment to redesign the activity room: the children's theatre. The room is used to organise weekly activities for children, coordinated by the MPZ, and other hospital related events. The WKZ wishes to keep the multifunctional aspects of the room, but also implement child day care into the space. The goal of my project is to explore the meaning of wellbeing in a pediatric hospital and use the room as an opportunity to facilitate design solutions according to these research results. A Vision for future designers who work in a similar context is part of the end result, aiming to guide designers into possible solutions areas. In this report I will refer to the redesigned room as the Waterval, because this is possibly the new name for the children's theatre. A Double Diamond approach was used throughout this project.

2

Wellbeing in literature

In preparation of the generative research to specifically explore the context at the Wilhelmina Children's hospital, a literature review was done on the meaning of wellbeing for children and how it can be improved for children and their family during child hospitalization.

2.1 What is the meaning of wellbeing?

Wellbeing is a broad term to which multiple definitions and factors of influence have been accustomed. Even though most people have a sense of the meaning of wellbeing, stating explicit components that affect the wellbeing of a person proves to be difficult. This chapter summarizes a literature research on wellbeing with a focus on child hospitalization.

In general, literature agrees that wellbeing is considered to be the quality of life, which is improved when someone can fulfill personal and social goals (Statham, J., & Chase, E., 2010). These goals can be reached through well-functioning of emotional, psychological and social capacities of a person (Gleason, T., & Narvaez, D., 2019). Wellbeing can be influenced by objective factors, like income or physical environment, and subjective factors, like happiness and life satisfaction (Statham, J., & Chase, E., 2010). Multiple organisations have listed domains for wellbeing in different ways, of which some concern children specifically and some are set up in a more general sense. UNICEF established a list of domains in research for childhood wellbeing in rich countries, which consisted of material wellbeing, educational wellbeing, family and peer relations, health and safety, behaviour and risks, housing and the physical environment, and subjective wellbeing (Adamson, P., Bradshaw, J., Hoelscher, P., & Richardson, D., 2007). Although the list of objective wellbeing domains is extensive in this case, the subjective wellbeing factors could be more elaborate. An Australian study developed a list of wellbeing domains from a children's perspective by working with children aged eight to fifteen years. This list conforms the objective domains mentioned before, but also includes subjective values: happiness and ability to deal with sadness, feeling autonomous, positive self image, and feeling valued (Fattore, T., Mason, J., & Watson, E., 2007). These subjective domains correspond with the idea that wellbeing includes an outward focus on society and morality, along with an inward focus on self-regulation. This 'sociomoral' perspective and ability to self-regulate is influenced by childhood experiences. Among these experiences is free play, which allows children to imagine the structure of play, so they can learn to self-direct, and explore social relations with peers (Gleason, T., & Narvaez, D., 2019). Free play is also one of the components in Boon's Playscapes framework, which "supports designers to turn children's environments into landscapes for physical activity and play". In this framework, three elements are given considering the implementation of free play in such an environment: loose elements, landscape elements and animate elements (Boon, M. J. B., 2020). Boon did case studies in a children's hospital in the Netherlands, which makes results of free play elements highly relevant for my project in the Wilhelmina Children's hospital.

The assignment of my project is focused on the establishment and improvement of the wellbeing of patients and their close family. It is therefore a useful insight that there is a close association between childhood wellbeing and positive family relationships (Statham, J., & Chase, E., 2010). This association is worth studying during context exploration and during co-design. However, these positive family relationship are endangered by upsetting events, such as children's illness, as this can alter everyday routine of a family and put pressure on the relationships among them (Massimi, M., Dimond, J. P., & Le Dantec, C. A., 2012). Patrizia D'Olivo et al. state design opportunities to establish and maintain positive relationships during childhood illness. These opportunities are based on different social themes, of which the level of the self and that of family show most potential to design for a short term solution. The three design opportunities stated are (1) that the design initiative should stimulate positive thinking, (2) that communication can establish bonding and understanding of others through interactive design and (3) that simple everyday interactions and rituals should be encouraged and shared among the family due to the design (D'Olivo, P., Rozendaal, M. C., Giaccardi, E., Grootenhuis, M. A., & Huisman, J., 2018).

SUMMARY

Chapter 2: Wellbeing in literature

Wellbeing can be improved by many factors, both objective and subjective. However, some factors are especially relevant in a hospital context, considering that they are disrupted because of hospitalization. Firstly, the wellbeing definition by Stathem and Chase mentions the fulfillment of social goals, but upsetting events like child sickness can endanger positive family relationships. Furthermore, multiple sources that list domains of wellbeing mention the physical (home) environment, which is of course far away during hospitalization. The work of Boon is focused on the physical environment of a hospital in connection with physical wellbeing. Lastly, the relation between self-regulation and childhood wellbeing is indicated, which is endangered by the disruption of daily routine and activities during hospitalization. These three factors - social relationships, physical environment and daily routine or activities - were used as a base point to set up the generative research sessions, in order to further explore their effect on wellbeing.

3

Exploring wellbeing in the Wilhelmina Children's hospital

The research in the Wilhelmina children's hospital was aimed to acquire insight in the research question: which aspects influence the wellbeing of patients and family members during child hospitalization? In response to the literature studies, the focus lies on the following factors during this phase of the project: social relationships, the physical environment and daily routine or activities. Several generative research sessions were organised with the aim to acquire latent knowledge about the feelings and experiences of patients and their family inside the hospital. This chapter also describes the analysis of the research outcomes, which leads to the constitution of problem areas.

3.1 Research context

This subchapter describes which stakeholders are involved in this project. Also, it gives an overview of the different contact points I had during my research activities.

Stakeholders

The main stakeholders during this context exploration phase are the users of the children's theatre: the patients and their close relatives. Figure 4 shows a stakeholder map of users and facilitators inside the children's theatre. Even though all stakeholders are involved in this project, this context exploration is done to explore the meaning of wellbeing for the main target group. Therefore, the focus is put on the patients and family members during the following research.

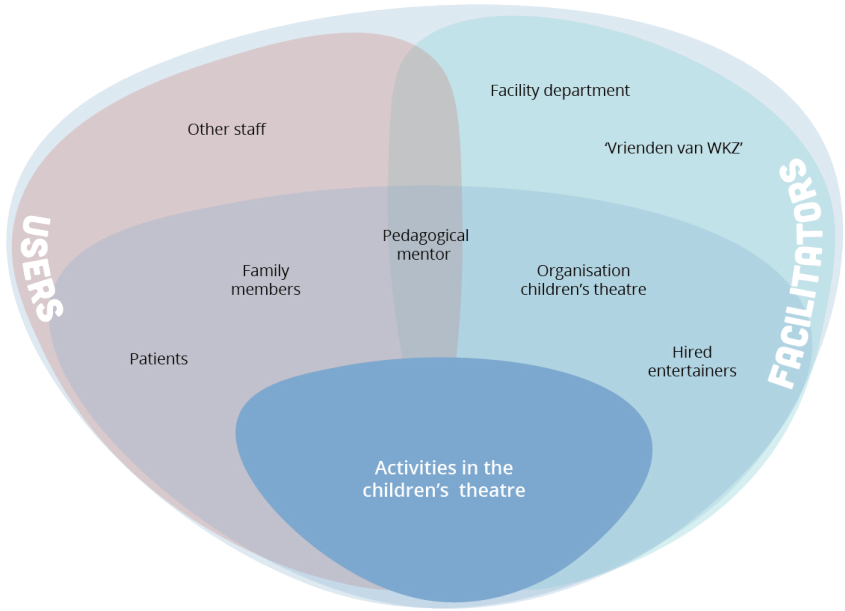


Figure 4: Stakeholder map

Contact points in the WKZ

To gain an overview of different people relevant for my research and their reachability within the hospital, I set up a contact point map (figure 5).
Inside the hospital, there is a distinction between hospitalized children who are physically capable to go to activities in the children's theatre, which gives me the opportunity to reach them during these activities, and patients who can not physically move in the hospital. These children have to stay in their room or on their department, making it hard for me to reach them. I approached members of the MPZ as in-between persons, as they are personally involved with the patients. Their insights in and empathy for patients' situations were used to get deeper into patient's experience. Besides the currently hospitalized children, insights were gathered from children of the children's council. This is a group of children who currently are or have formerly been patient in the WKZ. Many of the members have been frequent visitors of the hospital for many years and are experienced with the environment, staff and procedures of the WKZ. Lastly, the parents of hospitalized children were contacted in the Ronald McDonald living room inside the WKZ.

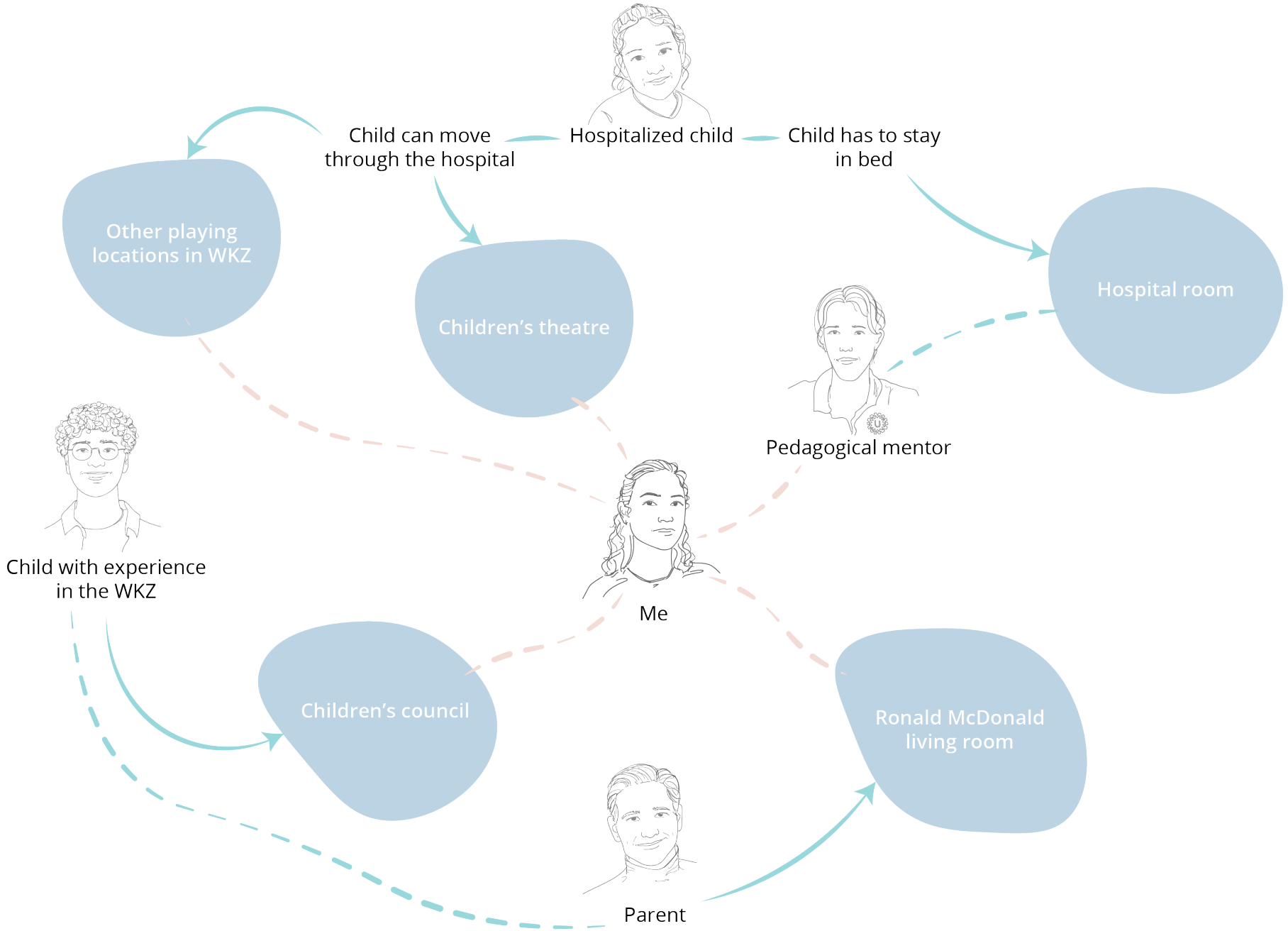


Figure 5: Contact points in the WKZ

3.2 Research activities in the WKZ

According to the different contact points available in the hospital as described in subchapter 3.1: Research context, I set up and coordinated generative sessions with various groups of people in the hospital. The sessions were designed for each of the groups separately, considering the way in which I would be able to gather the most valuable results. This section describes the research questions and methods for each of the sessions. For the sessions with children in the children's theatre this subchapter also describes the results, because I conducted two sessions where the results of the first session influenced the setup of the second.

3.2.1 Research with patients in the children's theatre

Research question

The research with children present at activities in the children's theatre is shaped to answer the following research question:

What is the difference between the situation at home and the situation in the hospital regarding social interactions, daily activities and the physical environment?

Method of the first exercise

The research consisted of two parts and was divided over two days, both during an activity in the children's theatre. Each time, children were asked to make a drawing according to given guidelines. During the first exercise, the children were asked to draw themselves in a pleasant place. They were also asked to illustrate where this place was, with who they would be there and what they would be doing. The goal of this exercise was to get a view of a pleasant situation and compare this to their hospitalization. To gain insight in this comparison, I asked the children questions about their drawing during and after the exercise (why are you drawing this? What is pleasant about this place?).

Results of the first exercise

During the drawing session, seven children made an illustration of a place that is pleasant for them, of which an example can be found in figure 6. The results show that the majority of the participants include family members and a home environment in their drawing. An intriguing result is that two children suggested that they desire a private space in the hospital. One of the participants mentioned that she often feels the urge to retreat to her own room, which is not possible inside the hospital. Another child wanted a quiet and personal place to do the drawing exercise. This was difficult in the children's theatre, resulting in the patient waiting for all children to leave after the activity, so she would be alone in the room. An overview of the results can be found in Appendix 13.1.

It is also interesting to see that there was almost no interaction between the children during the activity (baking Easter bread), with an exception for two children who follow a ten-day continence program and are constantly together during this therapy. All remaining children are accompanied by their parent or a medical pedagogic mentor and the interaction during the activity is almost only between the patient and their companion.

Method of the second exercise

The insight that patients look for a private and personal space in the hospital grabbed my attention, making me wonder what makes a space one's own. In a normal home situation, children would have their own bedroom as their personal space. A hospital room, with medical devices, hospital staff walking in and out and sterile looking furniture, can hardly compare to this. Therefore, I set up a second drawing assignment, which I conducted a week after the first during an activity in the children's theatre. Patients were asked to draw their own room at home and indicate their favorite part of their room (figure 7). During and after the exercise I asked the children why they appointed this as their favorite spot, aiming to discover elements that contribute to making a space personal and private.

Results of the second exercise

Only a few patients visited the children's theatre during this activity and therefore only three patients participated in my drawing exercise. However, these three patients were all part of the continence program and therefore more socially involved with each other. This resulted in a more lively conversation about their illustrations. Their explanation about what makes their favorite place a favorite place resulted in some characteristics of elements that contribute to making a room one's own: control over arrangement, comfort, habitual behaviour, personal artifacts and an expression of interests. Implementation of these elements could also benefit the creation of a personal and private place inside a hospital. An overview of the results can be found in Appendix 13.2.

Figure 6: Drawing from the first session

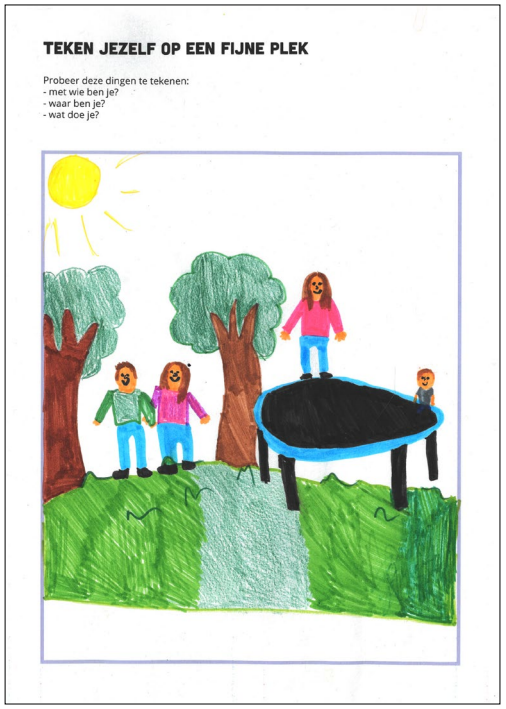
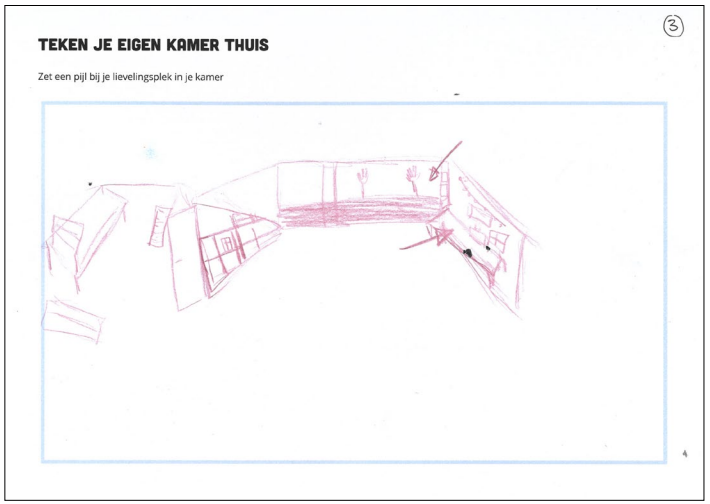


Figure 7: Drawing from the second session



3.2.2 Research with parents in the Ronald McDonald room

Research question

The research with parents in the Ronald McDonald is shaped to answer the following research question:

What is the difference between the situation at home and the situation in the hospital regarding social interactions, daily activities and the physical environment?

Method

The Ronald McDonald living room serves as a place for parents or other family members to relax during their child's hospitalization, for example when they are waiting for their child to finish a medical procedure or when the child is not allowed to receive visitors. No medical staff is present inside the living room; the room is meant to be a place to get out of the hospital environment. I approached parents in the living room with the question if they wanted to participate in my research. All approached parents, four in total, agreed to take part in my research. The participants were given two timeline templates, one of a situation at home and one of a situation in the hospital (figure 8 and 9 on page 22). I asked the participants to visualise a timeline of their day in both situations, indicating time, location, activity and interaction with others at that moment. Next, I asked them to highlight pleasant moments on both timelines with green and unpleasant ones with red. By asking why the moments were experienced in a pleasant or unpleasant way, I aimed to acquire insight about the difference of the two situations concerning social interactions, daily activities and physical environment. During my conversation with the participants, I took notes of their statements. Afterwards, I made paraphrases of all these statements, describing the interpretation of the quote in my own words (Stappers, P. J., 2012). The same paraphrasing method was used for the research with medical pedagogic mentors and members of the children's council. All paraphrases were combined and clustered into themes, of which the analysis and outcome will be discussed in subchapter 3.3: Research results and analysis.

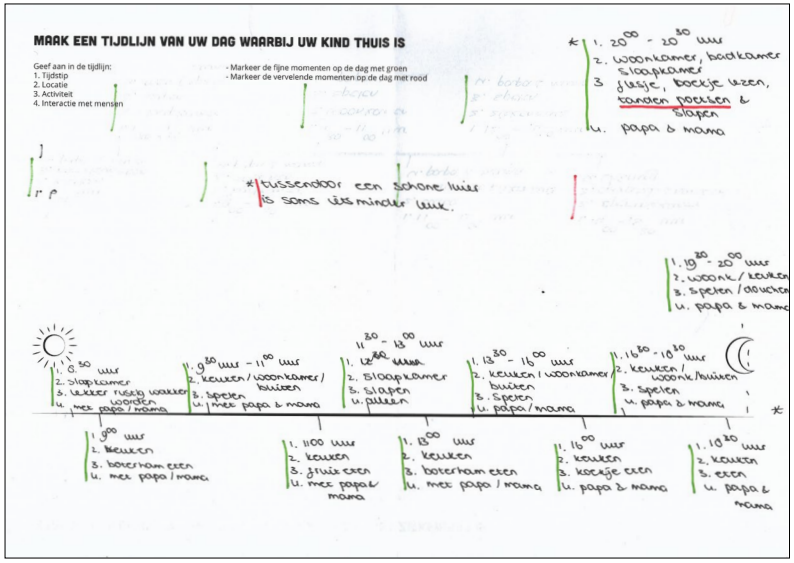


Figure 8: Timeline exercise home situation

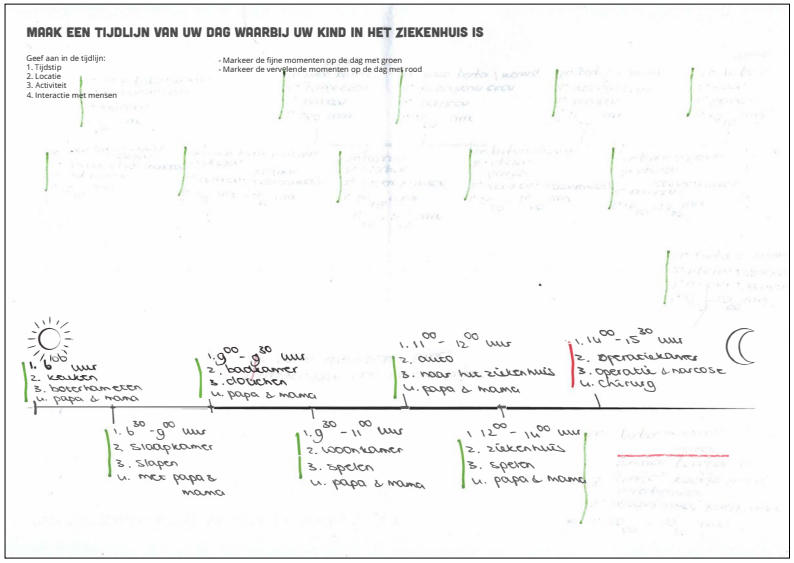


Figure 9: Timeline exercise hospital situation

3.2.3 Research with medical pedagogic mentors

The goal of the session with the MPZ was to acquire knowledge of the hospital experiences of the less reachable patients, because of more severe illness or constrained movability in the hospital. The MPZ is almost constantly present during children's hospitalization, supporting and accompanying them. Therefore, I expected to be able to acquire useful insights about patient experience and feelings from the MPZ.

Research question

The research with medical pedagogic mentors who work in the Wilhelmina Children's hospital is shaped to answer the following research questions:

1. **What does the daily routine of a patient in the Wilhelmina Children's hospital look like?**
2. **In what way do patients experience their hospitalization and how does it influence their daily life?**

Method

The session consisted of two exercises: a timeline exercise of a patient's daily activities and a persona exercise of a patient. The timeline exercise (figure 10) was shaped to answer the first research question and the persona (figure 11) to answer the second. Five medical pedagogic mentors participated in this exercise and the session started with an ice-breaker where each participant spoke about the thing that they appreciated most about their work. Next, all were asked to envision a patient in the hospital, whose identity stayed anonymous, and use this participant to complete both exercises. After completing the second exercise, I asked all participants to present their persona to the group and I asked them questions concerning the experiences, personality and

motivations of their persona. The entire session of 45 minutes was audio recorded and transcribed into a text document afterwards. I highlighted interesting quotes in this transcription, of which I made paraphrases. The same paraphrasing method was used for the research with parents and members of the children's council. All paraphrases were combined and clustered into themes, of which the analysis and outcome will be discussed in subchapter 3.3: Research results and analysis.

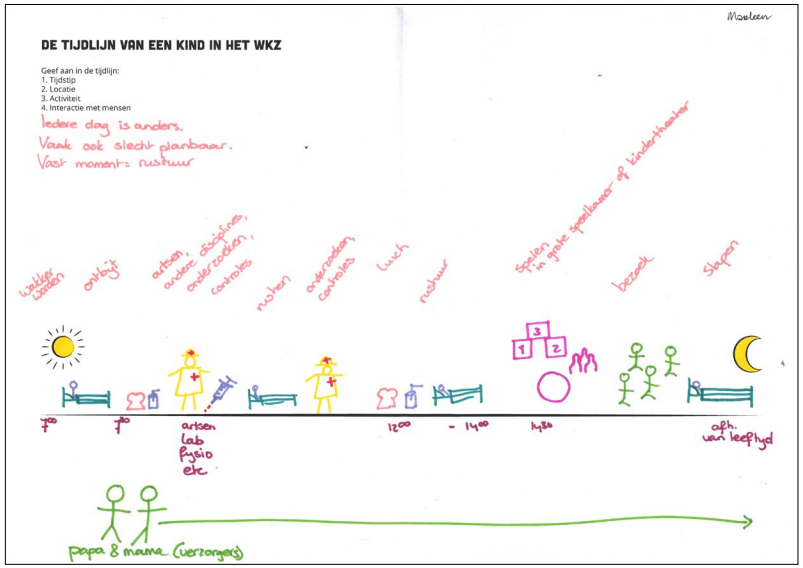


Figure 10: Timeline daily hospital routine

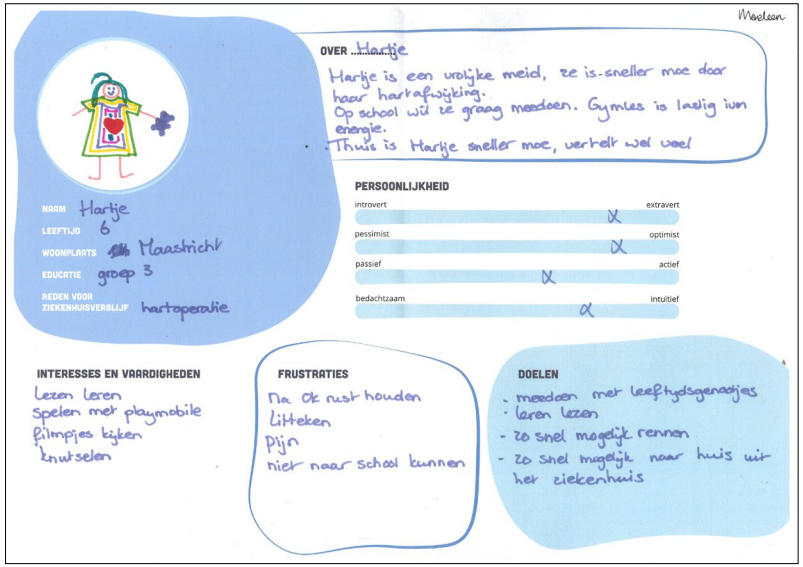


Figure 11: Persona of a patient

3.2.4 Research with members of the children's council

For this exercise, seven fundamental needs are chosen from the thirteen fundamental needs published by Desmet and Fokkinga (2020). According to their publication, everyone has the same set of psychological needs that contribute to long-term wellbeing. A list of the fundamental needs can be found in Appendix 13.3. The seven specific fundamental needs were selected because they assumably are most influenced by hospitalization. My hypothesis is that they are influenced because of the difference in social relationships, physical environment and routine during a stay in the hospital. By having members of the children's council rate the fundamental needs in two situations (being hospitalized and not being hospitalized) I want to find out in what measure the satisfaction of the needs differs. Next, I want to understand why this difference is present or absent.

Research question

The research with patients who are a member of the children's council is shaped to answer the following research questions:

In what way are the seven chosen fundamental needs influenced by a hospitalization in comparison to a home situation?

Method

In preparation of the children's council meeting, which took place via Microsoft Teams, I prepared an online interactive board in Miro in which the seven fundamental needs were listed in two situations: during hospitalization and at home. After explaining the meaning of each fundamental need to the participants in a presentation, I asked them to rate the fulfillment of each need for both situations (figure 12). During and after the exercise, I started a discussion about the differences that became visible between the two situations by asking questions about the way the participants rated the fundamental needs. The entire session was audio recorded and transcribed into a text document afterwards. I highlighted interesting quotes in this transcription, of which I made paraphrases. The same paraphrasing method was used for the research with parents and medical pedagogic mentors. All paraphrases were combined and clustered into themes, of which the analysis and outcome will be discussed in subchapter 3.3: Research results and analysis.

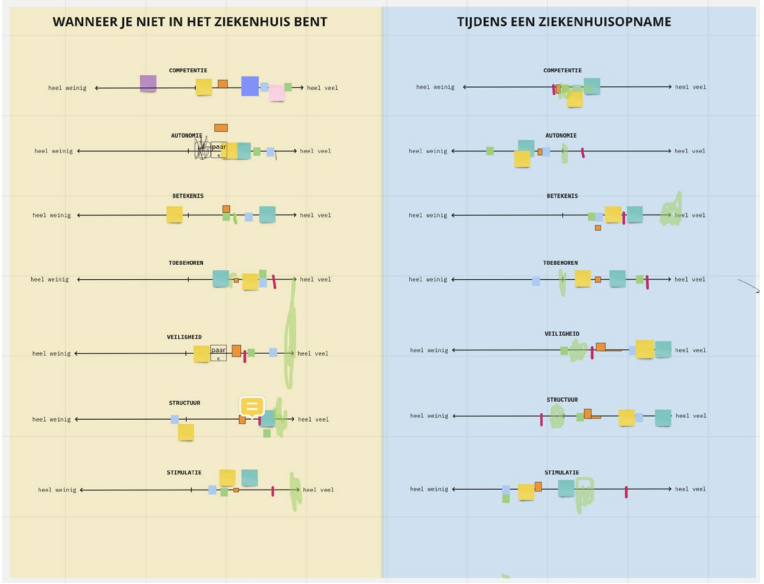


Figure 12: Filled out board from the children's council meeting

3.3 Research results and analysis

This part gives a short conclusion of the research in the children's theatre. It gives a description of the analysis and insights derived from the research with the parents, MPZ and the children's council.

Outcome of the drawing exercises in the children's theatre

As described in the previous chapter, the main insights derived from the drawing exercises in the children's theatre are that children often relate family and their home environment to a pleasant place and that patients look for a private and personal place inside the hospital. Aspects that contribute to the establishment of such a place are control over arrangement, comfort, habitual behaviour, personal artifacts and an expression of interests.

Outcome of the transcription and clustering

The results from the generative sessions with parents, MPZ and the children's council, are paraphrases of quotes from participants during these sessions. The entire list of paraphrases can be found in Appendix 13.4. All these paraphrases were combined in a document and clustered into eight themes: parent/child interaction, disturbing routine, hospital relations, interaction with peers, control, hospital procedures, hospital environment and attitude over time.

Next, these themes were defined in the visual in figure 13. Each area is depicted with some key elements that describe the content of the problem.

I decided to further develop and describe the area of control and social relationships during hospitalization. In the next chapter, I will define the relations between these areas as a problem statement, in which the main focus will be the perception of control and social support from peers patients have during hospitalization.

SUMMARY

Chapter 3: Exploring wellbeing in the Wilhelmina Children's hospital

I conducted context research activities with four different target groups in the WKZ: children in the children's theatre, parents in the Ronald McDonald living room, the MPZ and the members of the children's council. For each of these groups, I designed and coordinated a session. The results of the exercises in the children's theatre were analysed separately, generating the insights that children often relate family and their home environment to a pleasant place and that patients look for a private and personal place inside the hospital. The remaining sessions were analysed by paraphrasing statements from the participants and clustering these paraphrases into themes. These themes represent problem areas patients and family members experience that negatively influence their wellbeing. The problem areas are visualised and shortly described in figure 13.

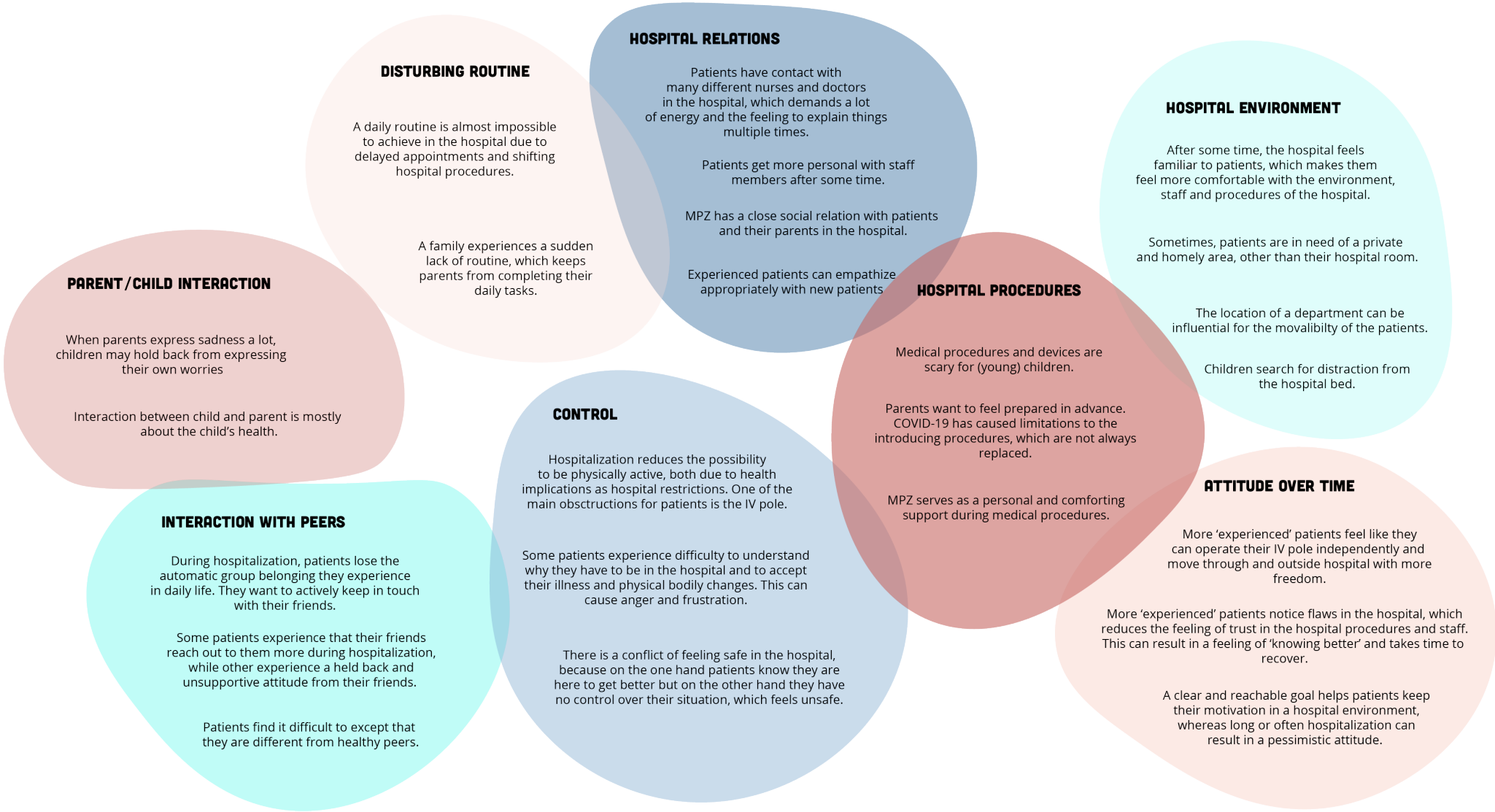


Figure 13: Problem themes in the WKZ

4

The project design brief

This chapter defines the design brief, consisting of a problem statement, an interaction vision, a design goal, and a first version of the Vision for future designers who work in a similar context. The design brief is established based on the insights gathered from the literature study and research sessions in the hospital.

4.1 Problem statement

The problem statement is derived from the problem areas with which I concluded my research activities described in Chapter 3: Exploring wellbeing in the Wilhelmina Children's hospital. I compared these problem areas to the main insights from the literature study and chose focus points that were translated into the problem statement. In this subchapter, the complete problem statement is posed, after which the separate elements are explained in more detail.

Patients in a pediatric hospital *want to feel more independent, search for a private and personal place in the hospital, need trust in and familiarity with the hospital to feel safe during hospitalization* and *want freedom to move inside the hospital* in order to **feel in control over their body, environment and the daily occurrences and activities in their lives**. Also, **patients want to be understood by, supported by and involved in the group of peers they identify themselves with**. These social relationships enhance the feeling of the patient's personal control. Both a sense of personal control and positive social relationships with peers will contribute to the mental wellbeing of hospitalized patients.

4.1.1 Feeling in control over the body, environment and daily occurrences and activities in life

The influential facets of personal control over the body, environment and activities are further explained below.

Patients want to feel more independent
Children who have been hospitalized often acquire significant experience with the hospital procedures, staff and devices. This establishes the feeling that they are sufficiently informed to make more decisions for themselves, but they are restricted by hospital policy and rules.
Also, parents are almost continuously present for hospitalized children. The need that patients feel to have their parents with them differs, depending on age and longitude of sickness. For example, a patient who undergoes a one-time operation is likely to appreciate constant care from his or her parents, whereas a patient with a chronic disease might feel strangled by his or her parents when they are constantly present during hospitalization.

Patients search for a private and personal place in the hospital
Inside the Wilhelmina Children's hospital, it is complicated for patients to find a private place that feels personal, homely and comfortable. Patients' own hospital room hardly meets these wishes, because it does not allow patients to escape the hospital surroundings, which seems to be an important requirement of a private personal place. The private place can be compared with a child's room at home and factors that make a room one's own are: control over arrangement, expression of interests, comfort, personal artifacts and habitual behaviour. When a space can offer these factors, it is likely to feel as a private personal place.

Patients need trust in and familiarity with the hospital to feel safe during hospitalization

Patients experience conflicting feelings of safety during hospitalization
Patients experience conflicting feelings of safety during hospitalization over time. On the one hand, coming to a hospital for the first time feels scary for children because they are overwhelmed by the unfamiliarity of the environment and their inexperience with the staff and procedures. This evokes an unsafe feeling. On the other hand, patients come to the hospital with a basis of trust, knowing that they are there to overcome their sickness. This strengthens the feeling of being safe. Over time, this ratio shifts the other way around. The hospital itself becomes more familiar and patients get used to the procedures and staff in the hospital. However, patients become more aware of flaws that are sometimes present in a hospital and start developing a stronger opinion about their own treatment. When they feel like something goes wrong or notice a mistake, this breaks the trust they have for the hospital staff and procedures. It will take more and more time to restore this trust, depending on hospital experience and frequency of flaw occurrence. Also, experiencing safety has to do with autonomy of choices. Because a hospitalization is involuntary, the feasibility to feel safe is already complicated in itself.

Patients want freedom to move inside the hospital

Two aspects influence a restriction from physical activity during hospitalization. Firstly, hospitalized children are often physically not capable to be as active as they usually are, due to sickness. Secondly, hospital policy limits them to be physically active. A comprehensive example is the intravenous pole. Patients with an IV pole are not allowed to leave the hospital department unattended by a nurse or parent. When they want to go outside the hospital building, this is only allowed in company of a nurse. As nurses are usually occupied with other work, patients with an IV pole are severely limited in their freedom of movement.

4.1.2 Being understood by, supported by and involved in the group of peers patients identify themselves with

The fact that the patients' circumstances are so different from those of their peers outside the hospital has quite an impact on their wellbeing. Most children have no personal experience with hospitals and the upsetting effects this may have and are therefore not capable of properly empathising with a hospitalized friend. Patients can experience a gap, both physical, because they are physically away from their friends, and mental, because they feel like their friends do not properly understand their situation. In addition, patients can easily feel like an outsider when they feel like they are different than other children of their age.
Furthermore, patients have little interaction between each other inside the hospital. When children are put together in groups, like with the children's council or during the continence training, more profound interaction does come about. However, children are reluctant to interact with fellow patients without external stimulation.

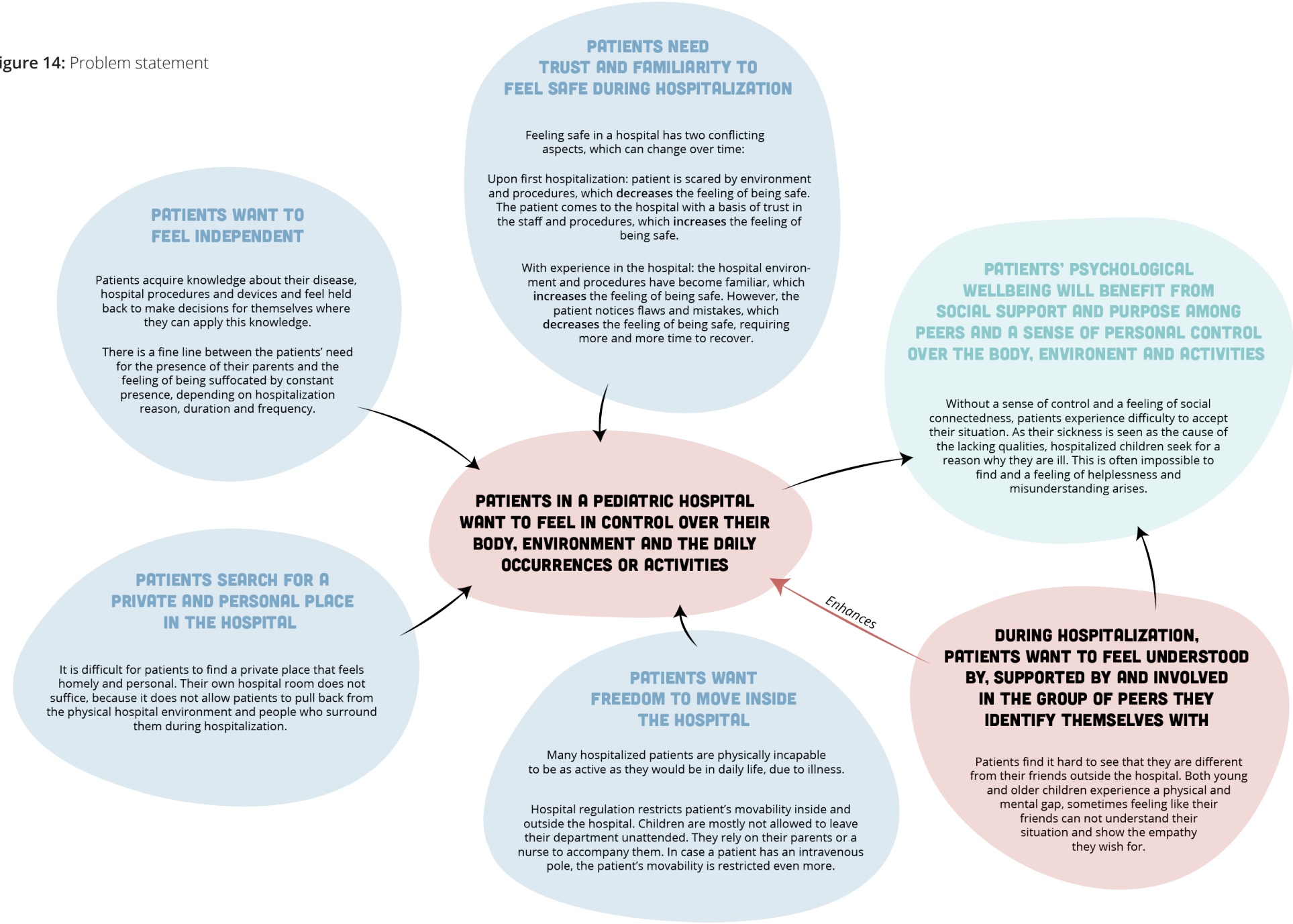
4.1.3 Personal control and social relations with peers influence patient's psychological wellbeing

According to the work of Carolyn H. Declerck, Christophe Boone and Bert de Brabander (2006), feeling in control is defined by a combination of personality measures that are socially advantageous, all related to psychological wellbeing and successful performance. Reed Larson (1989) argues that feeling in control is related to happiness in daily life. The results of his research show that within the range of normal daily life, feeling in control, both of own actions as of the situation, does not have a strong reaction to the general state of wellbeing. However, among disturbed individuals, for example people with an anorexic disorder, subjective control is strongly related with happiness. He states that it is expected that people who go through a stressful period, such as

patients and their family members in a hospital context, will show the same relation. Both these publications suggest that the sense of being in control contributes to the improvement of a person's wellbeing in disturbing situations, such as child hospitalization.
Concerning social relationships that patients have and experience with peers from outside the hospital, literature confirms that social support has a positive influence on mental health (Cohen, S., 2004; Uchino, B. N., 2008). Additionally, happiness is defined as experiences of pleasure and purpose over time. Purpose portrays a social value: meaning something for someone else (Dolan, P., 2014). Mental wellbeing therefore benefits from both social support and purpose, along with personal control. This means that the one can also substitute for the other when one is lacking. Additionally, substantial social support also enhances the sense of personal control (Mirowsky. J. & Ross, C. E., 2003).
The literature describes broad terms: social support, purpose and personal control. With my research in the Wilhelmina Children's hospital I defined these more explicitly, resulting in the definition as written in the problem statement.

The problem statement is visualised in figure 14 on page 31.

Figure 14: Problem statement



4.2 Interaction vision

In order to envision the desired character of interactions that should be present in my design, I selected a metaphor that carries these interaction qualities (Pasman, G., Boess, S., & Desmet, P., 2011). This way, I can better understand the experience my design should facilitate.

This is the interaction vision for my concept design:

The interaction with my concept should be like playing a LARPing game with a group of people.

About LARPing

Larping stands for live action role playing, a game where a group of people participate in a role-playing game. Usually, the game starts with a couple of directions, after which the storyline will develop by improvisation of the players. People participating in a LARPing game make up a character themselves. Usually, a player writes background information about his or her character, describing personality traits, demographic background and skills. During the game, all players act according to their character.

Describing the interactions

The player has chosen his character with care. He or she does so in response to what the game directions facilitate and stimulate, applying these in line with his own interests and appeal. The game regulation is set by the players themselves in cooperation with each other.
During a LARPing game, a player is located in the alternative environment he chose. He is completely engaged in the act and his environment during the role-play and responds to the actions of others around him. The game gives him the opportunity to gain success according to his skills. He is defined by his character and not by anything else.
The reality of his normal life finds itself on the background and the player experiences a full absorption in the process; he becomes his character.
LARPing also comes with a certain aspect of preparation and run-up: making a costume, designing a character and setting up play rules.

Figure 15: Interaction vision

4.3 Design goal and design directions

According to the findings from the research and the formulation of the problem statement and interaction vision, I phrased a design goal and design directions. They serve as a starting point for concept development.

My design goal is to give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital, which will be enhanced by stimulation of social involvement among patients within the hospital.

Design goal

When comparing the design goal to the problem statement as visualised in figure 14 on page 31, there are some differences that require clarification. Firstly, the problem statement says that patients in a pediatric hospital want to feel in control over their body, environment and daily occurrences or activities whereas the design goal only states the tools and empowerment to create control over their environment and autonomy over their activities in the hospital. Giving patients in a pediatric hospital the control over their physical body is impossible in this design project and therefore left out of this design goal. Also, the problem statement describes how patients experience difficulty to accept that they are away from their friends outside the hospital, feeling a physical and mental gap with them. However, the design goal is focused on stimulation of social involvement among patients within the hospital. The design can hardly take away the fact that a hospitalized child is physically distanced from the interactions he or she would effortlessly have when going to school or a sports club. Because the research in the hospital showed that patients currently have little interaction with each other during the activities, it is an interesting and challenging design goal to stimulate this social interaction among patients in the hospital. That way, new social involvement can replace some of the familiar social interaction the hospitalized children are missing.

Design directions

I phrased four design directions to serve as guidance for concept development.

1. Subjective control, meaning the control is not only factual but involves feelings, is strongly related with happiness for people who go through a stressful period (Larson, R., 1989). Patients in the WKZ are likely to belong to this group. For them, immediate control over their actions or the situation results in immediate feelings of happiness. Therefore, **the design should facilitate options that accommodate immediate control over children's actions or the situation.**

2. Patients look for a personal and private place in the hospital where they can pull back and feel comfortable. This place can be compared to a child's bedroom, which is characterised by personal artifacts, children's own arrangement of things, the possibility to express interests and hobbies, and comfort. To be able to offer patients a place of their own in the hospital, **the space should facilitate children's own contribution in the design and arrangement of elements, along with a choice to either look for company or pull back.**

3. I will use the three design opportunities to establish and maintain positive relations during childhood illness, as defined by Patrizia D'Olivo, as a starting point to stimulate social interaction. **The design should (1) foster positive thinking, (2) stimulate and facilitate communication, and (3) encourage people to share everyday interactions and rituals with others.**

1. A framework for positive design by Pieter Desmet and Anna Pohlmeyer includes three components: pleasure, personal significance and virtue. This can be used as a start or evaluation for positive design (Desmet, P. M., & Pohlmeyer, A. E., 2013).

2. Cooperative or competitive elements can provoke the communication among children and therefore contribute to the stimulation of social interaction.

3. One's home is a facilitating place to share everyday interactions and rituals. Therefore, a homely environment might stimulate this behaviour.

4. Being hospitalized causes feelings of unfamiliarity and restrictions compared to normal childhood. These effects are difficult to overcome, but both have to do with sick children being defined as patients instead of the child they are beside being a patient. Taking children away from the hospital environment can temporarily decrease these negative effects of hospitalization.
The design should therefore allow patients to let go of the characterization of them being a patient. Instead, they are defined as a child by their skills, personality, and hobbies. A certain form of preparation is an opportunity to already evoke this experience before or upon entry in the designed space.

4.4 Vision for future designers

After the establishment of the problem statement and the design goal, I combined both to create the first version of the Vision for future designers. This vision summarizes the main findings from my research as possible areas for improvement and aims to give future designers direction into solution areas.

The problem statement and design directions are visualised as a design guidance tool for future designers who are working in the context of facilitating wellbeing in a pediatric hospital in figure 16. The vision is meant to serve as a starting point to design in this context. The opportunities for the improvement of patient wellbeing are derived from the problem statement, visualised with the light blue background in the figure. A design direction is connected to each opportunity. In the evaluation of my final design, I will put this vision to the test once more to assess whether they are sufficiently contributing to reach the design goal, or if they require alteration. The guidelines are thus based on the research outcomes and will be reevaluated according to results and insights from my final concept design testing.

SUMMARY

Chapter 4: The project brief

The design brief consists of the problem statement, the interaction vision, the design goal and directions, and the *Vision for future designers*. The problem statement describes design possibilities regarding the control patients have over their body, environment and activities. It also describes possibilities regarding patient's desire for social interaction with their peers from home.
The interaction vision is about LARPing and describes interaction qualities such as choosing your own character, being in an environment of choice, reality being on the background, and being defined by your skills. These are all qualities that would be valuable in the context of this project.
The design goal is to give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital, which will be enhanced by stimulation of social involvement among patients within the hospital. Compared to the problem statement, the design goal has made the shift towards social involvement within the hospital instead of with peers from outside the hospital, because the social involvement inside the hospital can be considerably improved and replace part of the missing social interaction children would have at home. With the design goal, four directions are set up to guide the concept development process. The *Vision for future designers* is visualised in figure 16 and consists of the problem statement, as opportunities to improve patient wellbeing, and the design directions, as suggestions for possible solutions areas.

BEING A PATIENT IS NOT THE MAIN FOCUS

Being hospitalized causes feelings of unfamiliarity and restrictions compared to usual childhood. These effects are difficult to overcome, but both have to do with sick children being defined as patients instead of the child they are besides the sickness. Taking children away from the hospital environment can temporarily decrease these negative effects of hospitalization. The design should therefore allow patients to let go of the characterisation of them being a patient. Instead, **they are defined as a child by their skills, personality, and hobbies. A certain form of preparation is an opportunity to already evoke this experience before or upon entry in the designed space.**

PATIENTS NEED TRUST AND FAMILIARITY FEEL SAFE DURING HOSPITALI

Feeling safe in a hospital has two confl aspects, which can change over tim

Upon first hospitalization: patient is scared by and procedures, which **decreases** the feeling The patient comes to the hospital with a bas the staff and procedures, which **increases** t being safe.

With experience in the hospital: the hos ment and procedures have become fa **increases** the feeling of being safe. H patient notices flaws and mistake **decreases** the feeling of being safe, more and more time to reco

PATIENTS WANT FREEDOM TO MOVE INSIDE THE HOSPITAL

Many hospitalized patients are physically incapable to be as active as they would be in daily life, due to illness.

Hospital regulation restricts patient's movability inside and outside the hospital. Children are mostly not allowed to leave their department unattended. They rely on their parents or a nurse to accompany them. In case a patient has an intravenous pole, the patient's movability is restricted even more.

FACILITATION OF A PERSONAL PLACE FOR PATIENTS

Patients look for a personal and private place in the hospital where they can pull back and feel comfortable. This place can be compared to a child's bedroom, which is characterized by personal artifacts, children's own arrangement of things, the possibility to express interests and hobbies, and comfort. To be able to offer patients a place of their own in the hospital, **the space should facilitate children's own contribution in the design and arrangement of elements, along with a choice to either look for company or pull back.**

PATIENTS SEARCH FOR A PRIVATE AND PERSONAL PLACE IN THE HOSPITAL

It is difficult for patients to find a private place that feels homely and personal. Their own hospital room does not suffice, because it does not allow patients to pull back from the physical hospital environment and people who surround them during hospitalization.

PATIENTS IN A PEDIATRIC HOSPIT WANT TO FEEL IN CONTROL OVER T BODY, ENVIRONMENT AND THE DA OCCURRENCES OR ACTIVITIES

PATIENTS WANT TO FEEL INDEPENDENT

Patients acquire knowledge about their hospital procedures and devices and fe back to make decisions for themselves they can apply this knowledge.

There is a fine line between the patient for the presence of their parents and feeling of being suffocated by const presence, depending on hospitaliza reason, duration and frequency.

GIVING PATIENTS IMMEDIATE CONTROL

Subjective control, meaning the control is not only factual but involves feelings, is strongly related with happiness for people who go through a stressful period. Patients in the WKZ are likely to belong to this group. For them, immediate control over their actions or the situation results in immediate feelings of happiness. Therefore, **the design should facilitate options that accommodate immediate control over children's actions or the situation.**

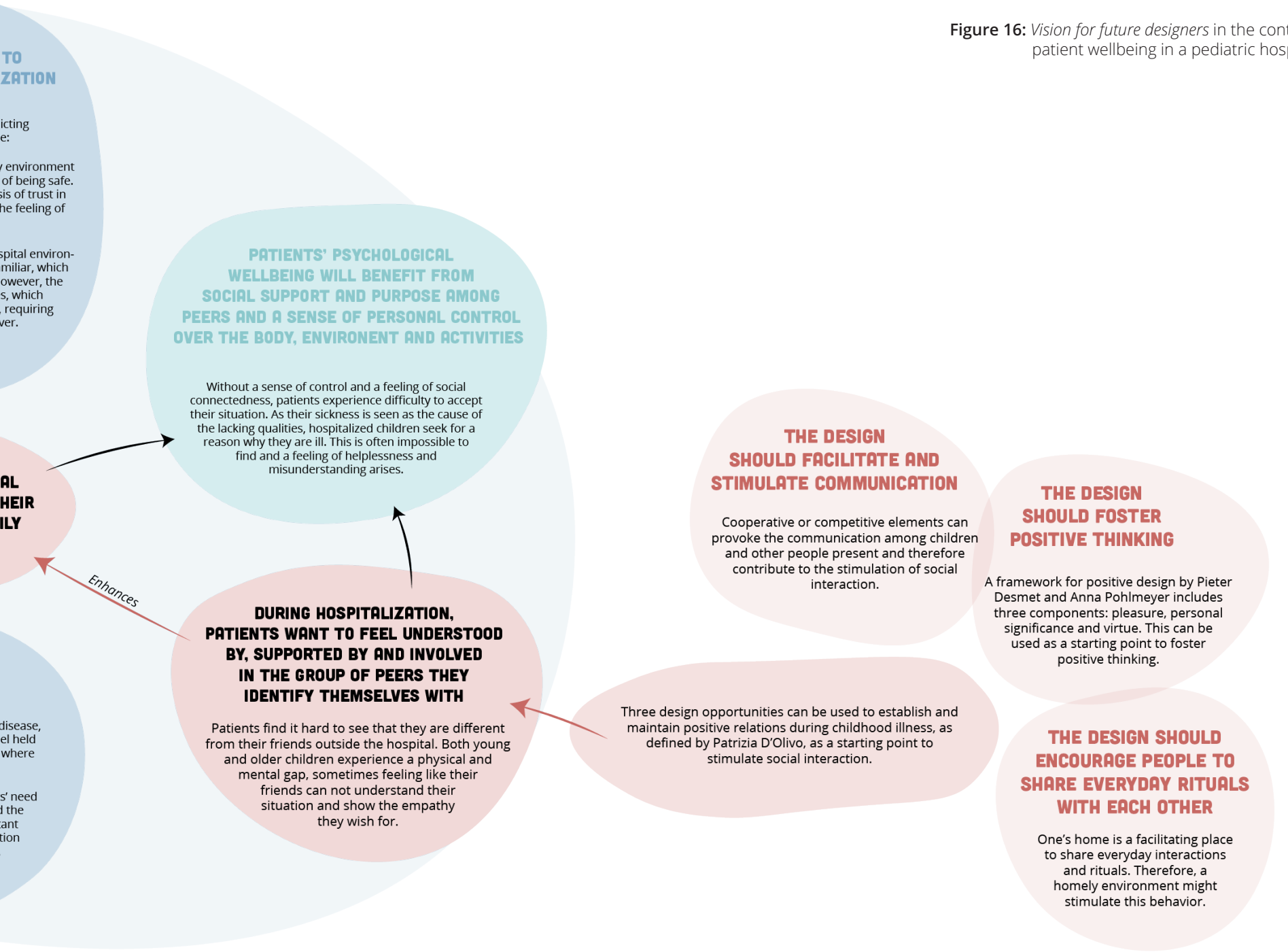


Figure 16: *Vision for future designers* in the context of patient wellbeing in a pediatric hospital

5

Ideation

The development phase from the Double Diamond starts with ideation according to the design goal and design directions. In the ideation process, a participatory approach was used by doing another session with the members of the children's council. In this session, the focus lies on generating ideas together with the children to be able to include their hospital expertise in the concept development process.

5.1 Ideation with design directions

To be able to visualize the design directions better, I started ideating by means of sketches and inspirational images. This subchapter shows the results from this ideation.

To start my ideation, I started sketching to stimulate my create thinking process, of which an assortment is visualised in figure 17. Simultaneously, I used the four design directions and to think of different approaches to achieve the goal of each design direction. Next, I added some images for inspiration of each approach. The figures on page 40 and 41 show the four inspiration boards with images and approaches. Alternating sketching and looking for inspirational images helped me give interpretation to my design directions.

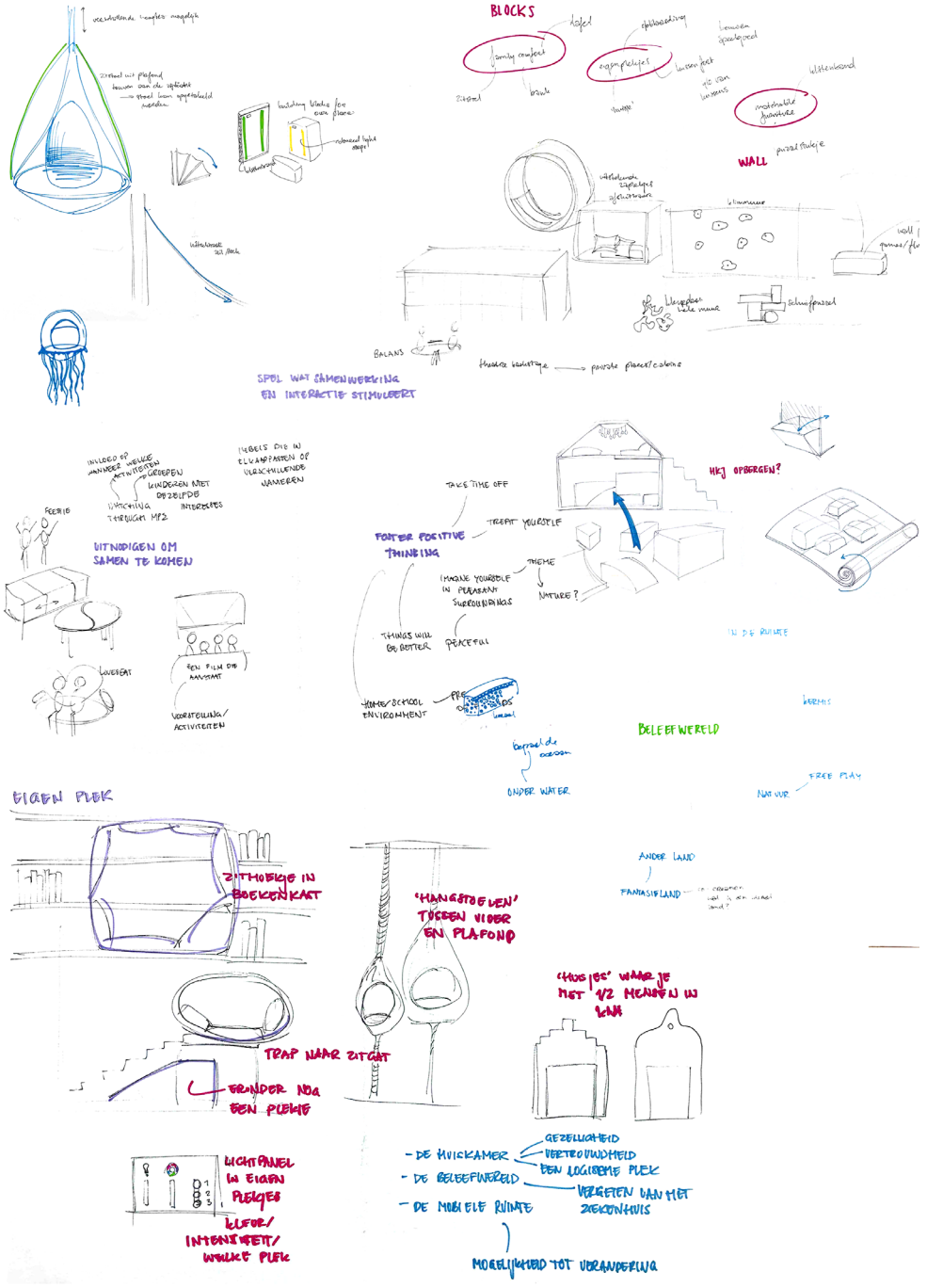


Figure 17: Ideation sketches

HAVING CONTROL OVER A PLACE OF YOUR OWN

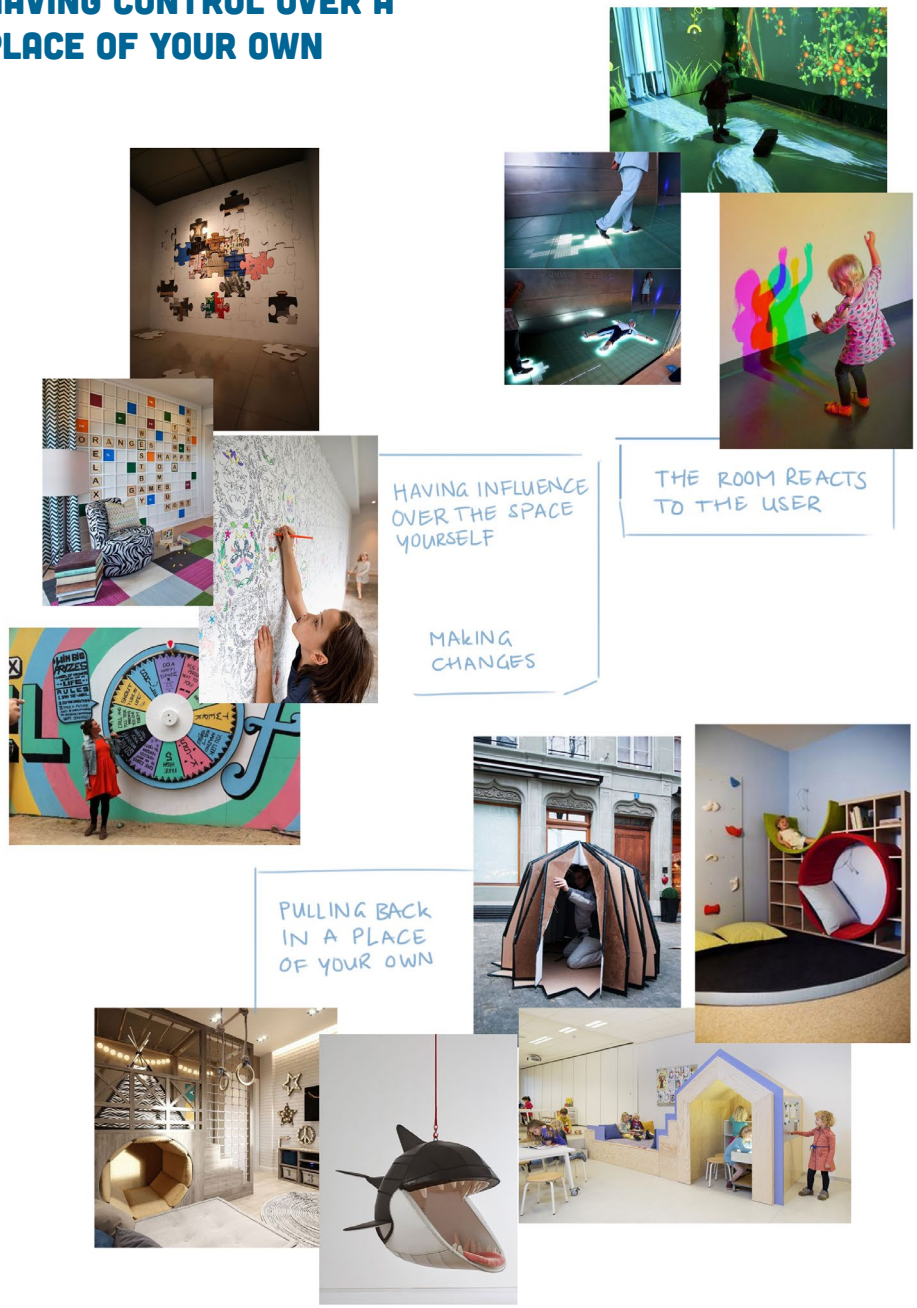


Figure 18: Approaches and inspiration images

DIRECT CONTROL OVER ACTION OR SITUATION

Figure 19: Approaches and inspiration images

STIMULATING INTERACTION AMONG USERS

Figure 20: Approaches and inspiration images

BEING A CHILD RATHER THAN A PATIENT

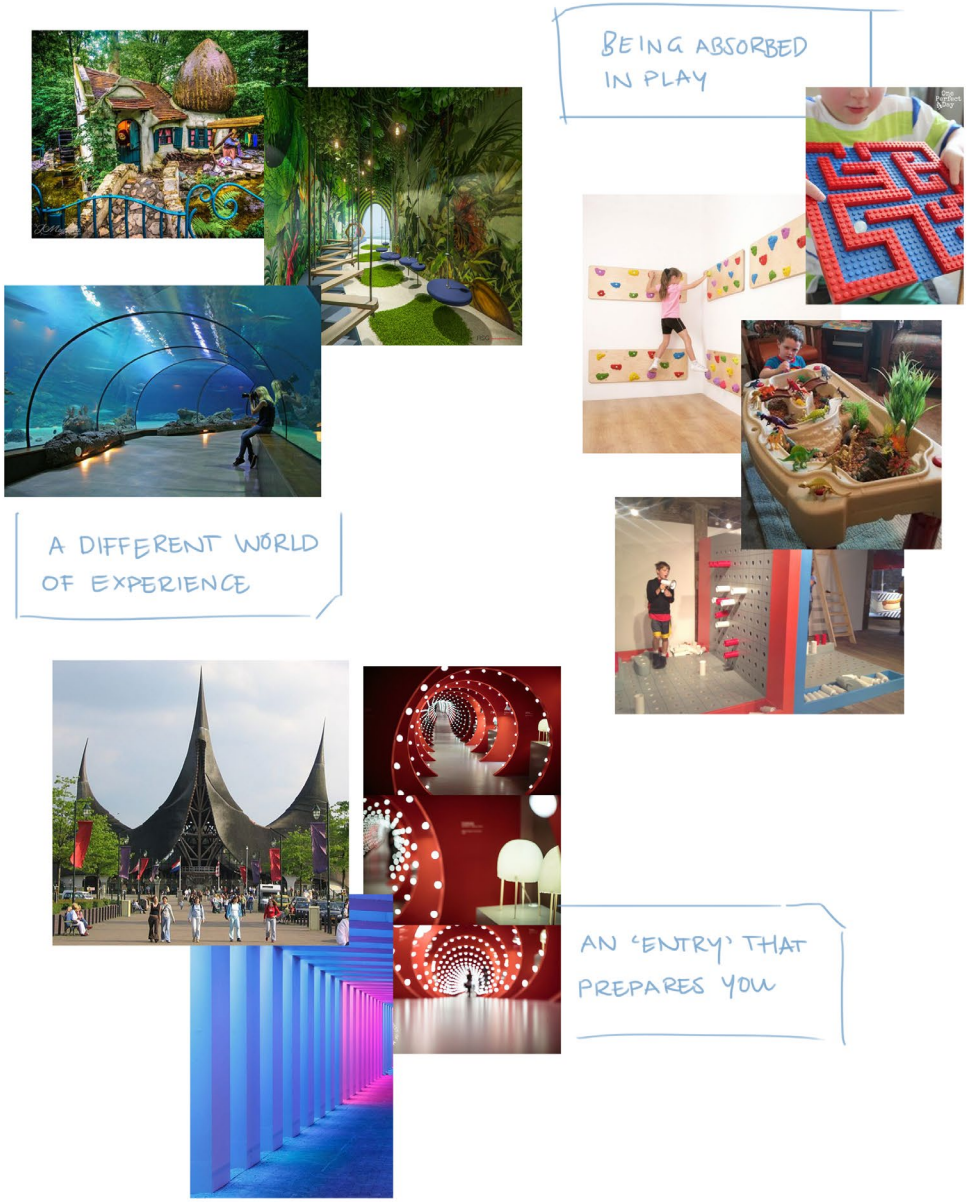


Figure 21: Approaches and inspiration images

5.2 Ideation with the children's council

I organised a second session with the members of children's council during the development phase. The first session is described in Chapter 3: Exploring wellbeing in the Wilhelmina Children's hospital. It was valuable to do a second session with the same group of children for the following two reasons: firstly, to present the outcomes of my research to the children so I could check whether my interpretations and conclusions were adequate. Secondly, because I wanted to involve the members of the council in my design process. With this participatory design approach, I aimed to strengthen my design directions and gain insights by generating ideas with the children according to these directions.

Research question

The session with the council was designed to answer the following research questions:

1. **Do the members of the children's council recognise their own problems and desires in the proposed design directions?**
2. **What kind of ideas can be a translation of the design directions, according to the children?**

Method

Due to COVID-19 measures, the session took place online with Microsoft Teams. This was the same setting as the session during the exploration phase and therefore all participants were already used to this setup. The session was part of the monthly meeting that the children's council has; the first hour of the meeting was reserved for my session.
The content of the session can be divided in two sections: first, I explained and checked the design directions with the council members. The second part was an idea generation session according to these design directions.

Rephrasing the design directions

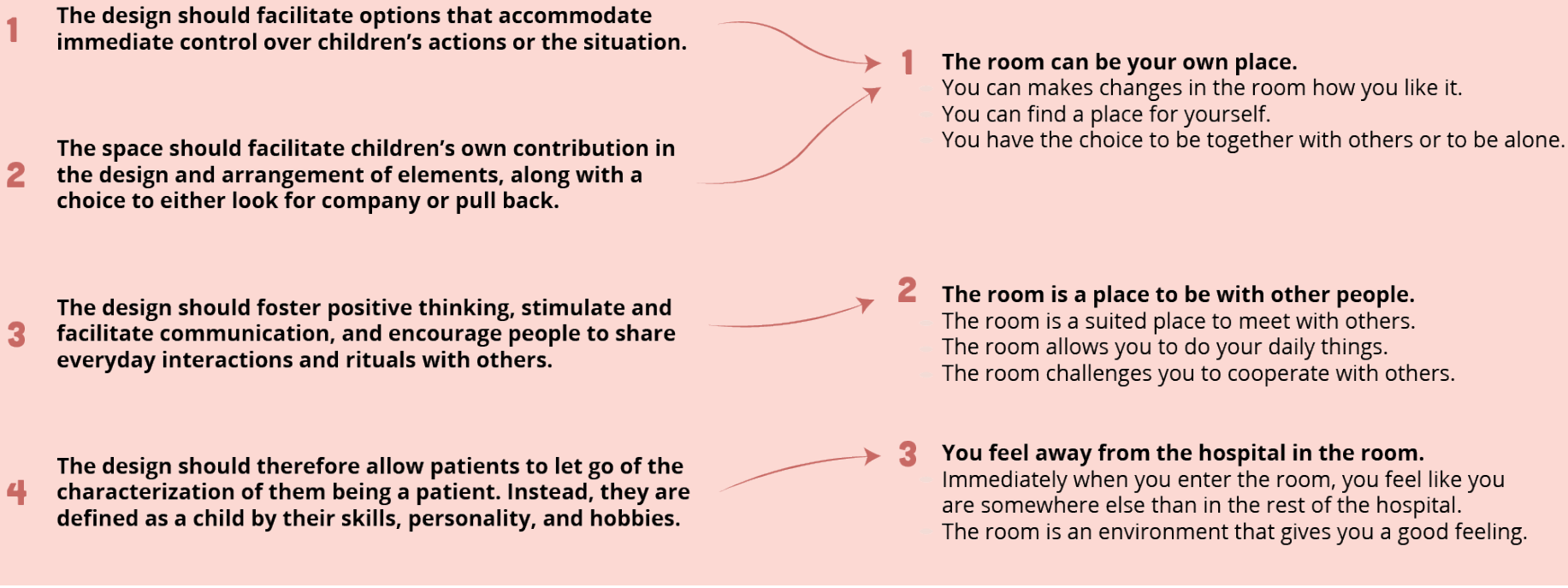
In preparation of the meeting, I rephrased my four design directions to make them understandable for all children in the council. During the first session in the exploration phase I noticed that a design jargon is easily used and that this is difficult to follow for some children in the council. I therefore did more extensive preparation on my use of language for the second session. The four design directions were therefore heavily simplified, in which I even combined the first two design directions into one. Even though the first direction touches upon control over actions and the second direction focusses more on control over the environment children choose to be in, the design directions have some similarities and overlap. Figure 22 shows how the design directions are rephrased. While explaining the design directions during the session I already mentioned some possible approaches and showed some examples, like the ones in figures 18-21. I did not necessarily do this to direct them into a certain outcome, but to help them to understand the directions with more ease.

The course of the session

Figure 23 on page 44 and 45 shows an overview of the course of the session. The first part of the session is visualised by the parts titled as 'set-up of the meeting' and 'member check'.
The second part of the session is visualised by the parts titled as 'idea generation with children', which shows questions I asked and some quotes from the children. For the idea generation, I prepared a board in Miro with the three design directions and the possible approaches written down. Also, I placed a selection of ambiguous pictures at the bottom of the Miro board, with the aim to stimulate the creativity of the children. The children were invited to join the Miro board and write things down themselves or move the pictures over the board. However, during the first session in the exploration phase I noticed that some children feel more comfortable to just talk during the session. Also, for some children the technology of working on the Miro board is too

difficult. For this session, I asked a fellow Industrial Design student to document the things that were said, so neither I or the children had to focus on writing things down. The part titled as 'feeling of responsibility for other patients' is a part that arose during the meeting, standing alone from my design directions.

Figure 22: Rephrasing the design directions



SET-UP OF THE MEETING

- 7 children
- 3 mentors from WKZ
- 1 fellow IDE student

All children were also present at the first session

1 hour session via Microsoft Teams

MEMBER CHECK

Last time we talked about:

Fundamental needs fulfillment:

IN THE WKZ vs. AT HOME

What problems do you experience during a hospitalization?

You were one of four information sources:

Children in the theatre

Parents

Children's council

MPZ

These directions come from my interpretation of your problems:

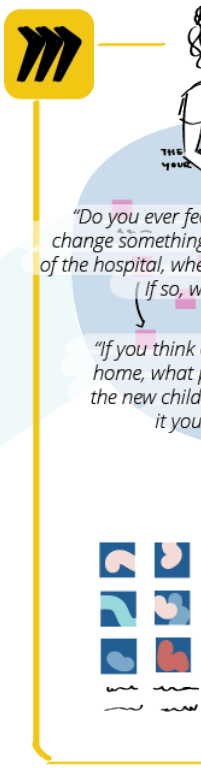
THREE DESIGN DIRECTIONS

The room can become your own place

The room is a place to meet with others

You feel away from the hospital in the room

IDEA GENERA



"Do you ever fe change something of the hospital, whe If so, w

"If you think home, what the new child it you

"Have I understood that correctly? What do you think of these conclusions?"

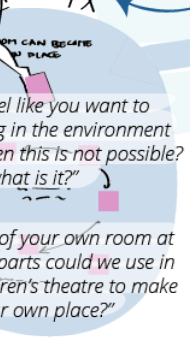
"I am hesitant towards the 'own place', it shouldn't be a second Ronald McDonald living room."

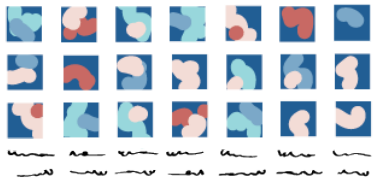
"The difference should be that the new children's theatre does not only feel like a homely place, but also like a personal place where you can express yourself."

Figure 23: An overview of the session with the children's council

ITION WITH CHILDREN

Notes taken by an Industrial Design Bachelor student





Ambiguous images and words

"Is there anything else that I have forgotten but is important for the design of the new children's theatre?"

"I was admitted to the day care of the child psychology department. There everyone sort of had their own room, but it was not much more than a space with a table and some chairs. There was no possibility to adjust the room yourself, so I think it's pretty important that you can make your own alterations to the space. These adjustments should not be permanent for other users."

"I always enjoy having breakfast with friends or family, such an activity in the children's theatre would be very nice. Different conversations will probably happen over breakfast compared to a normal hospital visit, when the conversation is often about the treatment: 'this and that is wrong.' Over breakfast you can have more personal but easy conversation."

"During a hospitalization where I get a new intravenous line I am often bored, lying in bed. Now I sometimes go to the Ronald McDonald living room, but I would prefer the new children's theatre: a room especially made for children.

Afterwards, children already started giving suggestions how this could be reached, so I continued to the explanation of the Miro board.

FEELING OF RESPONSIBILITY FOR OTHER PATIENTS

"We are of course a bit older, but we should also make sure that it is fun for the little ones!" - Lauré, aged 10

"The new children's theatre should be inclusive and also accessible for children in wheelchairs." - Julot, aged 18

Results of the session

The research question I posed for the first part of the session was: 'Do the members of the children's council recognise their own problems and desires in the proposed design directions?' Before explaining the design directions to the children, I gave a short recap of the first session I did with them and which other groups of people I interviewed. Using a Keynote presentation (Appendix 13.5) with short explanations and a collection of inspirational pictures, I presented each of the three design directions. Afterwards, I emphasised that this was my interpretation of ways that could contribute to solving the problems they discussed with me. During the entire session, I wanted the children to understand that they are experts on the matter and that I require their help to come to meaningful solutions.

Next, I asked the entire council what their first thoughts about these directions were. From my experience during the first session I knew that the children in the group feel comfortable to speak up, which is why I chose to pose this question to the group as a whole. One of the girls felt some hesitation towards the direction 'having a place of your own', because she linked it to the ambience of a living room. The WKZ already has the Ronald McDonald living room, so she was worried that the new design would look too much alike. After explaining to her that the 'place of your own' should not only be a homely place, but also a place for personal expression, she agreed to the direction. Other than that there were no disagreements. When I asked them whether they were missing something in the list of design directions, they had no contributions. I noticed at that point that the children already started to generate more concrete ideas to reach the design goals, so I decided to move on to the next part of the session.

I facilitated the idea generation for each of the three design directions one by one. As I expected, the children spoke freely and came up with quite some ideas, which were documented on the board by a fellow student. Appendix 13.6 shows the board with documentation after the session. I noticed that the children started to lose their attention when we talked about the third and final design direction. This was also due to the fact that the children had already mentioned some ideas at previous directions that were also relevant for the last one. Therefore, their inspiration came to an end. Unfortunately, the children did not use the ambiguous pictures during the idea generation. At one point, I positioned one of the images myself because I thought it was relevant. The children did not follow my example. Maybe I placed the pictures in the wrong area of the board in the first place: because they were positioned at the bottom, they easily got overlooked.

After we discussed all three design directions, I asked the children whether they could think of something that should absolutely be taken into account during the design of the Waterval (the new children's theatre). An interesting discussion about inclusion of all children in the hospital, instead of only thinking about themselves, arose. With quotes like "we are a bit older, but we should also make sure that it's fun for the little ones" from a ten-year-old and "the design should be inclusive and also accessible for children in wheelchairs" it is clear that the members of the council feel a responsibility to represent all children in the hospital. Especially for the young members, this is quite an astonishing and mature consciousness. These quotes also show a sense of ownership over the design process, implying that the children felt like their ideas and opinions were taken seriously, which was exactly what I wanted to achieve.

Analysis of the idea generation

As the children's council meeting was focused on idea generation, it delivered quite specific ideas about the design of the Waterval. After the session, I analyzed the ideas and quotes of the children in the session as follows: for each idea I thought of a broader idea category in which the idea belongs. Next, I aimed to discover the underlying values that the children in the hospital live up to according to this idea category. This analysis of each design direction is visualised in figures 24, 25 and 26. Discovering the broader notion and underlying values of the ideas helped me to ideate further, while still resonating with the wishes and needs of the patients in the Wilhelmina Children's hospital.

Striking about the outcomes in the 'having a private and personal place' section is that social interactions also play a role. Underlying values that can be found are the possibility to engage in social interaction when desired and belonging to the surroundings and loved ones. Even though a private place seems to arise from the wish to pull back from the things, environment or people around the patients, it proves to also include the opportunity to engage with others around them. Concluding, the main essence of the private and personal place is not only to pull back, but to also share such a place with others.

In both 'having a private and personal place' and 'being together with others', values can be found that imply children's desire to maintain personal skills and activities despite their illness. Feeling competent, having the chance to express your interests, feeling and acting like a child and keeping body active and stimulating activity for pears acknowledge this. This is defined on a personal level: being able to reach personal goals. However, maintaining normality in social relationships also plays a role. Especially towards friends and family members, daily and homely rituals are greatly appreciated.

As expected, control over the environment is important in 'having a private and personal place' and 'feeling away from the hospital'. Children want to be stimulated and also want to stimulate the environment around them. By giving them the opportunity to redesign the room, both control and self-expression can be a part of the design.

The ideas about the room require child-focused use of the space. Currently, the room is controlled by the facility department, who schedule the usage of the room. The room is now mostly used by organisations in the WKZ other than the ones organising activities for children. When the room becomes an area where children can find their own place, alone or with others, the manner of scheduling needs to change drastically. The starting point needs to be that the room belongs to the children, so they can go there whenever they want. When another organisation wants to use the room, this should be organised in a different way than is currently happening. This switch requires good communication of all parties inside the WKZ.

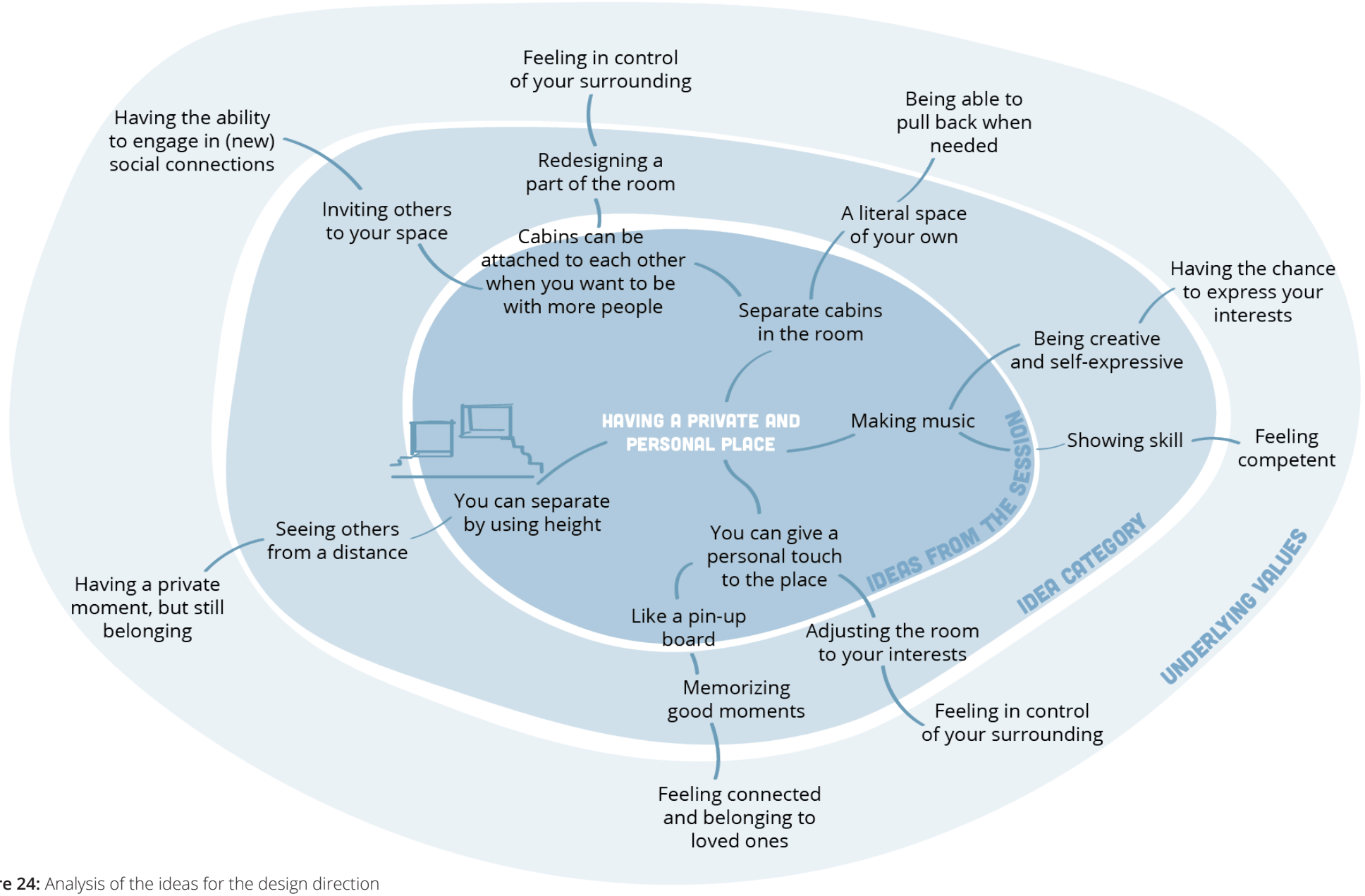


Figure 24: Analysis of the ideas for the design direction *having a private and personal place*

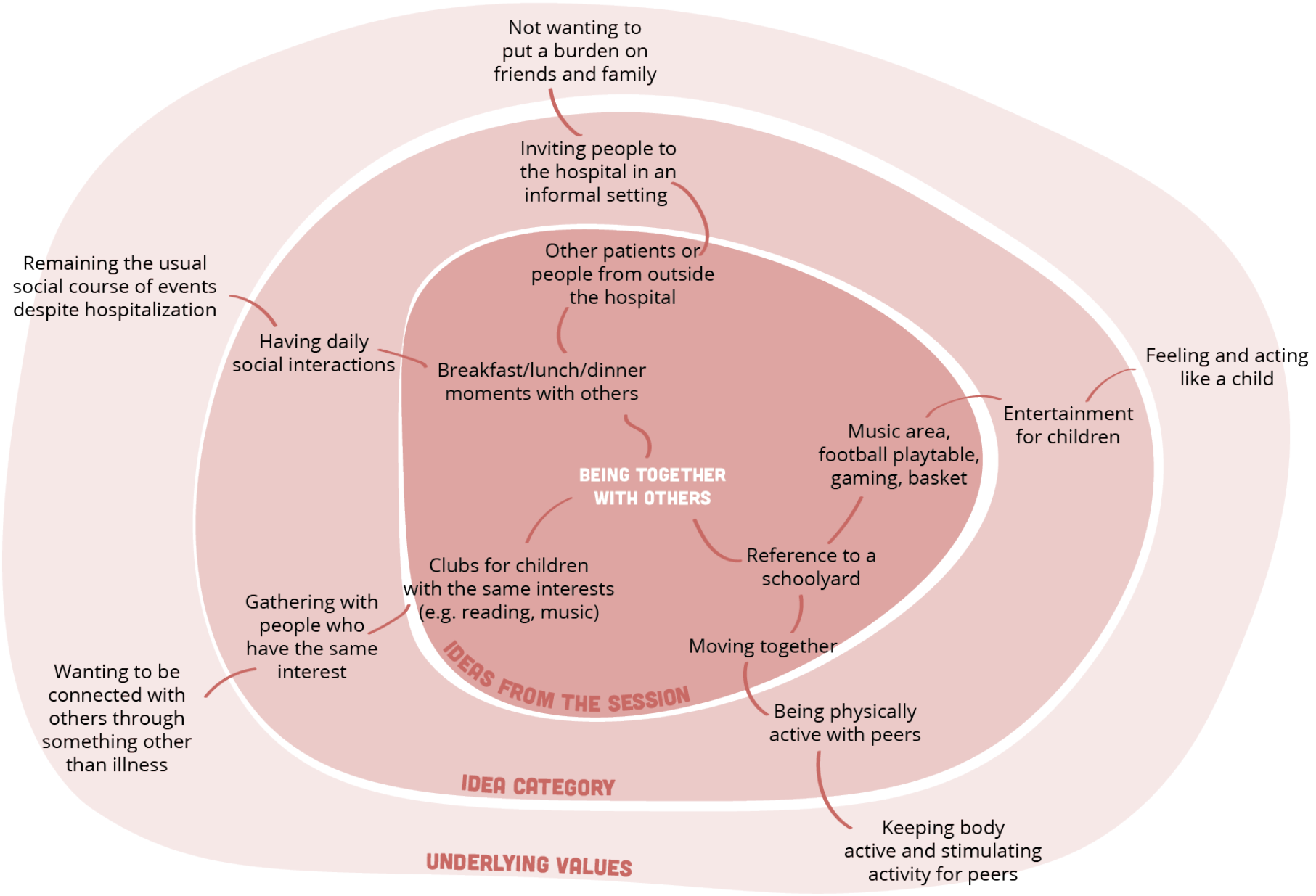


Figure 25: Analysis of the ideas for the design direction *being together with others*

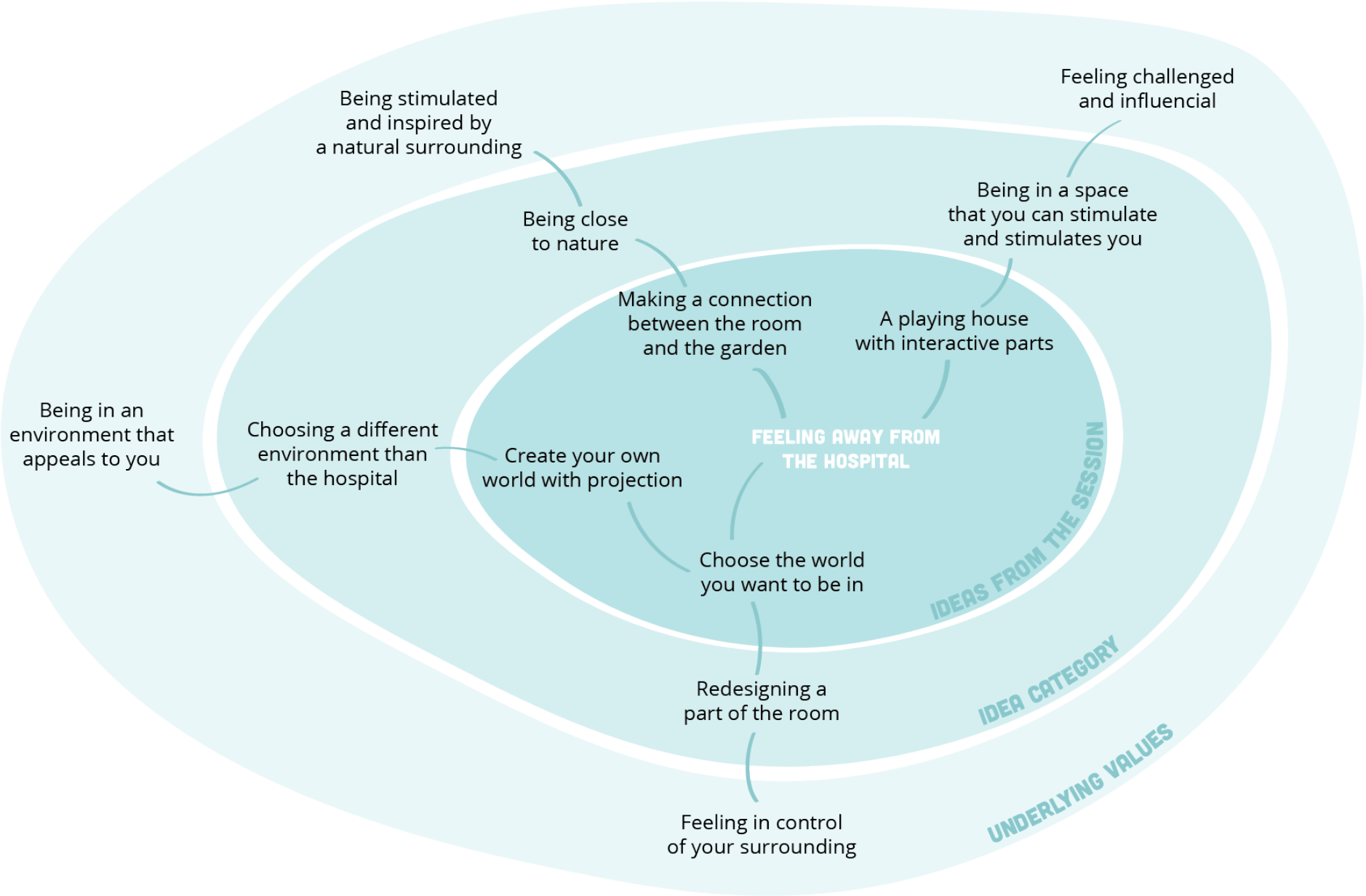


Figure 26: Analysis of the ideas for the design direction *feeling away from the hospital*

SUMMARY

Chapter 5: Ideation

The idea generation started with sketching and collecting inspirational examples that fit the four design goals. I organised an idea generation session with the children's council with the goal to validate the design directions and use their expertise in concept development with this participatory approach. In preparation of the session, I rephrased the four design directions into three heavily simplified directions to ease the idea generation process for them. Also, I showed the children some of the inspirational example images I collected, with the aim to help them into their creative thinking process. The results of the session were concrete ideas in each design direction for the design of the Waterval. I analyzed these ideas, firstly, by thinking of broader idea categories in which the idea belongs and next, by aiming to discover the underlying values that the children in the hospital have according to these idea categories. The broader notion and underlying values of the ideas are used to ideate further, while still resonating with the wishes and needs of the patients.

6

Developing concepts

In this chapter, the process of concept development towards two initial concepts is explained. The two concepts, Blok 2.0 and Hexa/Memomuur, are explained in detail. Also, the insights from the children's council ideation session (subchapter 5.2: Ideation session with the children's council) and the interaction vision are used to evaluate the expected effectiveness of the concepts on improving patient wellbeing.

6.1 Towards two initial concepts

Since the establishment of the design goal and directions, the concept development has been an ongoing process. This subchapter describes the concept development process chronologically.

Figure 27 on pages 54 and 55 shows the process in chronological order. The idea generation session with the children's council shaped the design process into Concept 1 and Concept 2. However, these concepts were based on literal ideas from the session. To be able to use the session as a qualitative guideline to stimulate my own creativity, the analysis as described in the subchapter 5.2: Ideation with the children's council, was necessary. Next, I could use the insights instead of the specific ideas for further concept development. The concepts 'Blocks' and 'Child's terrain' were the result of this.

The concept 'Blocks' allows children in the room to build their own space with different building elements that are all integrated in the room. This way, children can explore and discover the opportunities during the building process. One of the elements are foam blocks that are integrated in an octagon recess in the wall. When all blocks are removed from the shape in the wall, the octagon can also serve as a place to sit in. The integration of the objects in the room makes it easy to empty floor space in room when it is used for another event. The concept gives children the opportunity to pull back when needed, but also the ability to engage in social interactions: users can be inspired by others, share blocks with each other and combine their skills in the building process. The concept also stimulates physical activity because it challenges children to gather the blocks and build structures.

The philosophy of the concept 'Child's terrain' is that the children rule the room and therefore the room is designed to be a child in the first place. Children are allowed to express playfulness or even mischief. The children become the owners of the room and as a starting point the room is always a place for children to go whenever they want. Next to that, it also stimulates daily interactions children would have at home, such as having meals together, but with a playful touch. The concept philosophy is embodied by three things: firstly, an online platform to give patients more control and ownership about the activities in the room. Secondly, allowing children to do things that would not be approved at home, like playing with food and drawing on the wall. Finally, the purpose of the room is to make and display memories by making photos in a photobooth that are displayed on a screen, as if it is a pinboard of the owners of the room.

Some changes were made to the concepts before testing in the WKZ, leading to the concepts 'Blok 2.0' and 'Hexa/Memomuur'. For these concepts I chose a Dutch name, because this would make it easier to discuss the concepts with children, should that be necessary. Blok 2.0 is very similar to its former version, but only contains the blocks and the octagon shaped in the wall. The main reason to dismiss the other elements of the former concept was so I could explore the interactions people have with the blocks and octagon in more detail. 'Hexa/ Memomuur' still carries the philosophy from 'Child's terrain', but is non-technical. Instead of making an app to connect children in the room and stimulate interaction among them, I looked for possibilities to achieve the same through non-tech design. Making an online platform that is adapted to very young children and at the same time interesting for teenagers, is nearly impossible. With a non-technical solution, there can be more space for the children's own twist to the use. This makes it more feasible to make an inclusive design for the wide-spanned user group in the hospital. The concepts Blok 2.0 and 'Hexa/Memomuur' are described in more detail in the next two subchapters.

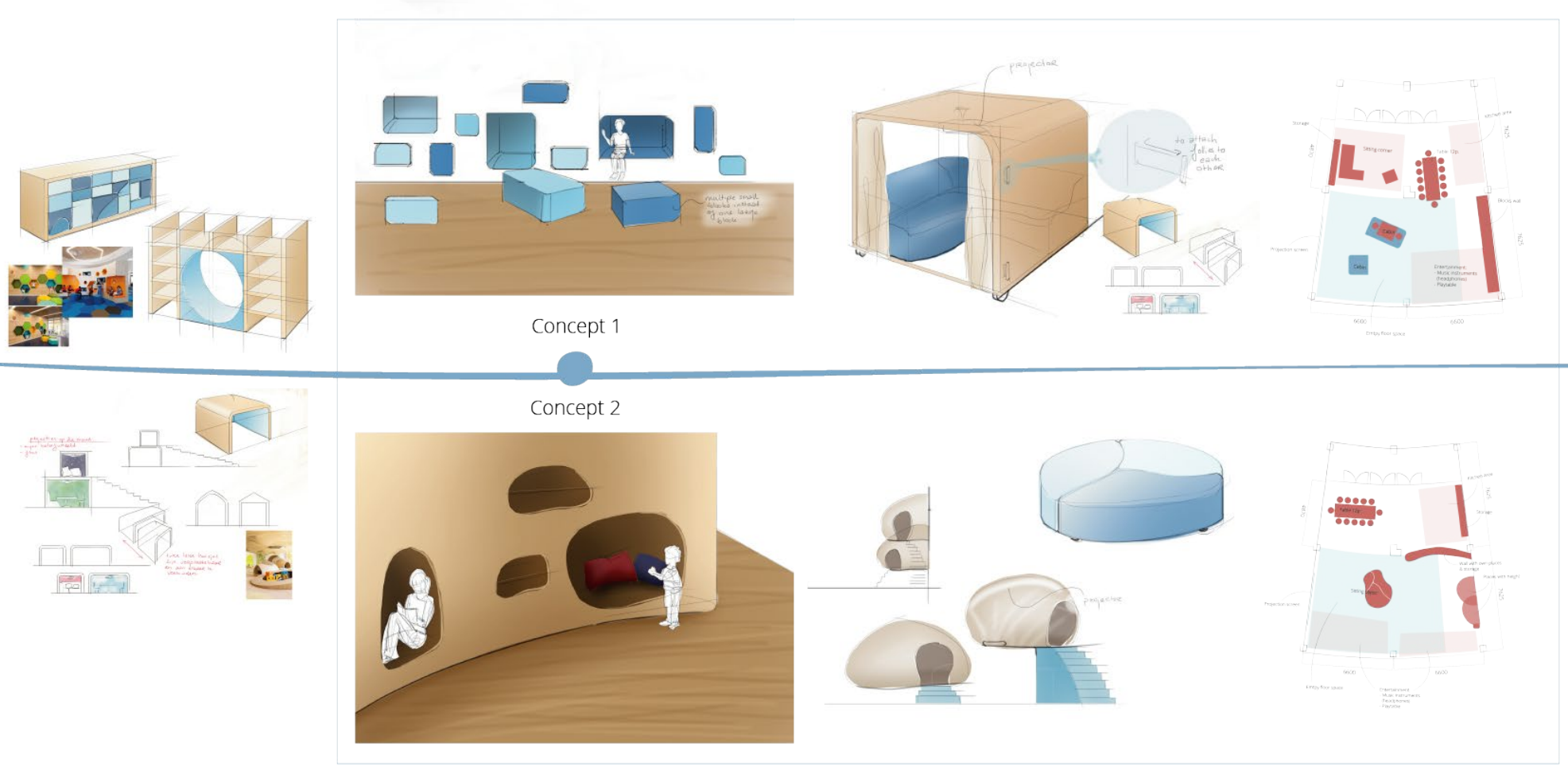
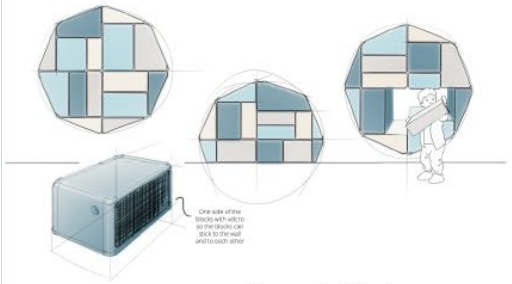
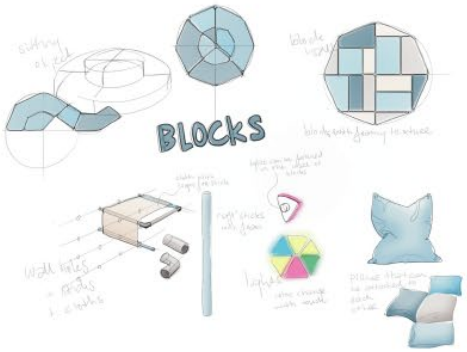


Figure 27: Concept development process

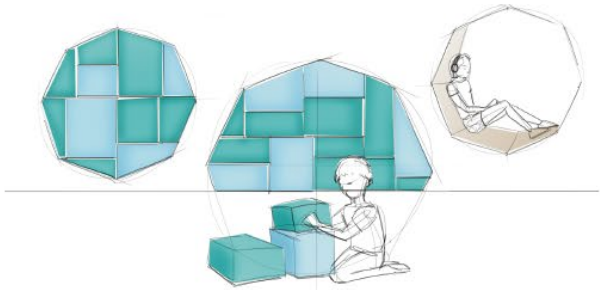
ildren's council
alue mapping

Simplifying variety of elements



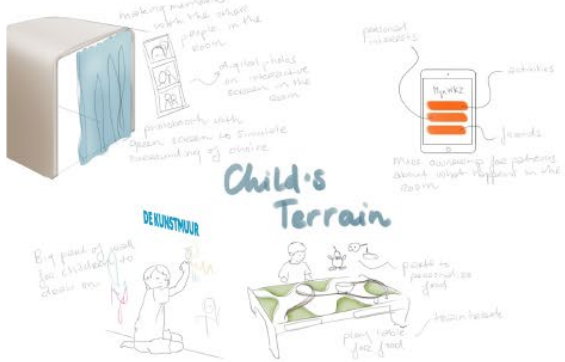


Concept Blocks



Concept Blok

Concept Child's terrain



Concept Hexa/Memomuur

Low-tech variation

6.2 Concept Blok 2.0

Concept Blok 2.0 is derived from the similar and previous concept 'Blocks'. This subchapter describes the elements and functionality of the concept.

The essence of the concept Blok 2.0 (figure 28) has not changed: it should allow children to create their own space inside the room and to pull back in one of the cutouts in the wall. The concept is applied on one entire wall of the room, with multiple octagonal cutouts and lightweight building blocks in various geometrical shapes. The blocks are multifunctional and can be used in play, but also to create more facilitating things like a chair or a table. Besides that the children can design a space in their own way, they can also use a space that someone before them has left behind. With simple geometrical shapes, the building options are not defined in advance, but have to be explored by the children. Children might inspire each other, or even join each other in a building or playing process.
Blok 2.0 allows children to find a place that is shielded off from the rest of the room. An octagonal cutout in the wall becomes a sitting area once the blocks are removed from the wall. It should offer the children a place where they feel safe and away from the department where they are hospitalized.
After play, the blocks can be put back in the wall. This might even become a new activity of play for the children. The octagonal shape of the cutout and the geometrical shapes of the blocks allow more than one composition in the wall. This can be explored by the users of the room.

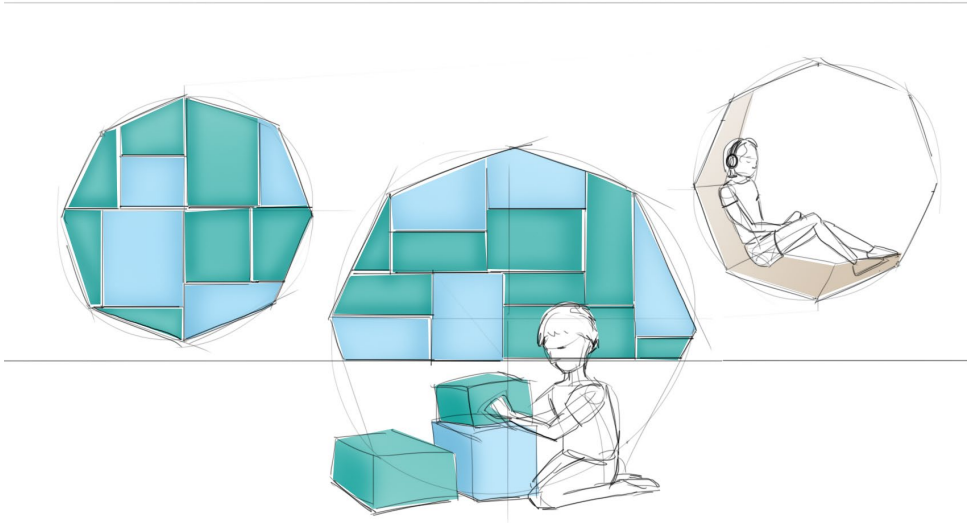


Figure 28: Concept Blok 2.0

6.3 Concept Hexa/Memomuur

Concept Hexa/Memomuur is a combined concept with to elements: the Hexamuur and the Memomuur. This subchapter describes the elements and functionality of the concept.

As mentioned earlier, this concept is derived from the philosophy of the concept 'Child's terrain', where the children rule the room and therefore the room is designed for children to be a child in the first place. The concept was therefore about personal expression and making the room one's own through things like a photobooth or a wall children can draw on. Also, the concept stimulated social connection among children in the hospital with an app, where children could indicate their personal interests and get more control over the activities held in the Waterval. These principles were translated into the concept Hexa/Memomuur (figure 29): an arch with on the inside left and right a Memomuur: a wall to display personal creativity, photos, or other personal things of the children in the WKZ. The left and right walls have holes like a peg board, so the composition of the elements that fill the pegboard can be changed by its users. In the middle of the arch is the Hexamuur: a wall with hexagons which can each be rotated. In two variations, each hexagon has two different sides. This way a different artwork can be created from both sides by turning the shapes. Half of the hexagons are non-transparant, of which one side is a mirror. The other half of the hexagons is made of plexiglass, in two different colours or textures. When two children are both on a different side of the Hexamuur, they can see each other through it, as well as a reflection of themselves. The goal of the Hexamuur is to stimulate interaction between children who are looking at their own or other's personal artifacts on the Memomuur. The goal of the Memomuur is to give children the chance to express themselves in a way unrelated to their illness and to make the room something of their own.

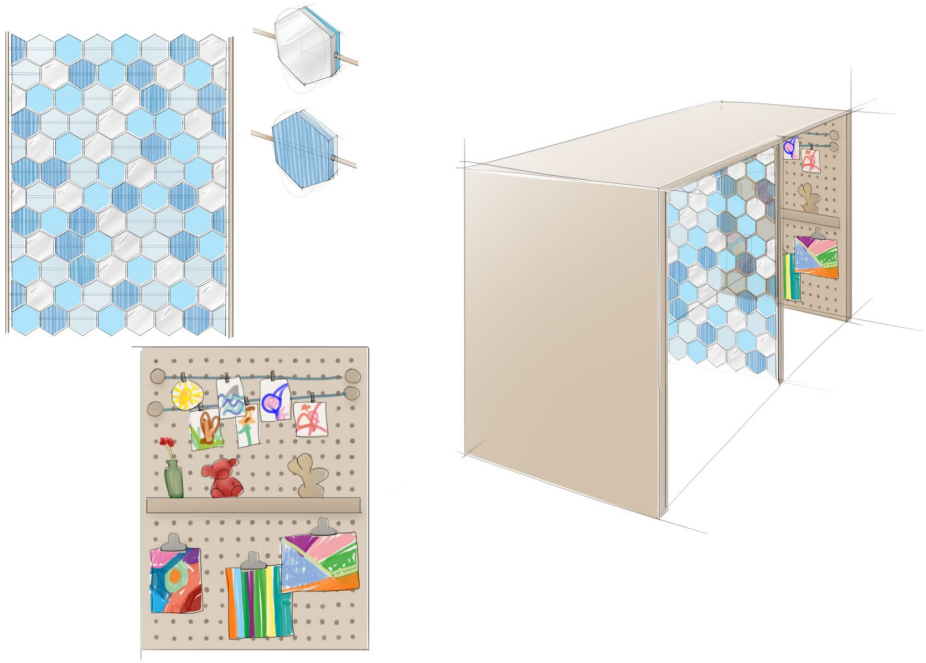


Figure 29: Concept Hexa/Memomuur

6.4 The concepts in relation to research results

Both concepts originate from the design directions that resulted in the idea generation session with the children's council and the analysis of this session. Because the concepts are derived from earlier concept versions, I take a step back to compare Blok 2.0 and Hexa/Memomuur with the insights from the children's council. Also, the interaction vision here serves as a way to evaluate whether the desired interactions can be present in the concepts.

Connecting the concepts to the interaction vision and insights from the children's council

To illustrate the connection between the research outcomes and the concepts, I created a visual (figure 30 on page 60) that connects the concepts to the interaction vision, by indicating which description parts of the interaction vision can be found in which concept. Also, I connected the concepts with the analysis of the idea session with the children's council. Looking at the idea categories in the visuals 24-26 on pages 48-50, I selected the idea categories that are present in a concept. I chose to select the idea categories and not the underlying values, because the underlying values are too abstract to be compared to the concrete concept and therefore the connection to the original ideas from the members of the council would be lost. The idea categories have the same colour as they have in the original visuals, so it is clear from which design direction they are derived. In the visual in figure 30 I chose to separate the Hexamuur and Memomuur because their goals are quite different. Therefore, I decided that it is more valuable to see with which parts of the interaction vision and insights from the children's council they connect to separately.

Evaluation with the interaction vision

When we look at the parts from the interaction vision, we see similar connections in the concept Blok 2.0 and Hexamuur. This is due to the fact that both concepts allow its users to make changes to the environment; to design part of the room. For example, the part of the interaction vision *the player has chosen a character in response to what the game directions stimulate and facilitate* can be interpreted as choosing a design in the room (Blok 2.0) or on the wall (Hexamuur). The game directions are the possibilities users have in their creation when using the concept: what kind of design does it facilitate and what are the limitations? The relation of the concepts with *the reality of his normal life finds itself on the background* is perhaps a bit more far-fetched, but could be interpreted as the child being caught up in his own fantasy while creating something with one of the concepts. That way, being a patient in the hospital would not be the centre of attention. The Memomuur is the only one of the three concepts with a relation to *he is defined by his character and skills, not by anything else*. By putting up personal artifacts, like a drawing or a photo, on the wall, children can show something of themselves to other people in the room. However, their illness is not visible and they are therefore defined as the child they are, instead of the patient.

Evaluation with the insights from the children's council

When looking at the outcomes of the children's council idea session, it is immediately visible that only one red-coloured shape is connected to one of the concepts. The red shape belongs to the design direction *being together with others*. Because only one of the concepts shows a connection, it seems as if the concepts lack a stimulation of social interaction. However, during the children's

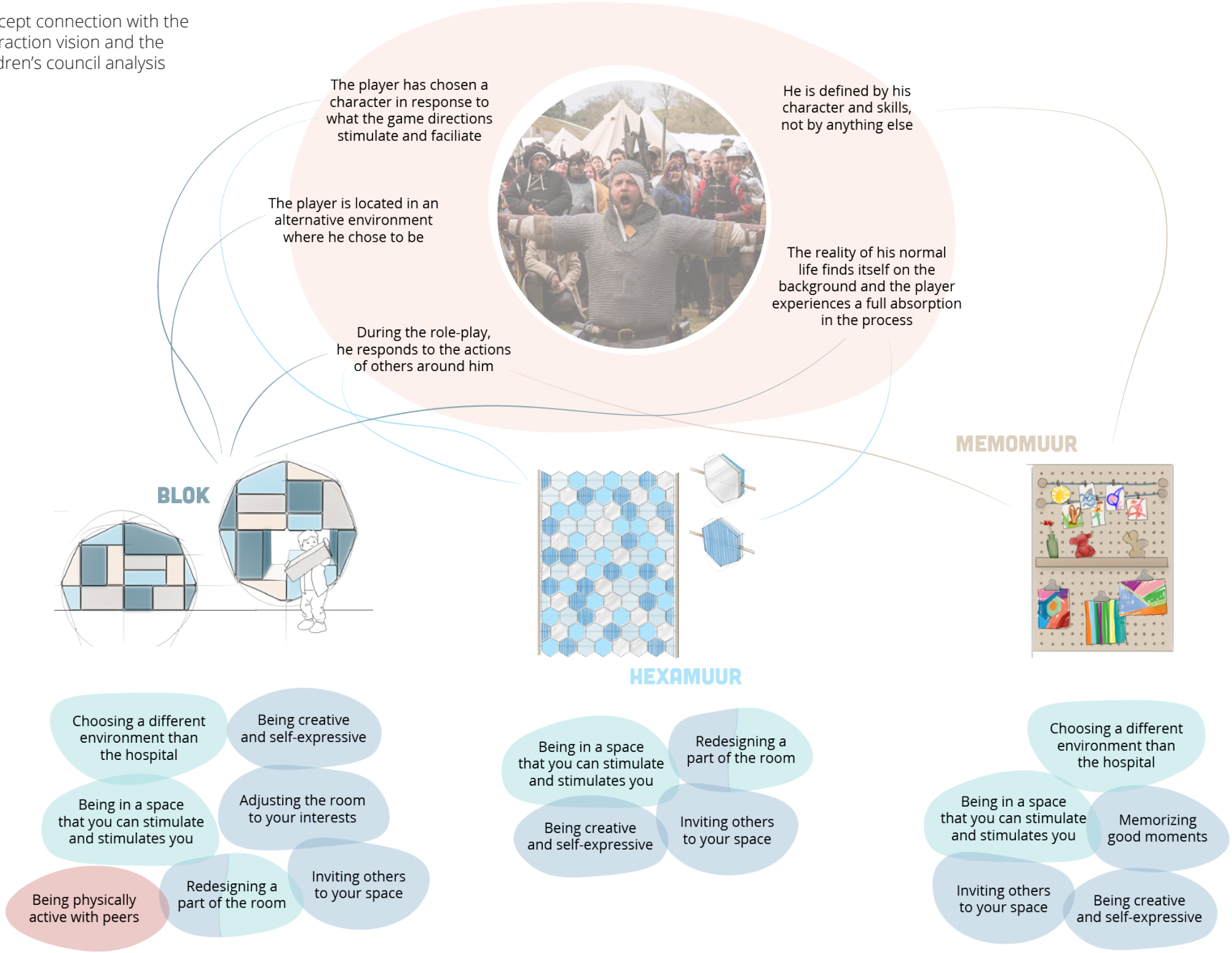
council, ideas with a social aspect already came up during the first design direction: *having a private and personal place*. Instead of only discussing how someone could isolate himself in such a place, the children came up with ways to share your space with others and inviting them. Therefore, not only the red-coloured shape represents an idea with social value; it can also be found in some blue ones, for example *inviting others to your space*. This can be connected to all three of the concepts. For Blok 2.0, the design that the children make can be extended and alternated to invite more people. For Hexamuur, the user can see who is on the other side of the wall. For Memomuur, users show something personal to others in the room and therefore let other people inside their personal space.

SUMMARY

Chapter 6: Developing concepts

Concept development was an iterative process, which eventually led to two initial concepts: Blok 2.0 and Hexa/Memomuur. Blok 2.0 is a wall with octagonal cutouts that are filled with lightweight blocks. Children can take the blocks out of the wall and use them to play or build something in the room. When the blocks are out, the octagonal shape serves as a sitting spot. Hexa/Memomuur is an arch that allows children to display personal creations on a wall. In the middle of the arch is a wall with rotational coloured hexagons that are partly see-through, allowing the children to turn the shapes from both sides to create a different view. The wall also is meant to ease interaction between children on either side.
The concepts were compared to the insights from the children's council and the interaction vision. This shows that both concepts touch upon multiple elements from the interaction vision and correspond with insights from the children's council that are derived from each of the three design directions.

Figure 30: Concept connection with the interaction vision and the children's council analysis



7

Testing the concepts in the Wilhelmina Children's hospital

The concepts Blok 2.0, Hexamuur and Memomuur were tested in the hospital. Even though Hexamuur and Memomuur form one concept together, they were tested separately because of the different goal and interactions I aim to achieve with either one. This chapter describes two testing sessions and the insights derived from the test results.

7.1 Testing in the playing room

The first test took place in the playing room in the hospital during a set playing hour. The WKZ has two playing rooms: one for children under the age of seven years and one for children who are seven years and up. During this test, I focused on the concepts Blok 2.0 and Hexamuur. Due to limited time and space in the playing room, I decided to leave out concept Memomuur in this test. This section describes the setup, method, and results of the test conducted in the playing room.

7.1.1 Blok 2.0

Research question

The test was designed to answer the following research question and sub-questions:

Does the concept Blok 2.0 give the children a feeling of control over their actions and environment?

- How do children build with the blocks?
- For what purpose do the children use their creations?
- Does the concept stimulate social interaction? Does it encourage children to work together?

Prototype

The prototype consists of multiple blocks made from styrofoam and clothed with blue felt, as shown in figure 31. The blocks vary in size, from small blocks up to blocks that are big enough to use as a sitting object of its own, and shape, according to the concept drawings (figure 28 on page 56).

Figure 31: Prototype of Blok 2.0

7.1.2 Hexamuur

Research question

The research question and sub-questions to answer with the test of the Hexamuur were:

Does the concept Hexamuur stimulate the social interaction between children in the room?

- Will children cooperate to move the hexagons from both sides?
- Is it inviting to join when one child is already moving the hexagons?
- Is it inviting to change the colour composition of the wall?

Prototype

The prototype is a stand with eight rows of paper hexagons, which can be turned from both sides of the stand. The hexagons all have a different colour on each side. The prototype is shown in figure 32.

7.1.3 Method

Children are invited to come to the playing room for an hour each day. The blocks were stacked up in a composition the middle of the room, as if someone had already used the prototype. The hexagons already formed a composition as well, so it was more clear that the hexagons could be turned to change this formation. Some blocks were placed on a couch in the room. This way, the children needed to move the blocks if they want to sit down. Figure 33 shows the setup in the playing room. During the test, I planned to observe how the children use the blocks. If the children didn't initiate to start using the prototype, I would move the composition myself, or ask a MPZ employee present to do this.
Three children were expected to come to the room during the set playing hour: a girl aged seven, a boy aged eleven and a boy aged twelve.

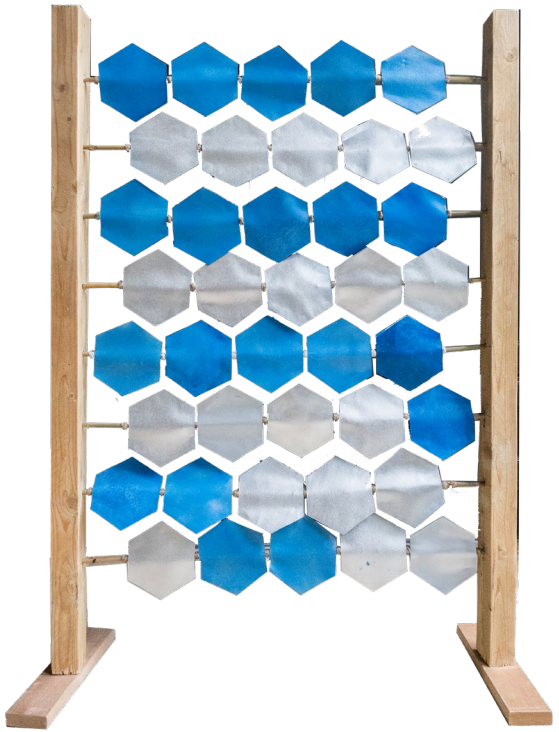


Figure 32: Prototype of Hexamuur

7.1.4 Results

The test did not go as planned. The children in the playing room saw the prototypes, but were not triggered to interact with them by themselves. The two boys were reluctant to do anything with the blocks or hexagon wall, also when I asked them about it. “I don’t know what it is, so I don’t know what to do with it”, one of them said. The girl turned the hexagons into a pattern, after I asked her if she had noticed the stuff in the room. Concerning the blocks, there was no independent interaction from the girl.
She mentioned that she wanted to paint, so I offered her one of the blocks to paint on. She liked this, but turned to painting on paper after a while because it was easier.

The main insight from the test was that the playing room is a space where children come and expect to be entertained. The playing room therefore stimulates a wait-and-see attitude from the children. Noticing this, I imagine that the current children’s theatre triggers the same behaviour: children come to a specific activity and expect that something will happen and be prepared for them when they arrive.

As the design in the Waterval should facilitate children to express themselves and create their own environment in the room, I decided to do a new test in the main hall of the hospital because I expected a less wait-and-see attitude here. I focused on the test of the Memomuur and Blok 2.0, mainly because I had not tested the Memomuur in the playing room. I figured that the blocks could serve as facilitating objects during the test, for example as a small stool next to it.

Figure 33: Setup of the prototypes in the playing room

7.2 Testing in the main hall

On the Tuesday afternoon when the test took place, an ice cream cart with one thousand ice creams was sponsored by FC Utrecht to give to children. The ice creams were handed out in the main hall and two mascots from FC Utrecht went to all hospital departments to go to the hospitalized patients. Also, the annual 'camp site' was opened on that day: a setup of tents and toys on a green mat. The camp site is set up annually for a few weeks during the holiday period to induce a holiday feeling, even if children can not leave the hospital due to their illness. On the camp site, children passing by can play freely. Also, some activities of the children's theatre are shifted to the camp site during this period. This section describes the setup, method, results, and conclusions of the test conducted in the main hall.

7.2.1 Blok 2.0

Research question

The test was designed to answer the same research question and sub-questions as during the test in the playing room:

Does the concept Blok 2.0 give the children a feeling of control over their actions and environment?

- How do children build with the blocks?
- For what purpose do the children use their creations?
- Does the concept stimulate social interaction? Does it encourage children to work together?

Prototype

The same prototype as during the test in the playing room was used: multiple blocks made from styrofoam and clothed with blue felt.

Figure 34: Prototype of Blok 2.0

7.2.2 Memomuur

Research question

The research question and sub-questions to answer with the test of the Memomuur were:

Does the concept Memomuur give the children the feeling of their own personal place?

- Are the children willing to display their personal work or photos?
- Will children communicate with each other because of the wall? Or even through the wall?

Prototype

The prototype of the Memomuur (figure 35) was a large canvas with multiple hooks attached to it, to which drawings, notes and pictures can be attached. I prepared two kinds of 'exercises': a drawing area with either 'My memory of the WKZ' or 'something I would like to share with others' on it to stimulate children to share their drawing on the Memomuur. An example of both drawing sheets can be found in figure 36. On the camp site was a table for tinkering, on which I placed the drawing sheets. The users could choose themselves where on the canvas they wanted to pin up their drawing or picture. A polaroid camera was hanging on the canvas, free to use by the participants.

Figure 35:
Prototype of Blok 2.0

Figure 36:
Drawing examples

7.2.3 Method

I set up my prototypes, the Memomuur and the blocks from Blok 2.0, next to the ice cream truck in the main hall and was there to assist in handing out ice creams. As the concept should stimulate independent action, at first I did not actively approach people who were passing by to see if this would happen. Some drawings, pictures and a polaroid camera were already hanging on the Memomuur prototype, so the people would see what the intention of Memomuur was. Ideally, they would make a drawing or picture themselves and add it to the collection on the wall. If it turned out that this method would not work, I planned to invite children to add something to the wall. The blocks were positioned on and next to the campsite, as if they were part of the collection tents and toys already there. During the test, I observed how the children used the blocks. Figure 37 and 38 show the setup of the prototypes in the main hall.

Figure 37: Prototypes in the main hall

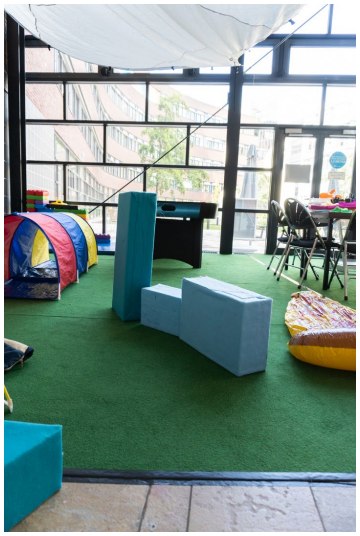


Figure 38: Prototypes in the main hall

7.2.4 Results and conclusions

Memomuur

At the start of the test session, I did not actively approach children to stimulate them to make an addition to the wall to see whether they would notice it themselves. Only some adults - staff members and parents - seemed to be interested in the drawings that were displayed. After a while, I started to ask children who came to the tinkering table if they wanted to make something for the wall. I explained that it was a place where all children could put up their photos and creations, so others could see what they made.
Figure 39 shows the wall at the end of the testing session. The illustrations faded with blue were the ones already displayed in advance, as an example, and thus not made by children. The visual shows quotes, describes occurrences and indicated relationships between participants. The girl who was first to add something to the wall mentioned: “I’m going to make a drawing for the other children in the hospital.” This is an interesting point of view: the girl is showing to be thoughtful of other patients, even though she is coping with illness herself. After a while, I went upstairs to the department ‘Pelikaan’ to ask children to participate. To invite them, I used the same description the girl used earlier: “Would you like to make something for other children in the hospital?” The things that children made vary from funny anecdotes, to drawings, to ‘feel better’ wishes for all children in the WKZ. The latter is clearly something meant for others to read and can therefore be seen as a form of communication between children who use the Memomuur. Multiple children said that they would be interested in the things that others made. However, when a group of siblings put their sheets on the wall, they paid no noticeable attention to the ones already on there.
A polaroid camera was also part of the test setup, giving children the opportunity to make a picture that is immediately printed. The aim was to make memories of a moment in the hospital and directly share it with the other children. The children enjoyed the polaroid camera, because they see a direct effect by means of the physical photo. However, none of them felt the urge to display the photo on the wall; they rather wanted to take it with them.

"OKAY, WHERE SHOULD WE PUT FATIMA'S DRAWING?"

Siblings of a hospitalized girl: writing a 'get well' message for all children in the hospital

The drawing of the hospitalized sister was taken to the wall by her siblings because she could not leave her room

SIBLINGS

The children stated that they would like to see other's drawings or notes, but when I took them to the wall, they did not show much attention to the creations already hanging on the wall.

Multiple children enjoyed having a polaroid photo taken, because they saw the result appearing. However, instead of hanging the photo on the wall, they rather take it with them to their home or room

"I'M GOING TO MAKE A DRAWING FOR THE OTHER CHILDREN IN THE HOSPITAL."

My most pleasant memory here is that I had stickers on my belly and a nurse connected them. I pretended like it gave me an electric shock and everybody laughed. That was really nice. And the staff is amazing.

"I THINK THIS IS FUNNY TO READ FOR OTHERS AND I'M ALSO CURIOUS ABOUT THEIR EXPERIENCES."

Figure 39: Activity on the Memomuur

Conclusions Memomuur

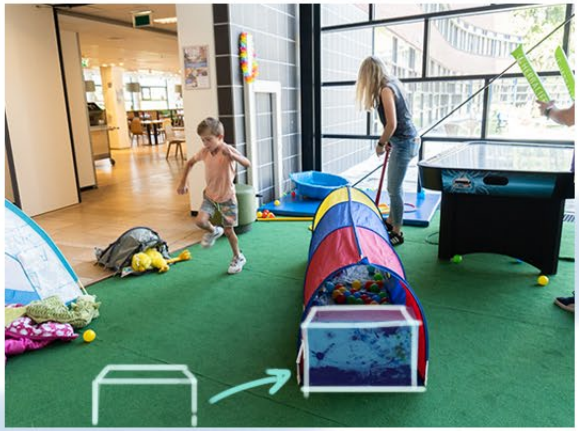
Independently creating and putting something on the wall is a big step for children. It might happen if the concept would be in place for a longer period of time, because children would know what it is, does and how they can manipulate it. However, in a situation like during the test, where a prototype is setup in the environment only for a short period of time, probably no one will take control to make adjustments to the prototype without someone asking them or suggesting to do so. Many activities in the WKZ, especially the ones where children can express their creativity, are initiated and guided by staff members. The tested activity can definitely be seen as similar, hindering children to engage in such an activity independently.
Also, children who claimed to be interested in the creations of others already on the wall, did not pay attention to it when facing it. It seems as if the children are focused on their own sheet, after which the interaction with the Memomuur simply stops. It is not clear whether they are not interested in the things others made after all, or if they 'forget' to look at it. In case of the latter reason, this could be caused by a lack of stimulating components on the wall. It could be an opportunity to combine the interaction qualities from the Memomuur with those from the Hexamuur into one surface, instead of two separate ones.

Blok 2.0

The blocks were placed in and next to the camp site, for children to freely use in play. Figure 40 shows the interactions children had with the blocks over time. At first, a boy used one of the blocks to barricade the end of the tent shaped like a tunnel. Next, he used this composition as a goal to play hockey and put multiple coloured balls in the tunnel.
It was remarkable to see that another child, who came to the camp site later, continued playing with the same composition the boy made. His father said to him: "would you like to play in the ball pit?", after which the boy answered: "look, it even has a door." It is interesting to see that the composition with the blocks, balls and tent left by the first child stirred up the imagination of another child, who used the same composition for another purpose. A while later, a girl used the blocks in several different ways, as if she was exploring what she could do with the blocks. Before leaving the play area, she put two blocks in a row. Her father added a third one to it. Apparently, it is inviting to leave the blocks in a certain configuration.
It was interesting to see that the blocks that were placed in the middle of the green area in advance were used by the children in their play, whereas the blocks that were stacked just outside the green mat remained untouched. It seems that a certain inclusion of the elements in the play field is required for the children to start interacting with them.
Also present in the playing area were some large Lego blocks and quite some children interacted with these objects. The Lego blocks can be attached to each other, which eases the building process, making it more inviting.

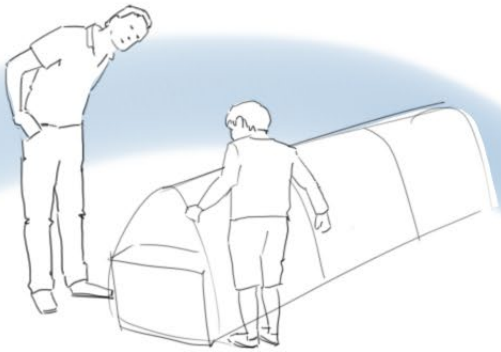
Conclusions Blok 2.0

The camp site was a suited place to test the concept, because it stimulated children to participate in free play and rearrange the elements on the site. However, the location and setup of the blocks was influential of whether children used them in their play or not. The blocks being in the middle of the play field, as if someone else had already played with them, works inviting for other children to do the same. Children can continue in each others playing set ups or create new ones; both were seen during the test. Blocks that seem to be out of the play field may appear out of use, increasing the threshold for children to use the elements. Also, a possibility to attach the blocks to each other would likely stimulate the building process.



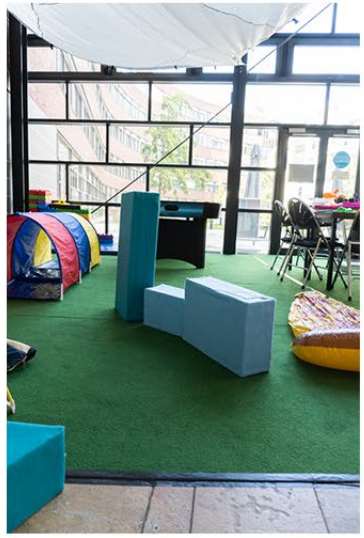
A boy placed one of the blocks at the end of the tent tunnel and used it as a stop for the balls that he was aiming inside the tunnel with a hockey stick.

"Do you want to play in the ball pit?"



"Look, it has a door."

The 'next' child continued playing with the composition that was made before.



Just before leaving, the girl put two blocks in the composition shown on the right. The last block was added by her father.

A big rectangular block would be safe to stand on, but small one can easily tip over.

"Maybe this is not the best idea."

Figure 40: Interactions with Blok 2.0

7.3 Conclusion of both testing sessions

The two testing sessions both had their own results, but because the second test in the main hall was largely based on the results of the first test in the playing room, a joined conclusion can be drawn about both sessions.

Two testing sessions were conducted with a similar approach, but with a very different course of events and outcome. The location of the test is of great influence concerning the behaviour of the children. Children in the WKZ are conditioned to live according to the what the hospital offers and restricts them. The 'failed' test in the playing room is a striking example: children are accompanied by MPZ members from their department to the room, where usually an activity is prepared for them. In the current children's theatre, this is not any different. This policy deprives hospitalized children in their independency in play. Even in a playing room, with a variety of toys and playing attributes, children are retained in their free play. Free play is one of the components of the design perspective that Boudewijn Boon proposes (Boon, M. J. B., 2020) to naturally stimulate physical activity and play. It is unfortunate to see that the hospital reduces this incentive for children, as it would contribute to children's social development and ability to self-direct (Gleason, T., & Narvaez, D., 2019). Free play can also help children express past unpleasant events and gain a sense of control over current events, because the child creates the rules in his play and allows imagination and feelings to run free. (Hart, R., Mather, P., Slack, J., & Powell, M., 1992).
Currently, children also show this behaviour in the children's theatre: they are taken to an activity by de MPZ and after doing what is prepared for and expected of them, they are brought back to their departments. It was a pleasant surprise to see a different dynamic at the camp site during the second test. The children crawled in and out of the tents, combined toys, blocks and tents to build their own structures and used their imagination to define the meaning and purpose of the elements on the camp site. The great behavioural difference can be due to the setup of the area: elements are placed somewhat randomly, as if someone already played with them and left them like that. Also, think of the metaphors that are used: a camping is a place where you can set up your own tent, cook your own food, live and play outdoors, a place where things don't have to be neat and organised and where it is okay to improvise. A theatre, however, is a place where you go at a certain time to see a certain act that someone prepared for you. You sit down at your seat and stay there until the act is over, after which all viewers go back home at the same time. These might just be metaphors, but they highlight the difference between the spaces and the accompanying behaviour that is induced by them.

For the Waterval to become the children's place of their own, where they can both find a private moment, but are also triggered to engage in social interactions with other children, a setting like on the camp site is required. In the current format, with set activities where children can come under guidance of the MPZ, children are not given the freedom to create and design their own environment. For the room to trigger children to play freely and independently, a habitual change needs happen, stimulated by the design in the room.

7.4 Feedback from the children's council

All children who tested the concepts were very young of age and therefore I missed the input from hospitalized teenagers in the WKZ. Through an online survey, in which I explained the concepts with textual description and drawings, I asked the children's council for feedback and suggestions.

Setup of the questionnaire

In the questionnaire I posed statements for each of the concepts, asking the children to rate on a scale of one to ten whether they agree with the statement or not. An example of one of the statements for concept Hexamuur is: 'this wall allows me to make my own creation.' I also asked the children for input with questions like 'what is your first impression?', 'would you change something to make the concept more suited for the WKZ?' and 'would you change something to make the concept more suited for you?'. The complete survey and the answers can be found in Appendix 13.7.

In this survey, the answers to the open questions are more relevant than the answers to the statement questions. The statement questions could, however, have served as a refreshment of the idea generation session, reminding the children of the sort of ideas they came up with during the meeting. Because the children were already part of two sessions during this project, I expected them to be able to easily understand and give their opinion on the concepts.

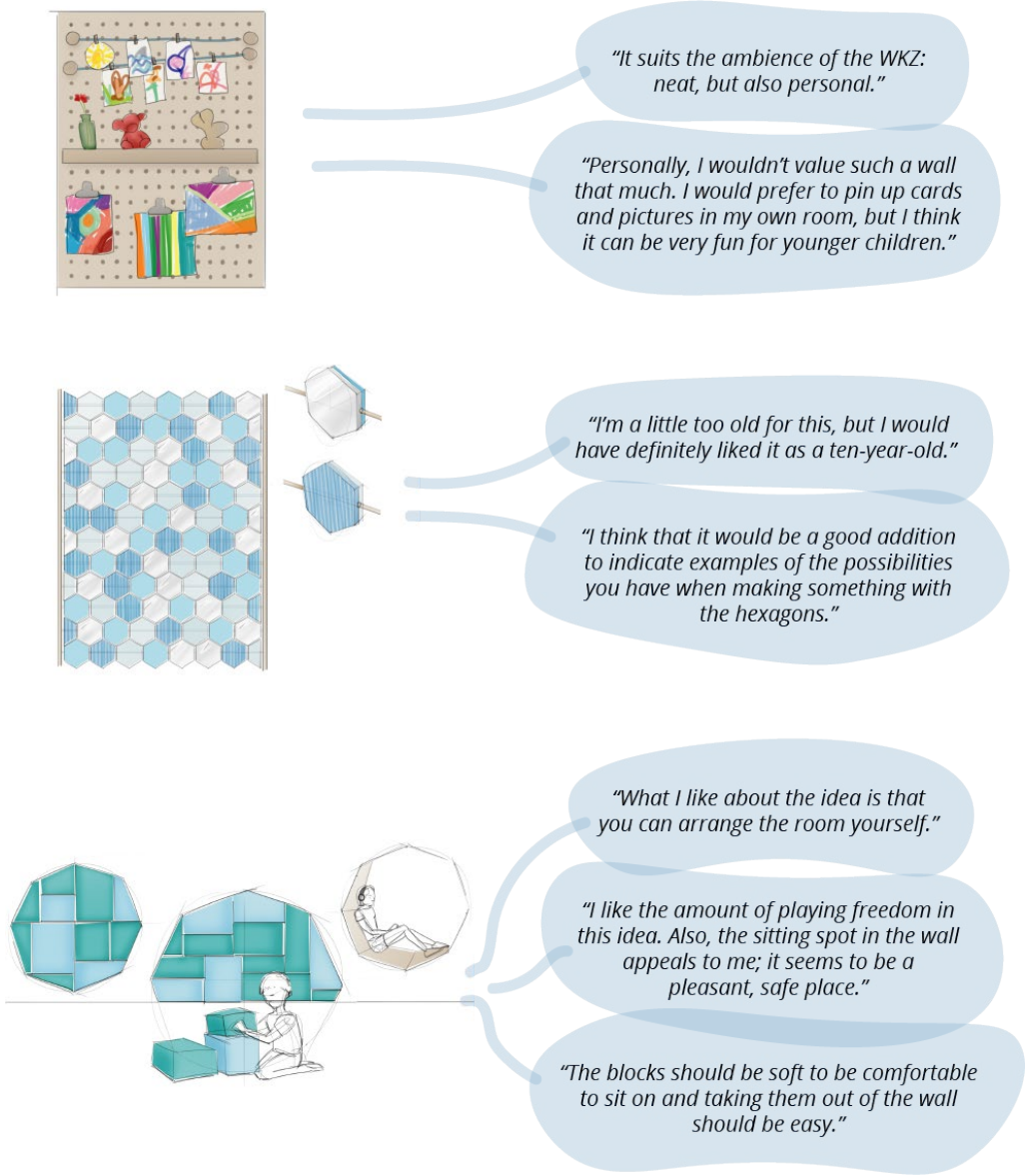


Figure 41: Feedback from members of the children's council

Results and conclusions from the questionnaire

Figure 41 shows the concepts with some interesting feedback and suggestions from the children. Six children responded to the questionnaire: one aged 10, one aged 15, and the others aged 17 and older. For both Memomuur and the Hexamuur, some children responded that they are a bit too old for the concept, but that it would be suited for young children. Someone mentioned that she rather pins up cards and photos in her room. Remembering the testing session in the main hall, the children would also rather take their polaroid photo with them, so it can be concluded that the Memomuur is more suited for drawings and other creations made inside the Waterval than for personal photos or cards sent by loved ones. When making something during an activity, children are more willing to display it on the wall because they feel like they contribute something to the room themselves. This probably makes the Memomuur more suited for younger children than for older ones, because most children joining the activities are young of age. Concerning the Hexamuur, the majority of the respondents claim to be curious about what happens when turning the wall. This implies that older children would be triggered to at least try what happens when they turn the hexagons, which could affect younger children in the room to imitate their actions (McGuigan, N., & Robertson, S., 2015).

Reactions to concept Blok 2.0 included several statements that acknowledge the aim of the concept: respondents mentioned playing freedom and self-arrangement when talking about the blocks. Young children during the test used the blocks as facilitator or element of play, but older children appear to also imagine the blocks in a more functional role, for example as a sitting object. Lastly, the members of the children's council value the sitting place in the wall, because it seems a pleasant and safe place. This aspect of the concept is probably most valuable for older children, being in line with their desire for a place of their own.

7.5 The goal of the final concept

The insights from the tests and the evaluation with the children's council lead to an additional goal for the final concept, next to the design goal as stated in Chapter 4: The project design brief. The new goal is explained in this subchapter and clarified by means of a metaphor.

With the insights derived from the testing sessions in the hospital, I will develop a final concept with the following goal: the Waterval has to become a place where independent exploring behaviour from children is encouraged. Ideally, the curiosity of children who are inside the room is significant enough to start interacting with the design and break their wait-and-see attitude, without someone telling them that they can do so. An earlier concept, 'Child's terrain', was based on the view that the Waterval belongs to the children inside the hospital; they are the owners and directors of the room. The insights from the tests emphasise the importance of this philosophy.

As the room should evoke the initiation of a (social) interaction with people or attributes present, I will use a metaphor to describe a similar interaction. This way, it might be easier to understand triggers of such an initiation.
Imagine you are staying in a hotel and you go to the breakfast buffet in the morning, thirty minutes after the buffet opened. Arriving at the buffet area, you notice that no other guests are present. Also, you don't see any staff members, who you expected to welcome you and direct you to one of the tables. In such a scenario, what would be triggers that are sufficient enough to convince you to take a table and start your breakfast? It could be the fact that the tables are set, that the food is displayed on the buffet table, or that you notice a sign with the opening times of the buffet that confirms the buffet should be open. It could be that the lights are on, that a background music is playing, or that the entry door to the buffet area is opened when you arrive. Even small things like a coffee machine that is turned on, closed chafing dishes that have handles to open them, or the fact that you are hungry can be cues to independently start your breakfast. Some of these triggers weigh more heavily in the decision making process and the lack of them could change your behaviour. When too many triggers are lacking, you might decide to look for a staff member or even to have breakfast somewhere else. It shows that cues like these, either inviting aspects like the lights or open door, or aspects that show someone has made changes to the space before you came in, should also be present in the Waterval.

SUMMARY

Chapter 7: Testing the concepts in the Wilhelmina Children's hospital

Concept Blok 2.0 and Hexamuur were tested in the playing room and a week later, concept Blok 2.0 and Memomuur were tested on the camp site in the main hall. It can be concluded that the location of the test is of great influence concerning the behaviour of the children. Children in the WKZ are conditioned to live according to the what the hospital offers them and when it restricts them. This attitude was highly existing during the test in the playing room and the children did not interact with the prototypes independently. An entirely different dynamic happened during the test on the camp site, where children played much more freely. Currently, the behaviour in the children's theatre is more similar to that in the playing room, rather than that on the camp site. However, children playing freely would be more desired.
The concepts were also evaluated by the children of the children's council through an online questionnaire. The conclusion from this evaluation is that the sitting place in the wall is likely to be most valued by older children, such as teenagers. They tend to look for a private place 'away' from the hospital.
The tests result in an additional goal for the final concept, besides the design goal that was stated earlier: the design should encourage independent and exploring behaviour from children.

8

Final concept: Mozaïek

The insights gathered from the tests in the WKZ led to the final concept for the new design of the children's theatre. In this chapter, the establishment and functionality of the final concept are described. Also, the suited material properties and appearance are discussed.

8.1 Towards the final concept

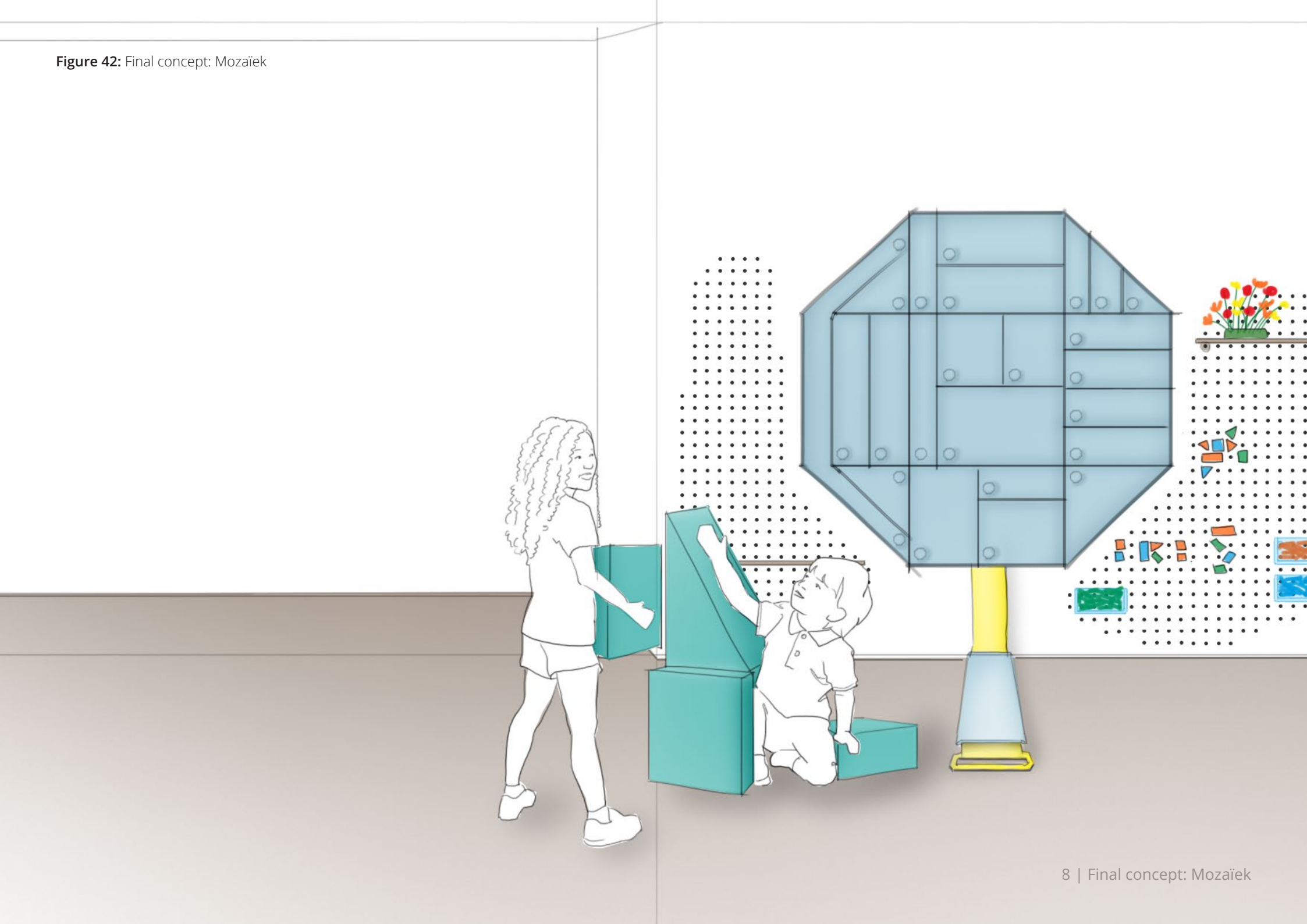
In this section, I explain how the insights from the testing sessions with Blok 2.0 and Hexa/Memomuur led to the final concept.

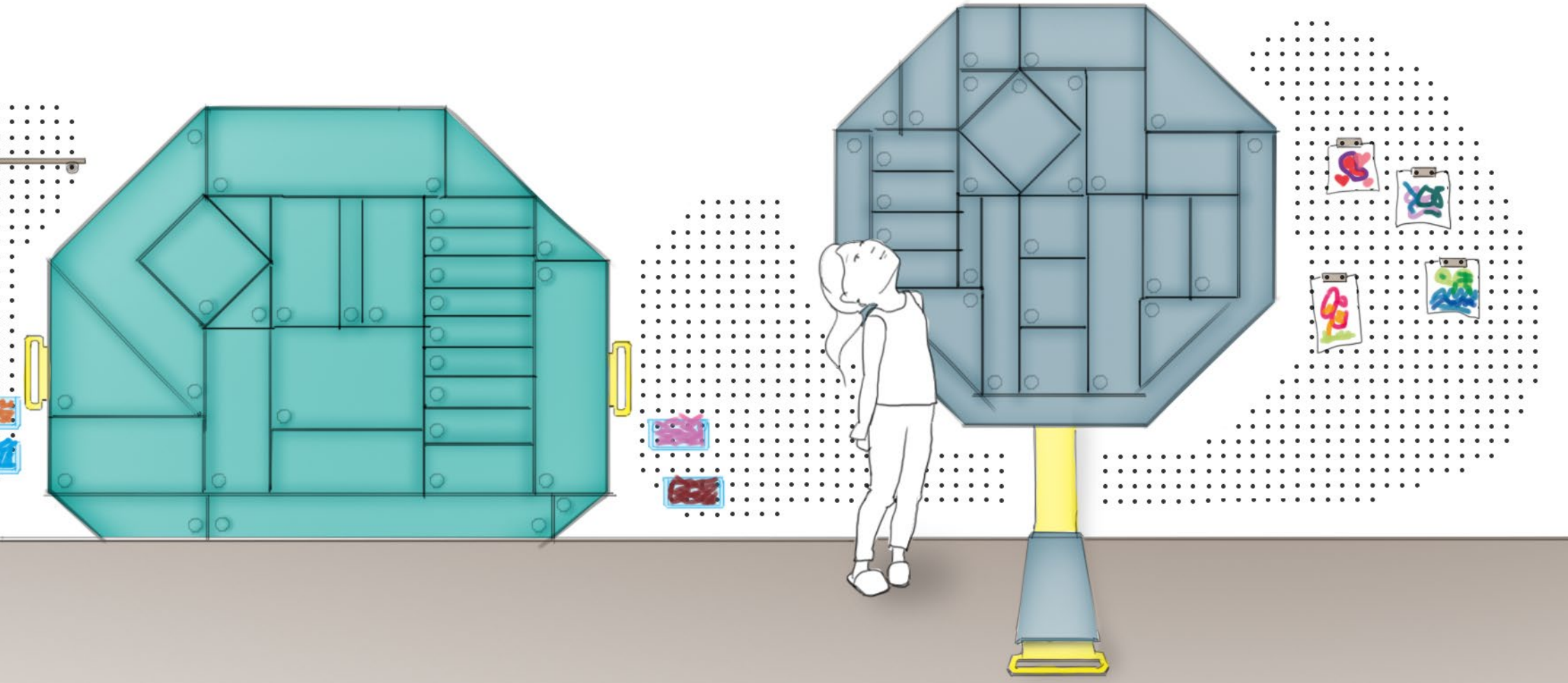
According to the insights from the testing sessions in the hospital and the feedback from the members of the children's council, I developed the final concept: Mozaïek, showed in figure 42. Mozaïek covers a large part of the wall with three octagonal cutouts that have blocks in them, like in previous concepts. The blocks are more variously shaped: some arch-shaped blocks are added to broaden the possibilities children have when playing or building with the blocks. Also, the blocks can be attached to each other. This will be explained in more detail in subchapter 8.2: How it works. The blocks can be taken out of the wall by pulling the yellow handles below or next to the octagons. When the blocks are removed from the wall, the octagon serves as a sitting area. Between the octagons are grids with holes, in which several elements can be placed that contribute to the creative and personal expression of children in the room. Because of this grid, the composition of the wall can be continuously changed by its users. Like with the Memomuur, drawings and other creations from the children can be displayed with clips and shelves. Additionally, geometric and colourful shapes can also be put in the holes of the wall, allowing children to make an own creation on the wall.

Mozaïek is Dutch for the art made with mosaic stones: small multi-coloured stones are used to make a large image. The mosaic stones are the facilitator for what the artist chooses to make with them; the possibilities are endless. One of the characteristics of the concept Mozaïek is that the children can create their own space every time they are in the room, which is why the mosaic stones are a metaphor for the elements in the concept.

The following decisions were made to form the final concept: firstly, the tests showed that inviting stimuli are necessary to provoke autonomous and exploring behaviour from the children in the hospital. This is the reason why parts of the separate concepts, Memo/Hexamuur and Blok 2.0, are combined into the final concept. This way, the possible interactions with the concepts are showed together and children might be urged sooner to try out what they can do with the wall. The Hexamuur might not seem so obviously present, but the attention-grabbing aspect was the starting point for the geometric and colourful shapes that can be put into the holes of the wall. The end result can still be a creation on the wall, like the with Hexamuur, but with more freedom and possibilities.
Another addition to the concept are the large yellow handles that are connected to the octagons in the wall. The large handle is meant to grab the attention of the children, triggering them to pull it. As a result, the blocks will fall out of the wall. The surprise should stimulate the children's desire to further explore what they can do with the Mozaïek wall.
During the tests I concluded that the blocks need additions to broaden the playing and building possibilities. A building process is made more challenging and rewarding when the elements can be attached to each other and children enjoy to crawl in, out and through their playing objects.

Figure 42: Final concept: Mozaïek





8.2 How it works

In this subchapter, I will shortly describe the functional use of the concept.

Figure 43 shows the functional use of the blocks in the wall:

1. Each of the octagons has a yellow handle, connected to the shape.

2. The handle is the end of a band that is positioned behind the blocks.

3. By pulling the handle, some of the blocks are pushed out of the wall and will fall on the ground. The handle is positioned at an appropriate distance so the blocks will fall in front of the child. Also, the blocks are very lightweight and soft.

4. The front of each block has a small octagonal lug. Two sides of each block have a shallow cut, stretched out parallel to the long side of the surface. The blocks can therefore be attached to one another in many different ways.

5. This shows some examples of how the blocks can be put together.

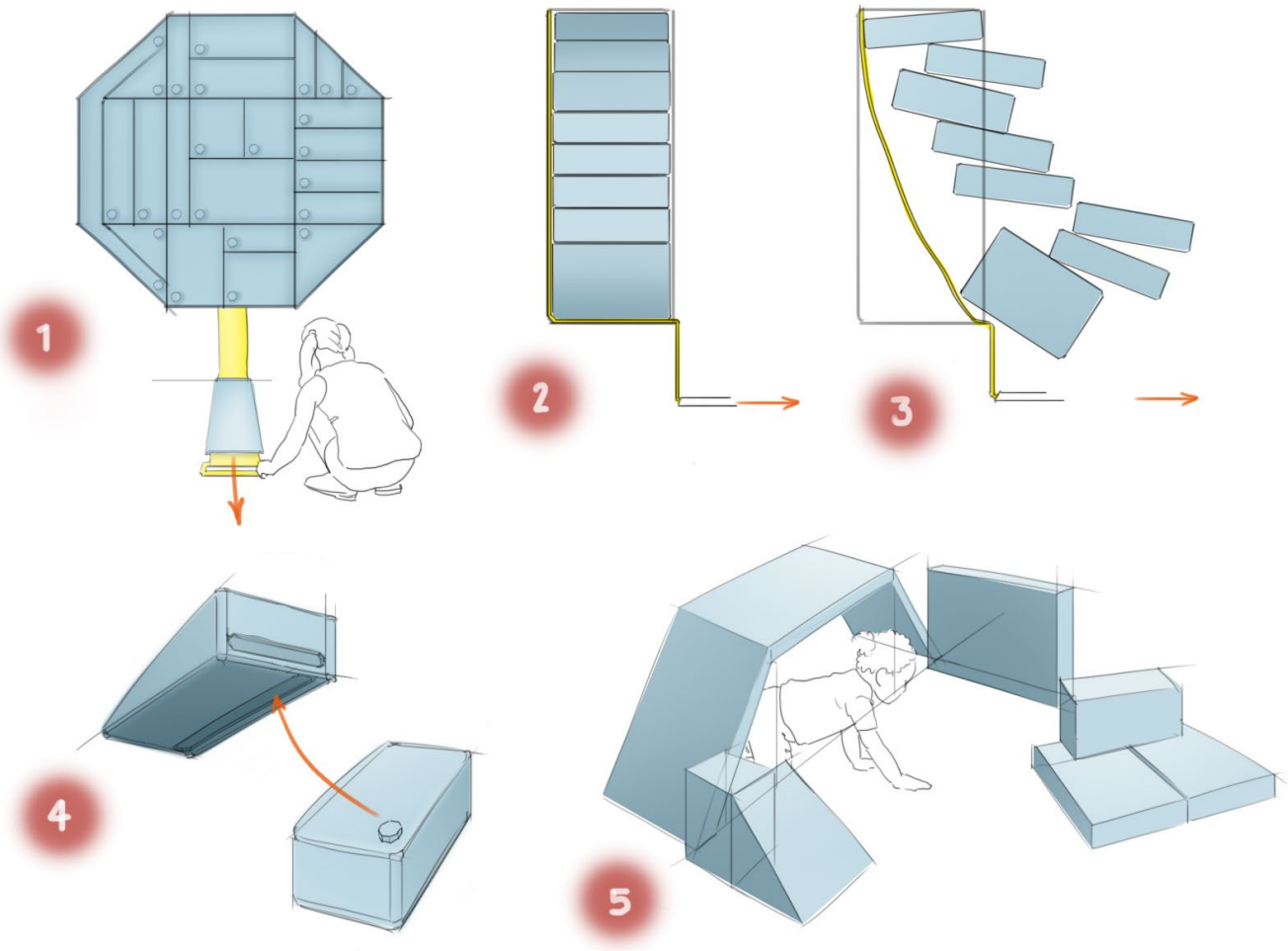


Figure 43: Functional use of the blocks from Mozaïek

Figure 44 shows the functional use of the grid of holes in the wall. The focus is put on the explanation of the geometric shapes, because the principle of the clips and shelves is similar:

1. Sections with a grid of holes are on the wall in between the octagons.

2. All the objects that hang on the wall have small sticks on the back, which fit into the holes. This way, the composition can easily be changed by anyone in the room. For example, the tub with the coloured shapes has one stick on each side of the back.

3. The pieces in the tubs contain similar sticks with geometrical shapes on them. Children can stick the shapes into the wall and the geometrical shapes allow for many different creations.

4. Similarly, the actual creative makings from the children can be displayed.

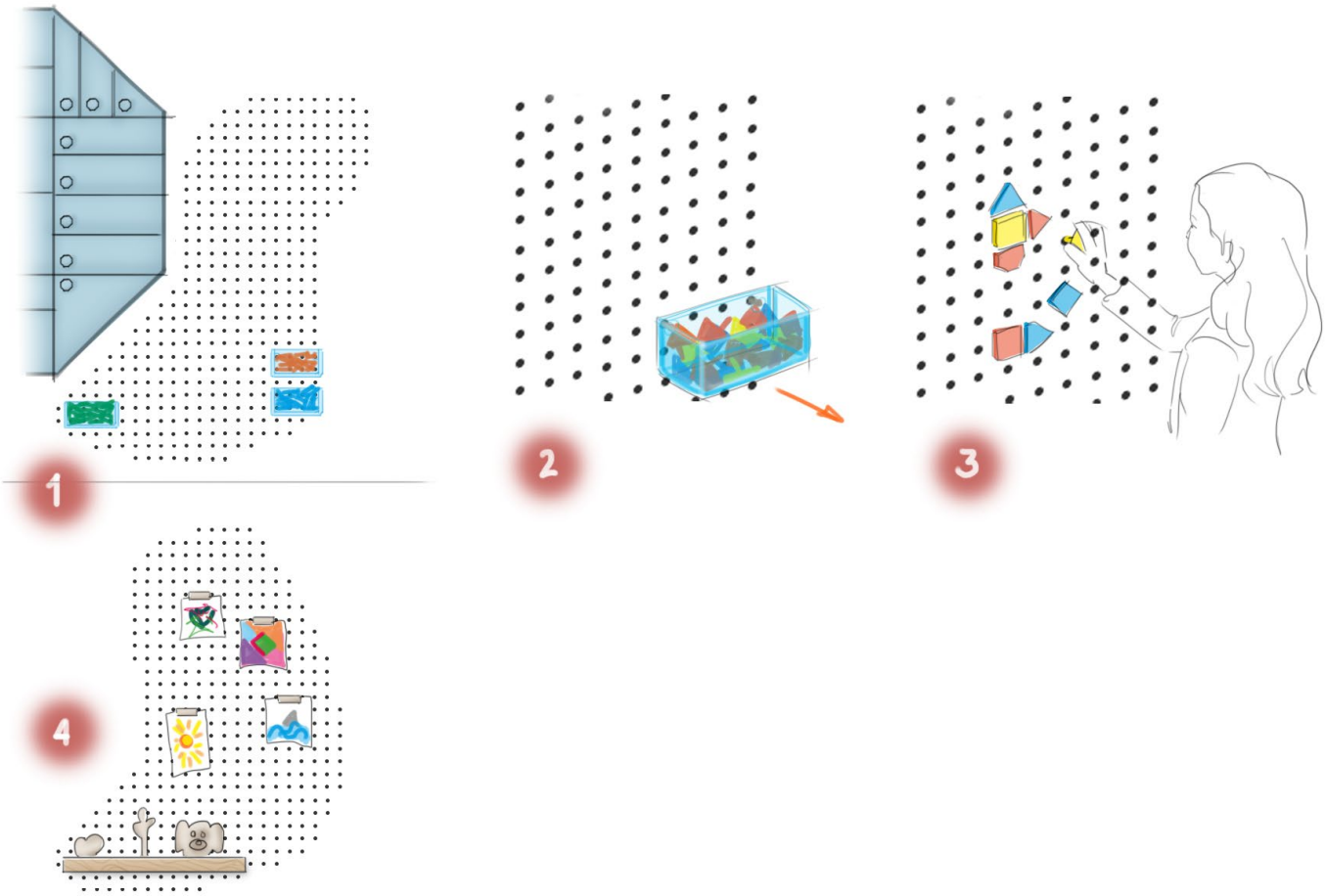


Figure 44: Functional use of the holes in the wall from Mozaïek

8.3 Appearance and materialisation

With multiple parts of the concepts combined in one wall, some thorough attention should be paid to the colour, shapes and feel of the concept elements. All elements should stand out enough to grab the children's attention, but also be one entity together. In this section, I will discuss the general appearance of the concept and the required material properties of several parts of the concept Mozaïek.

8.3.1 General appearance

Geometric shapes are used throughout the concept: the blocks, the octagon cutouts and the colourful shapes to put in the wall. Only the grid has a more organic shape, which makes it look like the octagons are embraced by the grid and therefore does not seem contrasting with the rest of the design.
Because the wall will be filled with colourful drawings and other creations, it seems natural that the geometrical sticking shapes are also variously coloured. Instead of being creative on a sheet of paper, children have similar creative freedom when making a work of art on the wall.
The blocks in the octagons cover a large part of the wall. By monotone coloured blocks in each octagon, the ambience remains peaceful. A colour distinction between the blocks of each octagon aids to put the right blocks back in the right shape. The blue shades are chosen to match the colour plan of the hospital: turquoise and blue shades are used on the ground floor because of the water theme. As the new name will also be the Waterval, following this colour plan makes sense.

8.3.2 Materialisation

Blocks
The material of the blocks needs to be firm enough for the blocks to stand on their own. Because the blocks will be falling out of the wall, even though the child who is pulling the handle will be at sufficient distance, they need to be very lightweight and soft. Shape-retaining plastic foam is therefore a suited material for the blocks. This will allow for very lightweight blocks that are strong enough to sit or stand on. Because the blocks will be shoved across the room a lot, they require a water-resistant smooth surface that can easily be cleaned.

Coloured geometric shapes
The geometric sticking shapes should be safe to use for young children. For children younger than three years, the parts should be larger than 3,17 cm in each direction and elongated parts should be at least 5,71 cm. This means that the shapes on the stick should have a diameter of at lest 3,17 cm and the length of the stick and thickness of the shape together should be at least 5,71 cm. Taking into account that young children could have the tendency to bite on the parts, a soft PVC plastic is advised. For this, it needs to be taken into account that certain plasticizers are prohibited (Nederlandse Voedsel- en Warenautoriteit).

Sitting spot
When the blocks are taken out of the wall, the remaining sitting area should be comfortable. The inside of the octagon should therefore be made from clothed, firm pillows. Soft, separate pillows should be available to make the sitting area more comfortable when needed.

SUMMARY

Chapter 8: Final concept: Mozaïek

‘Mozaïek’ is the final concept for this project: it covers a large part of the wall with three octagonal cutouts that have blocks in them, like in previous concepts. When the blocks are removed from the wall, the octagon serves as a sitting area. Between the octagons are grids with holes, in which colourful sticking shapes can be placed that contribute to the creative and personal expression of children in the room. Like with the Memomuur, drawings and other creations from the children can be displayed with clips and shelves. The blocks should be lightweight and soft to ensure that children can play with them freely in a safe way. A shape-retaining plastic foam like EPS is advised as a material. The blocks should be clothed with a water-resistant material, so they can be cleaned easily. A soft plastic that meets the safety regulations for toys should be used for the geometric sticking shapes. Lastly, the sitting spot should have a comfortable surface.

9

Testing the final concept

To be able to evaluate whether the final concept fulfills the design goal, a final test was conducted. This chapter describes the test setup: the research questions, the prototype, and the method. The results of the test are visualized and evaluated by aswering the research questions. Finally, the *Vision for future designers* is compared to the final concept design and finalised.

9.1 The test setup

To prepare the final test, I phrased research questions based on the design goals of this project. I made a final prototype of a part of the Mozaïek wall and composed a method.

Research questions

In the end, the final prototype should meet the design goal as phrased in Chapter 4: *to give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital, which will be enhanced by stimulation of social involvement among patients within the hospital.* Also, as stated before, *the room should stimulate children to behave and explore independently*. However, these goals are broad and therefore difficult to evaluate.
Instead of phrasing these broad goals as research questions, I drew multiple scenarios to envision the use of the concept. The scenarios can be found in Appendix 13.8. These scenarios helped me to derive research questions that could refer to each of the design goals: (1) the tools and empowerment to create control over their environment and autonomy over their actions, (2) stimulate social involvement among patients withint the hospital, and (3) provoke independent and exploring behaviour in play.

Give patients the tools and empowerment to create control over their environment and autonomy over their activities in the hospital

1. Are parts of Mozaïek used to build something?
2. How do children use the octagonal shape in the wall when the blocks taken out?
3. Are parts of Mozaïek used as a facilitating object for play with something else?
4. Are parts of Mozaïek (for example the blocks or the coloured wall shapes) used as playing objects?
5. How do children leave the prototype after use?

Provoke independent and exploring children's behaviour in play

1. Do children go to the prototype independently?
2. Do children change something in the composition they find the prototype in by themselves?
3. Do children find various ways to play or interact with Mozaïek?

Stimulate social involvement among patients in the hospital

1. Do children use each other's composition when arriving at the prototype?
2. Do children join someone else in play with Mozaïek?
3. Do children start talking to each other if they play simultaneously?
4. Do children interact through Mozaïek?

Prototype

The prototype of the final concept is a part of the wall, including an octagon cutout with blocks, one part of the grid of holes, and geometric colour shapes stick in the wall. Once the blocks are taken out of the wall, the children need to be able to actually take a seat in it. Figure 45 shows a sketch of the prototype.
For this prototype, I decided to leave out the yellow strap to pull out the blocks in the first place. It is meant as a trigger for independent interaction with the concept and for social involvement among children in the room. However, Mozaïek now has combined elements from previous concepts, which might already result in a design that achieves this *without* the pulling strap. If this appears to be not true, I planned to adjust the prototype by adding the strap.

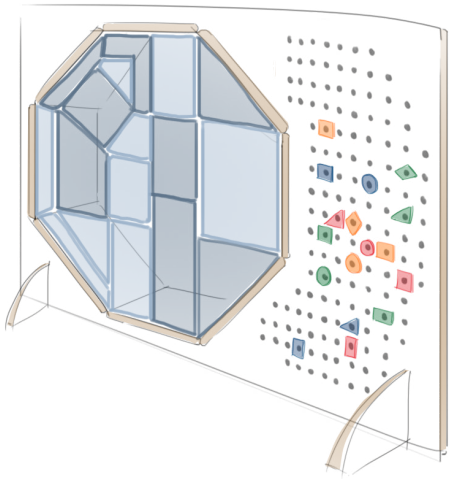


Figure 45: Sketch of the prototype

The wall and the sitting area are made from two types of cardboard. The vertical wall and the two support feet are honey rate cardboard, which is a strong cardboard with a honey rate structure. The octagon sitting part is made from normal EE cardboard. Under the sitting area is a structure of honey rate cardboard, so it will be strong enough to carry a person.
By making an AutoCAD drawing and cutting this on a CNC machine, I was able to make a fast and precise prototype of the wall.
The blocks are made from EPS foam, clothed with a smooth fabric that looks water repellent (because the eventual blocks material will need to be water repellant for hygienic reasons). In the final concept, the blocks can be attached to each other with a 'Lego-like' principle to give children more possibilities if they want to build something with the blocks. The blocks made for the final test did not have this feature yet. The final test blocks are larger than the ones used in the previous test in the main hall (figure 37 and 38 on page 67) and therefore the option to attach them to each other might be less necessary.
For this prototype, the geometric shapes to stick into the grid of the wall are made from wood and painted in different colours.
Figures 46 and 47 show the established prototype.

Figure 46:
The final prototype

Figure 47:
The final prototype

Method

The final prototype was set up in the main hall of the Wilhelmina Children's hospital during five working days. The prototype was placed on the camp site; the area in the back of the main hall with small tents, toys and a tinkering table. Because the prototype was set up in the main hall for several days, I had more time to observe interactions with the prototype and was able to make adjustments if that seemed necessary. Given the fact that I aimed to trigger independent action from the children, I set up several 'starting points' of the prototype to see which situations were most inviting. For example, with all blocks inside the wall or with some positioned on the ground as if someone else had played with them, and with the geometric shapes ordered randomly or sorted by colour. Figure 48 and 49 show the prototype position and setup in the main hall.

Figure 48:
Prototype setup

Figure 49:
Prototype setup

9.2 Results from the test

The test lasted a week and there were many different interactions between people and the prototype. Even though I was present during all days of the test week, I did not see every change in the prototype's state. In this section, chosen events from the test week are visualized and described.

During the testing week I prepared to make some alterations to the setup and prototype if necessary. As described earlier, I decided to start the prototype testing without the pulling strap element. Fortunately, it seemed that the wall itself with colourful shapes and the blue blocks were enough to invite children towards the prototype. Every day, multiple children entered the camp site area and interacted in a way with the Mozaïek prototype. Sometimes a MPZ employee was present at the camp site to help children with tinkering activities and he also joined in play when children used the prototype.
Figure 50, 51 and 52 show the most notable scenarios that took place during the test. For each scenario, I will describe the interactions people had with the prototype and with each other.

Scenario 1: girl starting to play

As visualised in figure 50, a girl went to the prototype on her own and independently started to take out some of the blocks. The prototype had all blocks tidied up in the wall when the girl decided to approach the prototype. She took out one of the blocks and put it in a position so she could sit on it. Afterwards, she continued taking out more blocks and put them on the ground in front of the prototype. As part of her play, she started to put the blocks back, puzzling to see how the blocks would fit in the octagonal shape. An MPZ employee who was present at the camp site started helping her.

It seemed to be quite difficult to put the blocks back in a way to fit them all, which is why I created a picture of how the blocks are fitted most ideally and pinned this on the prototype.

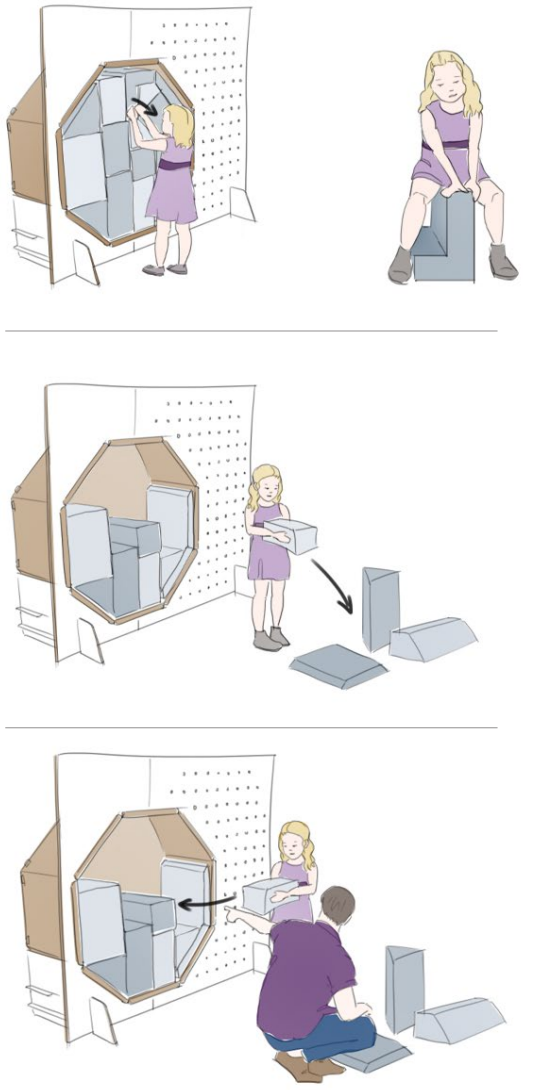


Figure 50: Scenario 1: girl starting to play

Scenario 2: A boy and girl interacting through the prototype

A boy and an MPZ employee were moving some blocks that were already taken out of the prototype. A girl, who did not know the boy, approached the pair and joined by taking out some blocks of the wall. The two children played together in one of the tents: they crawled through it together. Both their mothers were sitting at the tinkering table, watching the two children. Next, the children moved back to the prototype together and started to replace the colourful shapes to different holes in the wall. The girl walked to the other side of the prototype and started to push out the shaped from the back. The boy picked them up from the ground and put them back it. This resulted in a game where the girl pushed out the shapes as fast as possible and the boy tried to keep up by putting them back in. At a certain point, most shapes were pushed out of the wall. The girl, who was still standing on the back side, started putting her fingers through the hole. The boy copied this and they came up with a new kind of play where they tried to touch each others fingers through the holes in the wall. Both children giggled during their play. The girl went back to her mother and the boy stayed at the prototype. He took all blocks out of the wall and sat down in the octagonal shape. From this position, he started to put the blocks back in and in front of the shape, covering and hiding himself. An MPZ employee helped him and after a while the boy was hidden behind the blocks. He remained quiet and made eye contact with both his parents who were sitting at the tinkering table. His father laughed at him and the boy smiled back. After some minutes, the boy suddenly jumped up from his position, casting the blocks through the air. Both his parents laughed and acted surprised. The boy smiled in satisfaction of the effect.

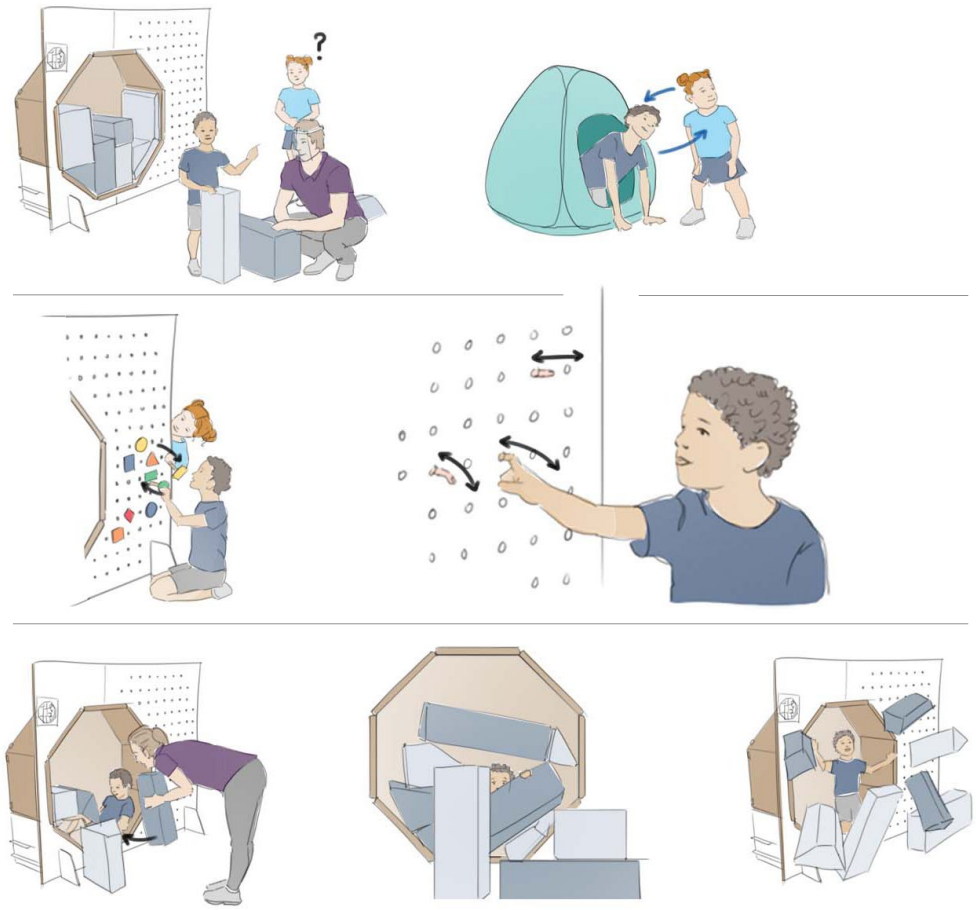


Figure 51: Scenario 2: a boy and girl interacting through the prototype

Scenario 3: Brother and sister make an obstacle course

A brother and sister approached the prototype together and some blocks were already positioned on the ground. The boy was very young; the girl took more blocks out of the wall and put them on the ground, while the boy moved some of the blocks that were already there. When enough blocks were taken out of the wall, the girl positioned them in a line. Some blocks were put down upright and some were lying flat on the ground so it could be used as an obstacle course with different heights. The girl held her brother and guided him over the course, making sure he would not fall. Their mother was sitting nearby, but let the children play as they wished. After playing for a while on the obstacle course together, the girl stated that they now had to 'make the puzzle to put the blocks back'. She struggled a bit, so a MPZ employee came to help her. The girl placed most of the blocks back in the wall and the boy mostly watched her do this.

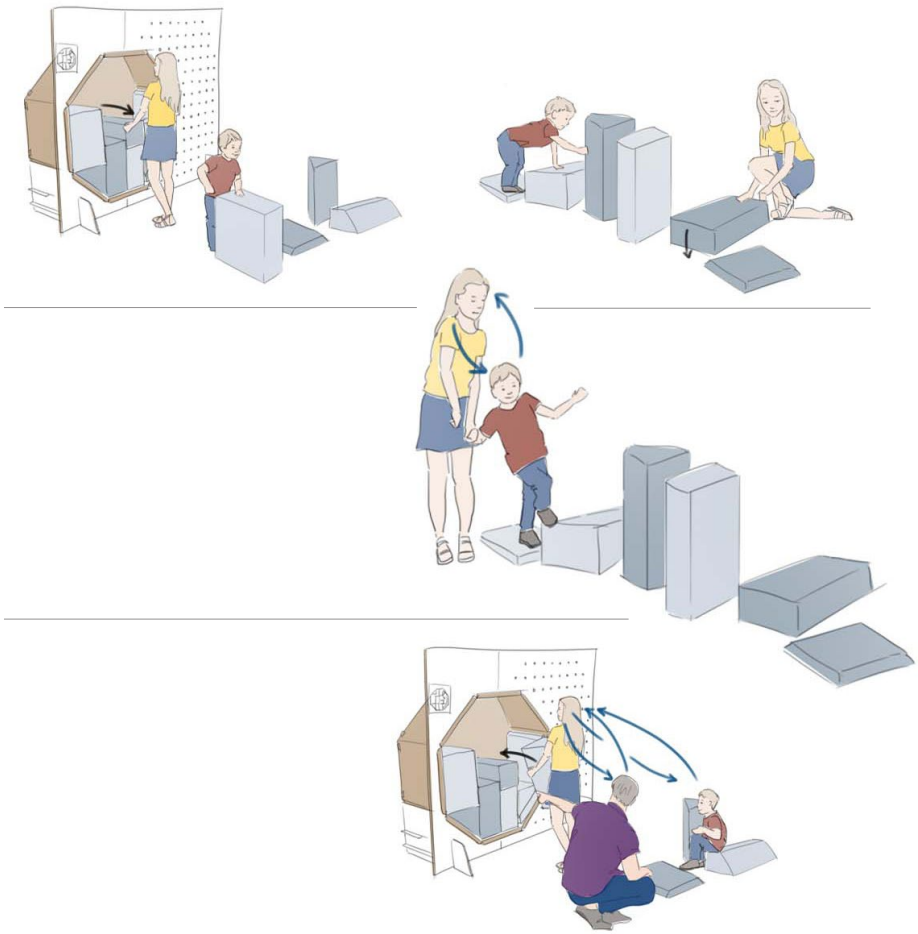


Figure 52: Scenario 3: brother and sister make an obstacle course

9.3 Evaluating the final concept

To evaluate the final test, I answer the research questions I posed for the test of the final concept using the three scenarios. Additionally, I will evaluate the Vision for future designers I composed in subchapter 4.4: Vision for future designers. I will asses to what extend the opportunities and directions from the vision are found in the final concept and whether the vision itself needs alterations dependent on the results from the concept tests.

Answering the research questions

Are parts of Mozaïek used to build something?
In scenario 2, the boy used the blocks and the octagonal shape in the wall to build a hiding place. This indicates that the octagonal shape in the wall and blocks can facilitate a safe and private place if someone would want that.
In scenario 3, the girl built an obstacle course for herself and her little brother. By putting down the blocks in different positions, she could easily create height diversity in the course. The styrofoam material of the blocks makes them very lightweight and therefore easy to move, but also generates enough substance to hold children who are climbing or standing on them.

How do children use the octagonal shape in the wall when the blocks taken out?
During the testing period, multiple children sat down in the octagonal shape for a moment to try it out. The boy from scenario 2 was the only one who used the sitting shape for a longer period of time. The evaluation with the children's council in subchapter 7.4: Feedback from the children's council, indicates that the use of the shape as imagined (to find a place for yourself and relax) is predominantly suited for patients who are a bit older. During this final test the children in de main hall were mostly young, which can explain the singular use of the octagonal shape. It also gives the insight that the overall ambience in the room determines how the sitting area in the wall will be used. When children took out the blocks, they started to play with them right in front of the shape. For someone who is looking for a place to relax, this would not be the most peaceful surrounding.

Are parts of Mozaïek used as a facilitating object for play with something else?
Once during the test week it occurred that a boy wanted to play with the air hockey table, but he was not tall enough to comfortably reach the table. He looked around, took out one of the blocks from the prototype, and used this as a stand to easily reach the table.

Are parts of Mozaïek (for example the blocks or the coloured wall shapes) used as playing objects?
There were some moments were parts were used as playing objects. Children are tempted and entertained by throwing around the blocks because of their lightweight material. Additionally, two children used the colourful geometric shapes in the wall to play a reaction game, as is described in scenario 2. Even only the holes in the wall served as a playing object. However, it is not possible to be the back of the wall in the current design. Because the two children had interesting non-verbal interaction through the wall, also facilitating this in the design is a valuable opportunity.

How do children leave the prototype after interacting with it?
Children who had interacted with the prototype left it behind in different ways. Concerning the geometric shapes that stick into the wall: some children end their play by putting all shapes into the holes, but frequently the shapes ended up lying on the ground in front of the prototype. In the final concept explanation in figure 44 on page 81, it is shown that the sticking shapes are placed in tubs hanging on the wall when they are not used. The final prototype did not have these tubs, but it appears to be a necessary elements to quickly tidy up the sticking shapes after playing with them. Sticking each shape back into one of the

holes proves to require too much effort.
Similarly, the blocks were also left in diverse compositions after children used them. Notably, many children started to put the blocks back into the octagonal shape as part of their play, some even called it a 'puzzle'. During the first day of the test, I noticed that the 'solution' of the puzzle was too difficult. I added an example of how the blocks fit in the shape to ease the process. However, it was still too challenging for children to complete it on their own. The blocks have some difficult shapes and the correct rotation to put them back into the wall was difficult to find for the children, which resulted in most of them dropping out before finishing the 'puzzle'. Sometimes the blocks were also left on the ground, after which an MPZ employee would usually tidy them up by either putting them back into the wall or stacking them in a more neat way. The way children leave blocks (if they don't put them back into the wall) is easily seen as a mess. In the final concept explanation in figure 43 on page 80, it is shown that the blocks have little juts and incisions which allow to attach the blocks to each other. The blocks in the final prototype did not have this feature. When children leave an attached structure, it would seem less 'messy' than when blocks lie around separately. Nevertheless, it is a useful opportunity to make the puzzling more adapted to the capabilities of the children so the blocks are more often put back into the wall after play.

Do children use each other's composition when arriving at the prototype?
When children leave the blocks or sticking shapes in a certain composition, it is often unclear what the elements represent. The shapes of the parts result in ambiguous compositions, which means that a child approaching leftover parts of someone else can interpret and use them in an entirely different way. During the test, I left the prototype untouched in between children playing with it and new children approached the parts and started a new play. It can therefore be concluded that walking into the playing area of a previous user triggers the curiosity to play with the materials.

Do children join someone else in play with Mozaïek?
Do children start talking to each other if they play simultaneously?
Do children interact through Mozaïek?
Scenario 2 showed a situation where two children who don't know each other played together with the prototype. A girl approached a boy and MPZ employee who were already playing with the blocks. The most interesting thing to see here was that the two did not verbally communicate that much, but Mozaïek allowed them to interact with each other through its elements. By moving blocks together, but especially by interacting with each other from either side of the wall. It is a valuable result that the concept could lower the barrier for two children to play together.

Do children go to the prototype independently?
During the test week, I observed multiple children who approached the prototype by themselves. Apparently, the elements combined are sufficient to attract children and stimulate them to explore the possibilities there are when using Mozaïek. The final concept description in Chapter 8: Final concept: Mozaïek, describes handles to pull out the blocks from the wall. This element is supposed to trigger the children to start interacting with the concept. However, the test shows that this additional element is not necessary and that the concept already triggers enough curiosity with the blocks, octagonal shape and the geometrical sticking shapes.

Do children change something in the composition they find the prototype in by themselves?
Children started using the prototype from different starting points: with the blocks and sticking shapes taken out and also with them put back neatly into the wall. However, when the prototype would be set up with all parts into it, I noticed longer periods without interaction from children than when the parts would be lying somewhere else around it. The latter

situation made children see the connection between the loose parts and the wall, triggering curiosity.

Do children find various ways to play or interact with Mozaïek?
The scenarios show the most notable flow of events I observed during the test week. It shows that children are able to use a concept like Mozaïek in various and creative ways that I had not imagined beforehand. This shows that the concept allows children to explore and express in a self-directed way.

The *Vision for future designers* and the test results

Here, I discuss the *Vision for future designers* on page 36 and 37 in relation to the results from the tests in the WKZ. Next, I evaluate whether the *Vision for future designers* requires additions or alterations.

'Patients want freedom to move inside the hospital' and 'patients need trust and familiarity to feel safe during hospitalization'
During hospitalization patients are restricted and controlled. However, inside a pediatric hospital where the main goal is to treat illness, this is not easily changed. Therefore, the design space was targeted towards allowing hospitalized children to step out of the hospital environment and situation once in a while. In the new design, children should be defined by their skills, personality, and hobbies. This is facilitated in Mozaïek in multiple ways: children can make the room their own by putting up personal creations on the wall or making a creation with the wall itself.
The vision also states that *a certain form of preparation is an opportunity to already evoke this experience before or upon entry in the designed space*. This, however, turns out to be difficult in the hospital context, because patients are obligated to receive guidance from a parent or MPZ employee when they would want to go to the Waterval. The MPZ, who already plays a crucial role in the pediatric and mental support for children and their family, can also play a large role in the preparation of the children to go to the Waterval. Patients have to be aware that they are always welcome in the Waterval and the MPZ stands in the unique position make patients aware of this fact. Assuming that children in other pediatric hospitals cope with similar regulations and restrictions as in the WKZ, the design direction can be redefined as: *pediatric care staff can give patients the necessary preparation that lowers the boundary to leave the hospital environment and enter the designed space.*

'Patients search for a private and personal place in the hospital'
The vision currently states that a personal place should facilitate children's own contribution to the design and arrangement of elements, along with the choice to either look for company or pull back. The test results showed that Mozaïek offers children the possibility to make surprising new space compositions. For example, the obstacle course is a good example where a sister made a new arrangement of the concept elements and subsequently used it together with someone else, her brother. Another example, where the boy hid in the octagonal shape with the blocks as separation from the environment, shows that the concept can also offer children a way to pull back. The test did not generate any results indicating that this part of the vision needs to be adjusted.

'Patients want to feel independent'
Direct control is strongly and positively related to happiness for people who go through a stressful period, like pediatric patients are (Larson, R., 1989). Therefore, the design direction states that the design should facilitate options that accommodate immediate control over children's action and the situation. However, after the first tests in the playing room I concluded that the patients in the WKZ are so used to being controlled all the time that they are reluctant to take action in a playing environment. Instead, they wait until a staff member or a parent tells them what to do.
Additionally, the problem statement says that there is a thin line

between patient's need for presence from their parents and a suffocating closeness. Constant presence from parents probably causes the waiting attitude I noticed during the first tests.
Therefore, it should be added to the vision that the design should trigger children to start playing independently. Also, a separation between the children's playing area in the room and the area where parents can sit down and relax can contribute to children's self-directed play. During the final test, the camping area was clearly a space for children and most parents sat down at the tinkering table on the edge of the area, allowing their kids to play freely.

'During hospitalization, patients want to feel understood by, supported by and involved in the group of peers they have outside the hospital'
The translation of this part of the part problem statement was already made into *stimulation of social involvement among patients inside the hospital* because it can serve as a replacement for the loss of social interaction children experience with friends from home. However, during the final test I noticed that besides patients, many visiting children would also play with the prototype. These visiting children join the playing area with a less restricted attitude than the hospitalized children, which could help to stimulate patients to let go of their tendency to hold back from playing freely and independently. Therefore, the notion that the design should stimulate social involvement between all children in the hospital, should be added to the design direction. The three design opportunities as stated by Patrizia D'Olivo et al. (2018) are still a useful starting point to establish this social involvement.

According to the outcome of the tests in the hospital, I completed the *Vision for future designers*, visualized in figure 53. This visual shows the final version of a vision on how patient wellbeing can be improved in a pediatric hospital. The vision is established to help and direct future designers who work in a similar context.

SUMMARY

Chapter 9: Testing the final concept

I conducted a final concept test by placing a prototype of Mozaïek in the main hall of the WKZ during five working days. During the test, I observed many different interactions children, MPZ staff, and parents had with each other and with the prototype. Using scenarios, I highlighted the most notable events during this test week. The scenarios are evaluated by answering the research questions stated on page 85 and 86. Some insights are that children show that they use their imagination when playing with the blocks: they use them for various purposes and think of creative ways to build things. The wall with the geometrical sticking shapes facilitated a valuable interaction between two children who did not know each other beforehand: by standing on either side of the wall, they interacted through a made-up reaction game with the sticking shapes. The octagonal shape was used by one boy as a hiding place. The test also revealed that a private and peaceful place is quite dependent on the fuss that takes place in front of the wall: when children are playing with blocks right in front of the sitting place, it is probably not so private after all. Lastly, the amount of children who approached the prototype and interacted with it with great variety suggests that the the concept can stimulate children to play and explore independently and freely.
Lastly, the final test outcomes are compared to the *Vision for future designers*, as was set up in subchapter 4.4. This resulted in alterations to the vision and the establishment of the final *Vision for future designers* that I will state within this project in figure 53.

BEING A PATIENT IS NOT THE MAIN FOCUS

Being hospitalized causes feelings of unfamiliarity and restrictions compared to usual childhood. These effects are difficult to overcome, but both have to do with sick children being defined as patients instead of the child they are besides the sickness. Taking children away from the hospital environment can temporarily decrease these negative effects of hospitalization. The design should therefore allow patients to let go of the characterisation of them being a patient. Instead, **they are defined as a child by their skills, personality, and hobbies. Pediatric care staff can give patients the necessary preparation that lowers the boundary to leave the hospital environment and enter the designed space.**

PATIENTS WANT FREEDOM TO MOVE INSIDE THE HOSPITAL

Many hospitalized patients are physically incapable to be as active as they would be in daily life, due to illness.

Hospital regulation restricts patient's movability inside and outside the hospital. Children are mostly not allowed to leave their department unattended. They rely on their parents or a nurse to accompany them. In case a patient has an intravenous pole, the patient's movability is restricted even more.

PATIENTS NEED TRUST AND FAMILIARITY FEEL SAFE DURING HOSPITAL

Feeling safe in a hospital has two conf
aspects, which can change over tim

Upon first hospitalization: patient is scared b
and procedures, which **decreases** the feeling
The patient comes to the hospital with a ba
the staff and procedures, which **increases**
being safe.

With experience in the hospital: the ho
ment and procedures have become f
increases the feeling of being safe. H
patient notices flaws and mistak
decreases the feeling of being safe
more and more time to reco

FACILITATION OF A PERSONAL PLACE FOR PATIENTS

Patients look for a personal and private place in the hospital where they can pull back and feel comfortable. This place can be compared to a child's bedroom, which is characterized by personal artifacts, children's own arrangement of things, the possibility to express interests and hobbies, and comfort. To be able to offer patients a place of their own in the hospital, **the space should facilitate children's own contribution in the design and arrangement of elements, along with a choice to either look for company or pull back.**

PATIENTS SEARCH FOR A PRIVATE AND PERSONAL PLACE IN THE HOSPITAL

It is difficult for patients to find a private place that feels homely and personal. Their own hospital room does not suffice, because it does not allow patients to pull back from the physical hospital environment and people who surround them during hospitalization.

PATIENTS IN A PEDIATRIC HOSPIT WANT TO FEEL IN CONTROL OVER T BODY, ENVIRONMENT AND THE DA OCCURRENCES OR ACTIVITIES

GIVING PATIENTS IMMEDIATE CONTROL

Subjective control, meaning the control is not only factual but involves feelings, is strongly related with happiness for people who go through a stressful period. Patients in the WKZ are likely to belong to this group. For them, immediate control over their actions or the situation results in immediate feelings of happiness. Therefore, **the design should facilitate options that accommodate immediate control over children's actions or the situation. Also, the design should trigger children to start playing and exploring independently. Having a separation between the playing area and the facilities for parents makes it easier for children to play and act on their own.**

PATIENTS WANT TO FEEL INDEPENDENT

Patients acquire knowledge about their
hospital procedures and devices and f
back to make decisions for themselves
they can apply this knowledge.

There is a fine line between the patien
for the presence of their parents an
feeling of being suffocated by cons
presence, depending on hospitaliza
reason, duration and frequency

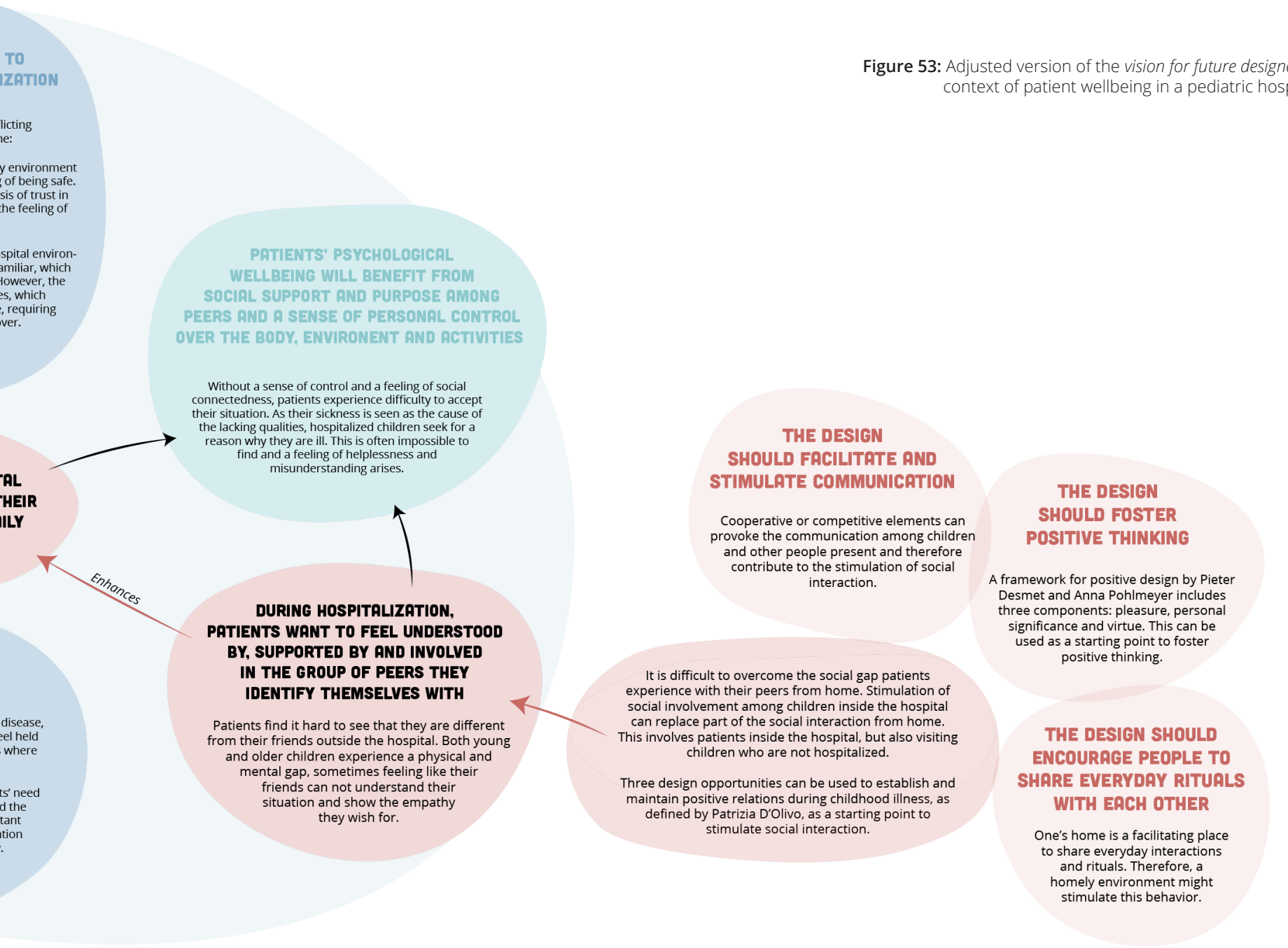


Figure 53: Adjusted version of the *vision for future designers* in the context of patient wellbeing in a pediatric hospital

10

Conclusion and final adjustments to the concept

In this chapter, the results of the final test in relation to the design goal and problem statement form a conclusion. Next, the results from the literature study and research in the WKZ are used to illustrate how the final design can improve patient wellbeing. Also, some final design alterations are proposed based on the results from the final test.

10.1 Conclusion

I draw a conclusion of the project using the results from the final test for each of the two parts of the design goal: about control and about social interaction. Here, I also make a connection between the final test results and the insights derived from the literature and context research.

Part one: create control

The first part of the design goal states *to give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital*. This goal was derived from patients' desire to feel more independent, have a private and personal place in the hospital, experience trust and familiarity around them, and the desire to have more freedom of movement during hospitalization. During concept testing, I discovered another aspect related to control and autonomy: hospital regulation causes hospitalized children to have a coordinated schedule during the day and this results in a waiting attitude, also at moments when the patients are allowed to play freely. So, even though patients claim that they want more control over their environment and activities during hospitalization, they currently fail to take it when they have the chance. A result that shows an improvement of the problem areas named above is, firstly, the fact that the prototype of Mozaïek was approached and parts were used by the children in various ways. The prototype had to be inviting enough for children to start interacting with it on their own. Also, the fact that children used the prototype in various ways, e.g. making an obstacle course, finding a hiding place, or making up a trying to solve the block puzzle, are all examples that the concept allows children to create their own environment. They can therefore take control over the environment they want to be in at that moment. As argued by Larson (1989), feeling in control is directly related to happiness, which has absolute relevance to wellbeing (Sen, A., 1985), in daily life for individuals who are going through a stressful period. Also, personal control is defined by a combination of personality measures that are all related to psychological wellbeing and successful performance. This means that the more personal control someone experiences, the more likely this person is to possess and express personality traits that contribute to psychological wellbeing (Declerck, C. H., Boone, C., & De Brabander, B., 2006).

Figure 54: A girl playing with the blocks of Mozaïek

Part two: social involvement

The second half of the design goal stated that *social involvement among patients within the hospital will be stimulated, which will enhance the control patients experience* (Mirowsky. J. & Ross, C. E., 2003). This design goal originated from the struggle patients have to stay close to their friends from home during hospitalization. Because of the physical distance patients have from their normal life, the usual and effortless interaction is suddenly lost. During my research phase, I noticed that children hardly interact with each other during a children's theatre activity. Instead of focusing on the reestablishment of social interaction with peers from home, I therefore decided to stimulate social involvement among children inside the hospital. If the design can improve the current situation, this can partly replace the daily interactions children have with their friends from home.

The tests showed that two children who did not know each other found a way to play together with the prototype of Mozaïek. Together they came up with a new game by standing on either side of the wall and pushing out the geometrical sticking shapes. Without having notable conversation, their self-invented game made them interact with each other through the wall. This suits with the idea that free play, like the two children performed, allows children to imagine the structure of play and discover relationships with peers. Both these effects contribute to a child's ability to self-regulate, which is positively contributing to wellbeing according to the work of Gleason and Narvaez (2019).

Because Mozaïek gives children the opportunity to design and build their own environment, it can be left in many different compositions and next, found like that by others. The tests showed that children started to play with the prototype from different starting points, which suggests that children are willing to use the end result of their predecessor as a starting point. Besides leaving the room according to your design, children can also leave a more permanent trace by putting up drawings, pictures or other creations on the wall. A child visiting the room can see the personal contribution of other children in the WKZ, which can also be seen as a way of social interaction.

Figure 55: A boy and a girl playing together with Mozaïek

10.2 Final changes to the design concept

The test showed some possibilities to improve the final concept. I will shortly recap the findings and how adjustments can improve the final concept.

Firstly, I noticed that the children have the tendency to play right in front of the prototype when they have taken out the blocks. This causes a crowded scene right in front of the wall and taking a seat in the octagon cutout might be less appealing for someone who is not playing with the blocks. Therefore, I made an adjustment where one of the octagon cutouts contains only two large blocks. These two blocks can be used as a sitting object in the room rather than as playing objects and therefore a less chaotic playing scene will take place in front of the octagon. Additionally, only having to pull out two blocks will be much faster and easier for someone who only wants to use the octagonal area.

During the test, two children came up with their own game by standing on either side of the wall. This was interesting, because it also allowed two children who did not know each other to interact in an easy and accessible way. Therefore, it can be a valuable adjustment to the concept if children are also able to get behind the wall. One side of the middle octagon will be open, which allows children to get *behind* the wall. This material of this part of the wall is changed to semi-transparent (plexi) glass so when children are on either side, they can see each other.

Lastly, the test revealed that the puzzle to put back the blocks inside the octagonal shape was too difficult, resulting in frustrated children because they were not able to solve it independently. Therefore, the pattern of blocks in the wall are made simpler, with more symmetry and a distinct color for each shape. Also, the back of the octagon shows the solution of how the blocks should be placed back, with coloured planes for each block.

Figures 56-58 show a model of the altered final concept.

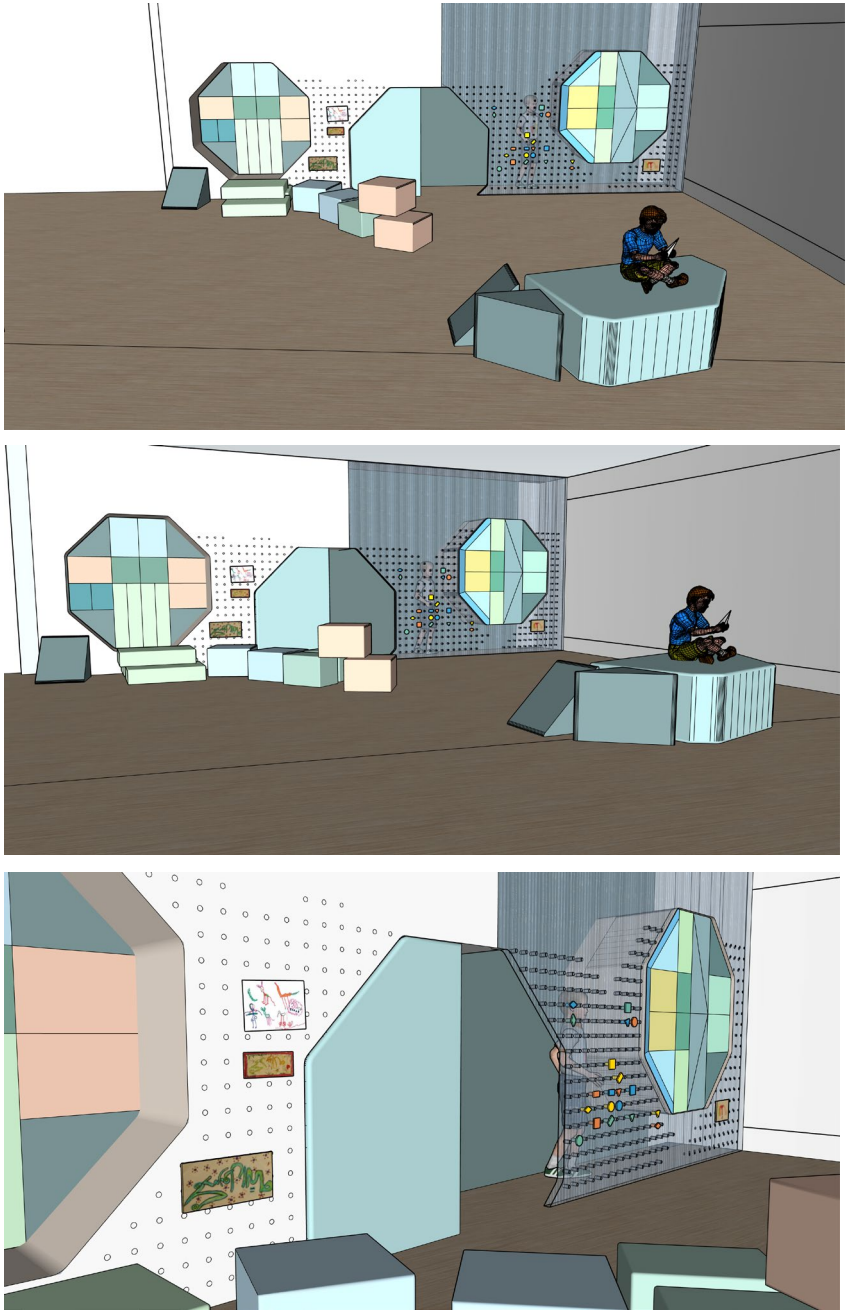


Figure 56, 57, 58: Model of the final concept

SUMMARY

Chapter 10: Conclusion and final adjustments to the concept

A conclusion about the establishment and fulfillment of the design goal by the final concept is separated into the two parts of which the design goal consists.
The test shows that Mozaïek can fulfill the first part of the design goal, I will give patients of the Wilhelmina Children's hospital the tools and empowerment to create control over their environment and autonomy over their activities in the hospital, by triggering children to play and explore independently. Also, the children show a great variety in the way that they interact with the prototype, from which I draw the conclusion that the concept allows them to create their own environment, taking control over the environment they want to be in at that moment.
The second part of the design goal, social involvement among patients within the hospital will be stimulated, which will enhance the control patients experience, was meant to make up for the loss of interaction hospitalized children experience with their peers from home. The concept proved to be able to stimulate this social involvement when two children, who did not know each other, interacted with each other via the prototype. Also, the concept allows children to leave behind a personal trace in the room, by changing something in the environment or by making a creation on the wall. This can also be seen as a social interaction, albeit more indirect, between children in the Waterval.
The test revealed some opportunities to improve the concept and therefore I made some small changes to Mozaïek. Figures 56-58 show a model of the final concept after the alterations.

11

Recommendations

For further development of children's theatre's redesign, I describe some recommendations about further testing possibilities and the further composition of the room.

11.1 Testing with teenagers

Most of the hospitalized children in the WKZ are young and therefore more dominantly present in the hospital environment. The minor share of teenagers among the patients makes it more complicated to retrieve results from this group.

The physical testing sessions in the WKZ mostly facilitated the presence of young children. In the main hall, the largest group of bypassing children who are interested in a playing field like the camp site are approximately aged 4 to 12. Therefore, the only feedback I received from teenagers is the input from the ideation session with the children's council (page 42) and the online feedback they gave on earlier prototypes (page 72). This input showed that one of the main wishes from this group of children is to have a place where they can engage in their own hobbies and activities, both alone and with friends and family. The part of the final concept that is mostly derived from these ideas is the octagonal shape in the wall that can be used as a sitting spot when the blocks are taken out. Even though the space was also used by the young test participants, I would recommend to physically test the use of the space with teenagers. It can remain challenging to make the room suited for children of all ages, especially at the same time. Literature has been written about suited hospital facilities for teenagers, because a substantial part feels out of place in both pediatric as adult hospitals (Donovan, J. L. C., Taylor, B., & Karl, J. A., 1999). A Dutch study carried out in eight hospitals about children's perspective on hospital facilities (Schalkers, I., Dedding, C. W., & Bunders, J. F., 2015) writes about patient's suggestions on special periods in hospital activity rooms for teenagers and the need for more privacy. This literature corresponds with the suggestions from the children's council, but also implies that separate activities and time slots in the Waterval would be appreciated by children. I would recommend the WKZ to test whether the integration of such an age group division is appreciated by teenagers in the hospital.

11.2 The further composition of the Waterval

The redesign of the children's theatre will be adopted and realized by an interior architect after I complete this project. This section describes some recommendations for the further development of the room that are not explicitly mentioned in my final concept, but can potentially contribute to patient wellbeing in the WKZ.

The final concept of my project is based on the desired interactions, activity freedom and environmental needs that resulted from my research in the WKZ. The tests performed throughout the concept development phase show that Mozaïek consists of several parts that can benefit to the design goal of this project. However, the design of the entire room is not complete and will be taken over after I conclude this assignment. From the context research and participatory ideation with the children's council arises the idea that a combination of a playing area and a homely environment is a valuable fulfillment of the room. It has been mentioned several times throughout my project, but I will shortly summarize the argumentation for this integration. Firstly, literature tells us that there is a close association between childhood wellbeing and positive family relationships (Statham, J., & Chase, E., 2010). In a 'normal' home scenario, most family interactions are likely to happen, for example, when eating together or sitting on the coach in the living room. The WKZ already has the Ronald McDonald living room and the new children's theatre should therefore not become a living room alone. However, the combination of the homely and playing elements like my concept can contribute to the feeling of being 'out of the hospital'. A boy in the children's council made a corresponding statement: "I enjoy having breakfast with friends or family. Different conversations will probably happen over breakfast compared to a normal hospital visit, when the conversation is often about the treatment. Over breakfast you can have more personal but easy conversation."
Also, homely elements in the room can help to create a 'separation' between the part of the room where children play and that where parents can sit down and relax. As I saw during my tests in the main hall, this separation is beneficial for the independent and free playing behaviour of children.

SUMMARY

Chapter 11: Recommendations

For further development of the children's theatre's redesign, I recommend to organise a session to test the concept with teenagers. The spontaneous encounter with teenagers in the WKZ is rare and therefore the evaluation with teenagers is currently solely based on the sessions I did with the children's council.
Also, a valuable idea derived from the context research is the implementation of homely elements in the redesign of the children's theatre. There is a close association between childhood wellbeing and positive family relationships. In a 'normal' home scenario, most family interactions are likely to happen, for example, when eating together or sitting on the coach in the living room. Finally, a separation between the playing area and the homely elements, where parents are likely to locate themselves, is beneficial for the independent and free playing behaviour of children.

12

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Improving patient wellbeing in the Wilhelmina Children's hospital through a design concept for the activity room

Master thesis

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