THE IDEAL DAYCARE

A master thesis by Bruce Haantjes

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SUMMARY

This thesis describes the design process of the ideal daycare for Sophia Kinderziekenhuis as part of Erasmus MC. The hospital finds itself at the start of a renovation process that will possibly give Sophia an entirely new space. This new building will only be ready in 7 years, which is why the result of this project is twofold; a design proposal for an ideal situation in a new building and a shortlist of recommendations to improve the current situation in the short term.

The report is structured according to the double diamond process. The discovery will elaborate on the interior design process itself, the current situation at WKZ and SKZ, brainstorm sessions with the staff and interviews with the parents and children. It shows the daycare is extremely noisy, insensitive to privacy, inconveniently arranged, boring, outdated and not stress relieving for any of the users involved.

The insights of the discovery are condensed into 6 persona's and 3 design drivers, which combined form the design vision of the ideal daycare. There are 2 parent-persona's: Matt and Julie, with a distinction in time spent at the daycare. There are 3 children-persona's: Ethan, Olivia and Jackie, with a distinction in tolerance for external stimuli. Finally there is a single staff-persona: Sarah, because there are no clear distinctions in value sets between different staff members. The 3 design drivers are defined as privacy, routine and atmosphere, and each of the three user groups has a different view on each of these drivers. These views combined will form a definition of what the ideal daycare means to them.

The development describes three iterations, each one pushing the design forwards in a different way and concluded by a simulation with one of the stakeholders. The first one was about creating maximum improvement with minimal change, which invoked a pivot in the project after the simulation with the architect. The second iteration revolved around ideating on the ideal arrangement of all the spaces, which was simulated with managing partners of the department. The third round focussed on developing different design solutions for each of the area's, so that they could be combined into concept arrangements for the ideal daycare. These concepts were used for simulation with the daycare staff, who gave feedback on the designs and then made an ideal version of their own.

The delivery focuses on the visualisation of a final design proposal. It shows several impressions from an eye-level perspective of what the modern future of Sophia could look like. It applies a nature theme with a large tree that anchors the space, symbolizes health, growth and serenity, and is functional as sound isolation, table and play area. There is a central coffeecounter for the parents, secluded beds for enough rest and a separated staff area.The project is concluded with a set of recommendations for short term improvement. The hospital should invest in - amongst other things - a daily food service, freeing up spaces for an extra treatment room, better chairs, a proper break room with comfortable couches, and sound absorbing furniture.

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INTRODUCTION

Why this project?

This project focuses on a new interior design for the **Erasmus MC Sophia daycare**, further referred to in this project as 'Sophia' or 'SKZ' (Sophia Kinderziekenhuis).

The objective is to **create a design proposal for 'the ideal daycare'**, a nurturing and efficient (work)environment for children, parents and staff.

The **space is quite outdated** and not up to the modernized standards in comparison to Utrecht MC Wilhelmina, further referred to as 'WKZ'. Their playful environment and high-quality workspace is something that SKZ aspires to have as well.

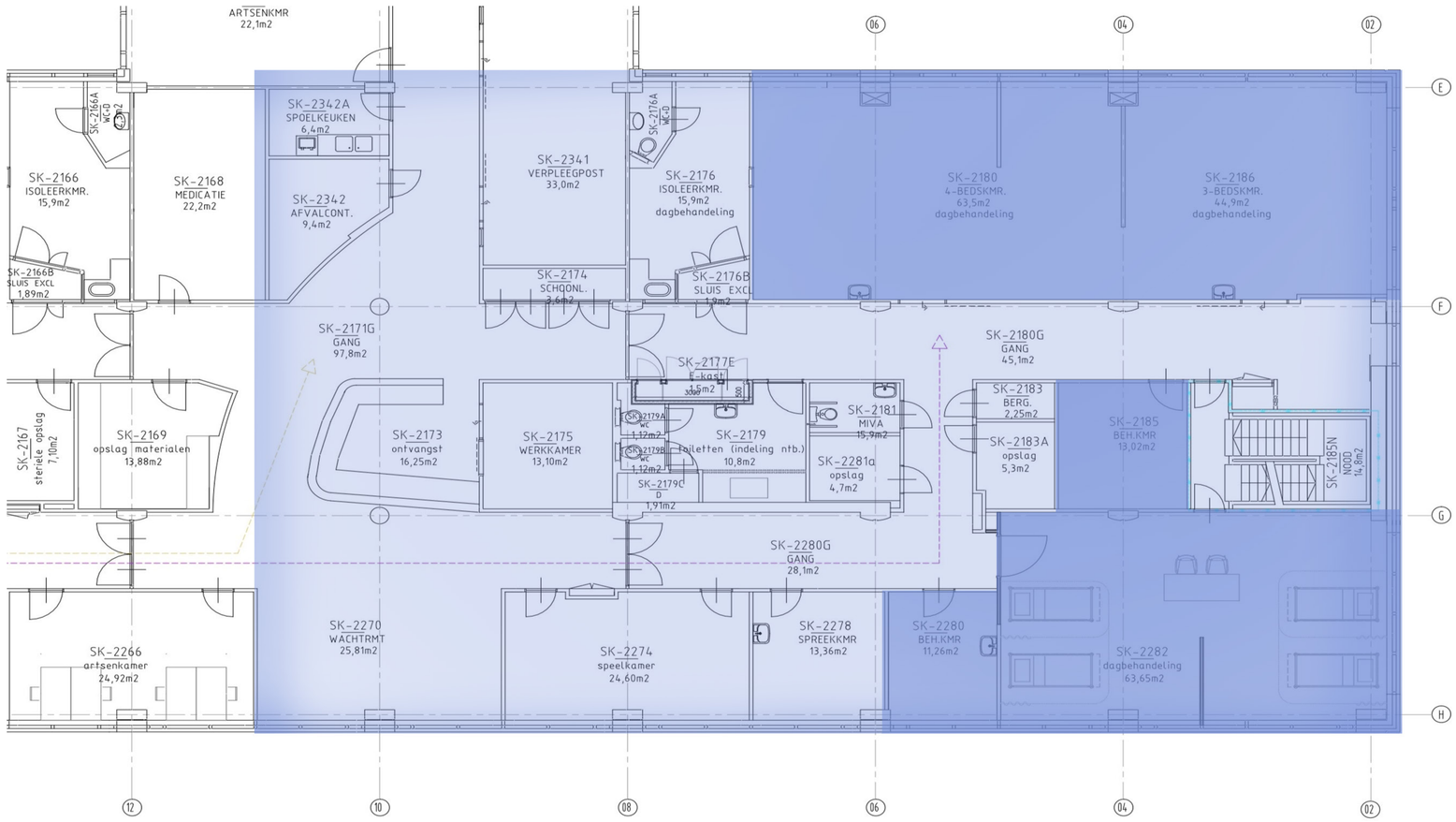
SKZ also wants to be able to **host more patients**, and therefore plans to implement 4 extra treatment spots, in addition to the 10 already present.

Much like WKZ, Sophia wants to **move away from the hospital environment**, and consider 'the healthy child', meaning not every patient has to lay in a bed. The staff has accumulated a significant amount of loose pragmatic ideas, concerning their own needs and those of their patients.

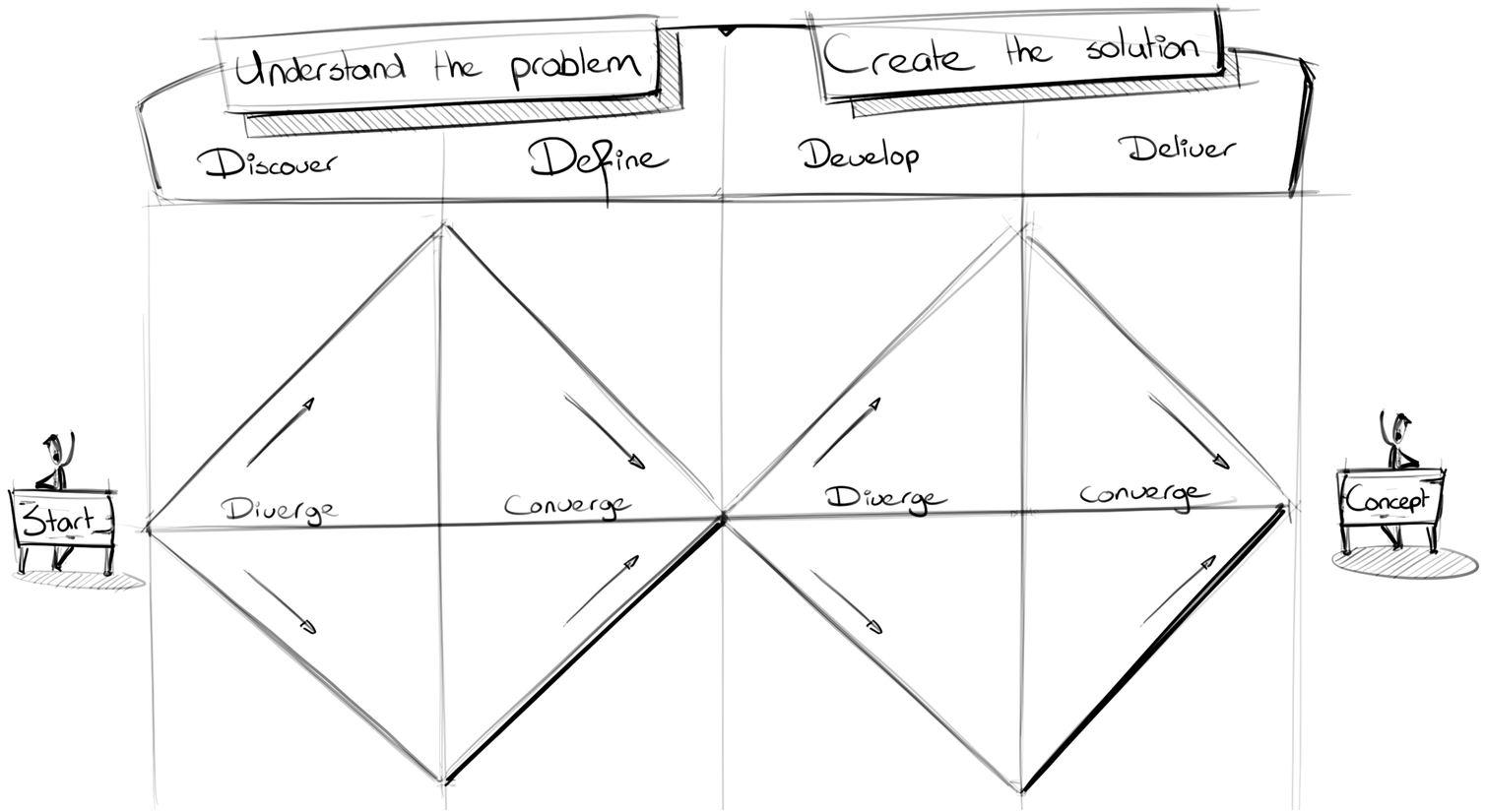
The original assignment considered only the dark blue area indicated in figure FIXME. **A pivot in the project shifted the focus towards the entire daycare** - defined by the surface area allotted to SKZ by Erasmus MC - indicated in light blue. The design proposal at the end of this project is meant as an inspiration for a large-scale renovation in 7 years, from which we can extract recommendations to improve the daycare in the short term.

"The work-environment is inefficient and the daycare looks outdated."

Erasmus MC Sophia, a.k.a.
Sophia Kinderziekenhuis - or 'SKZ'



INTRODUCTION



Steps taken per phase

- *Stakeholder analysis*
- *Interviews*
- *User observations*
- *Benchmark research*
- *Literature research*

- *Persona's*
- *Design drivers*
- *Design vision*

- *Maquette building*
- *3d-modelling*
- *Morphological chart*
- *User simulations*

- *Design sketching*
- *Blender rendering*
- *Evaluation*
- *Reccomendations*

What is this report about?

This report will outline the four key stages of the double diamond design process: **Discover, define, develop, deliver**, in an attempt to give clarity and insight into the decision making process that guided the development of the new interior design proposal.

The discovery stage is designed to collect valuable insights by exploring the challenges of the current situation, the wishes of the stakeholders, and the areas for improvement or preservation.

All insights are then clustered and converged into three design drivers, five persona's and three visions during the define stage, which attempt to formulate an answer to what the ideal daycare means to them.

The development stage aims to create a preliminary proposal, through an iterative process of diverging on possible solutions and integrating them into a concept that considers the values of all its users best.

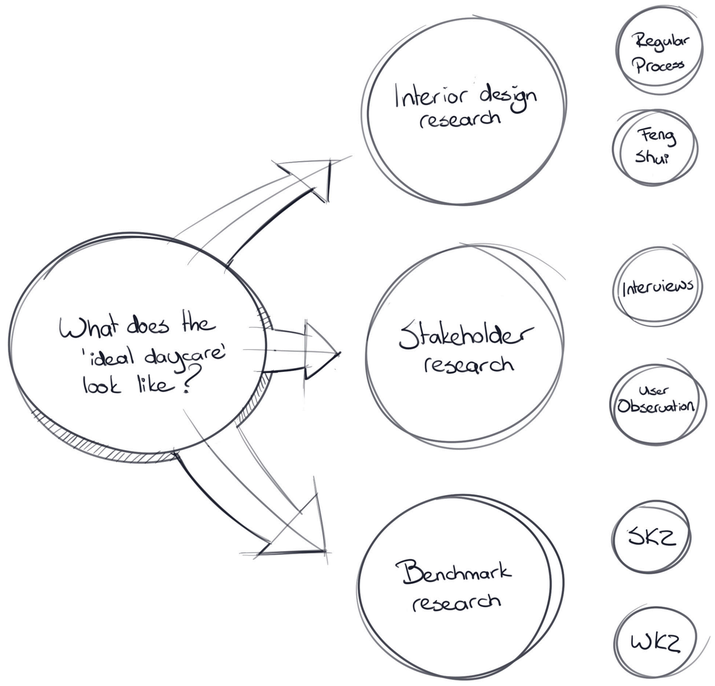
Finally, the delivery stage will show the design proposal for the ideal daycare, including a list of recommendations for short term improvement and an evaluation based on the three design drivers.

Diverge

DISCOVER

At the foundation of the project is the main research question:
What does the ideal daycare look like?
It sheds a light on several knowledge gaps that are explored throughout the discovery.

This phase elaborates on different interior design processes and how these can be applied within this project. We show how Utrecht MC Wilhelmina (WKZ) deals with the challenges of a children's hospital and dive into the situation at Erasmus MC Sophia (SKZ). We discuss the different stakeholders, their values, and how these translate into needs and requirements for the interior.



How does one approach an interior design project?

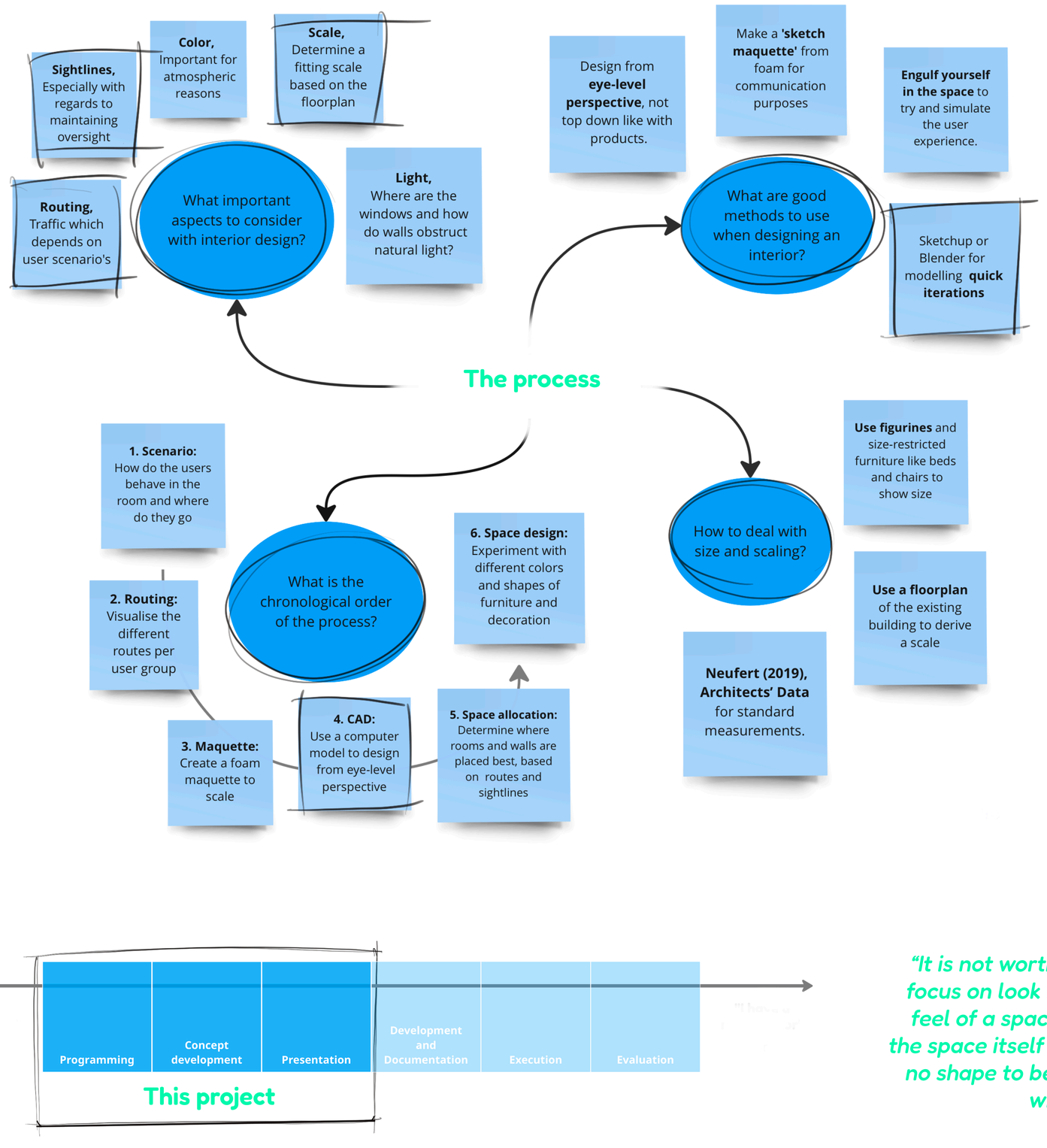
What are the stakeholder values and how do they manifest themself in the interior?

What can be improved upon and needs to be preserved in the current situation?

1 INTERIOR DESIGN

Facebook Sohpia homepage.

DISCOVER



What does an industrial design process normally look like?

In order to gain a better insight in the shape and important aspects of an interior design process, a combination of expert consultation and online research was conducted, with results depicted in the brainmap on the left.

Noorhani et al. (2021) compares different approaches defined by several authors, depicted in figure 1 below. It shows many similarities to any industrial design process, as also described by Haddad (2014) and Roozenburg et al. (2001). Aided by this information, we can create a simple overview of the overall structure and indicate the focus of this project, which involves research, ideation, conceptualizing and presentation. After the concept proposal, it is up to the architects and the hospital board to carry the project forward towards technical drawings and eventually realization.

"It is not worth to focus on look and feel of a space, if the space itself has no shape to begin with."

Table 1 - The comparison of work development process among the authors

NCIDQ (2003)	Neilson and Taylor(2007)	Pile (2007)	MSID (2004)	IPDM (2006)
Programming	Letter of Agreement (Contract) Problem Statement Research and Programming Writing the program	Project Beginnings Programming	Programming Phase	Research study and planning – schematic design
Schematic design		Concept development	Schematic Design Phase	Concept and design development
Design development	Design Development	Design development	Design Development Phase	
Contract document		Design implementation	Contract Document Phase	Working drawings, specifications and contract documentation
Contract administration			Contract Administration and Implementation Phase	
	Post Occupancy Evaluation	Project supervisor		Inspection supervision and contract administration

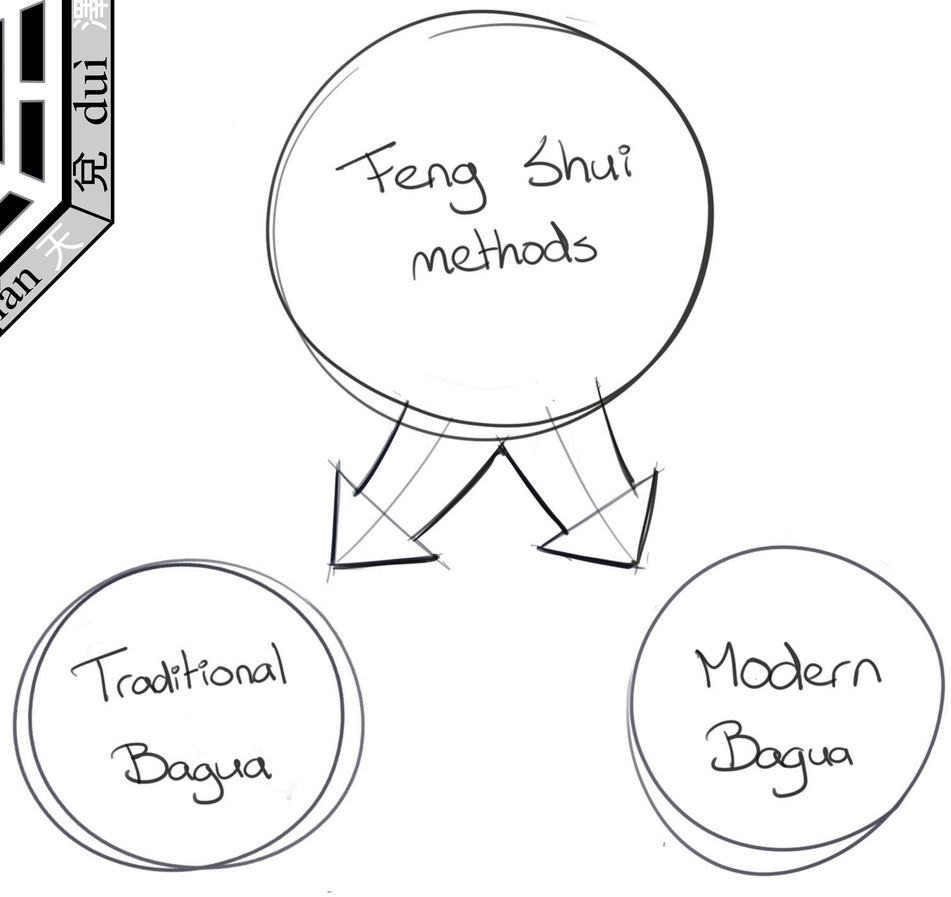
Figure 1: *The tasks of an interior designer defined by different authors*

Feng Shui, an ancient approach

Figure 2: *Later heaven Bagua*

Akkerman, Abraham & Shao, Jingkun. (2021). The Bagua as an Intermediary between Archaic Chinese Geomancy and Early European Urban Planning and Design. Journal of Chinese Architecture

What are the main differences between the two approaches?



- *Layout is based on the 'life-destiny' of the users*
- *Considers the four wind directions for oriantation.*

- *Layout of the bagua is fixed, no matter the user*
- *Orientation is based on the location of the front door.*

DISCOVER

How could this method be useful for the creation of the ideal daycare?

Feng Shui is an ancient Chinese practice of interior design that seeks to harmonize the environment with the flow of natural energy, known as "qi," to promote well-being, balance, and prosperity in ones living space. It involves arranging spaces and objects in specific ways to enhance positive energy and minimize negative influences. Theoretically, Feng Shui might provide some insights and inspiration for the creation of such a nurturing environment as the daycare. This research explores what the method is and how it can be implemented into this project.

What is the process of such an ancient interior design method?

Central to the ancient practice is the Bagua - a symbolic map consisting of an octagonal grid divided into nine sections, each corresponding to a specific aspect of life. Figure 2 shows the grid known as the "Later heaven Bagua". It emerged during the first century BCE, fueled by the knowledge transfer through the Silk Road, according to Akkerman, A. & Shao, J. (2020). "The Bagua as an intermediary between archaic Chinese geomancy and early European urban planning and design."

The first Bagua map is estimated to find its origin in 6000 BC, created by a Chinese emperor Fu Xi, as described in a paper by Shih-Jung Wu from the Rochester Institute of Technology, "Feng Shui: A Comparison of the Original Concept and Its Current Westernized Version" (2019). The approach has evolved quite a lot since its creation, which is why **both the traditional and modernized Bagua - as described by Shih-Jung Wu (2019) - were explored.**

DISCOVER

How does the traditional method work?

The traditional method uses a concept called '**life destiny**' to determine the configuration of the Bagua. Life destiny can be calculated by using the birth year of the homeowner, which will result in a number that corresponds with one of the 8 trigrams as described by Shih-Jung Wu (2019), see figure 3.
This trigram will then determine what configuration of the 9 life area's is best suited and considers the location of the front door in relation to the four wind directions. Each one of these life area's has its own characteristics and impacts its inhabitants in different ways. As a result, rooms are considered to be better located in a life area that supports its function.

How to calculate a life-destiny

Life destiny males
= (100-year of birth)/9

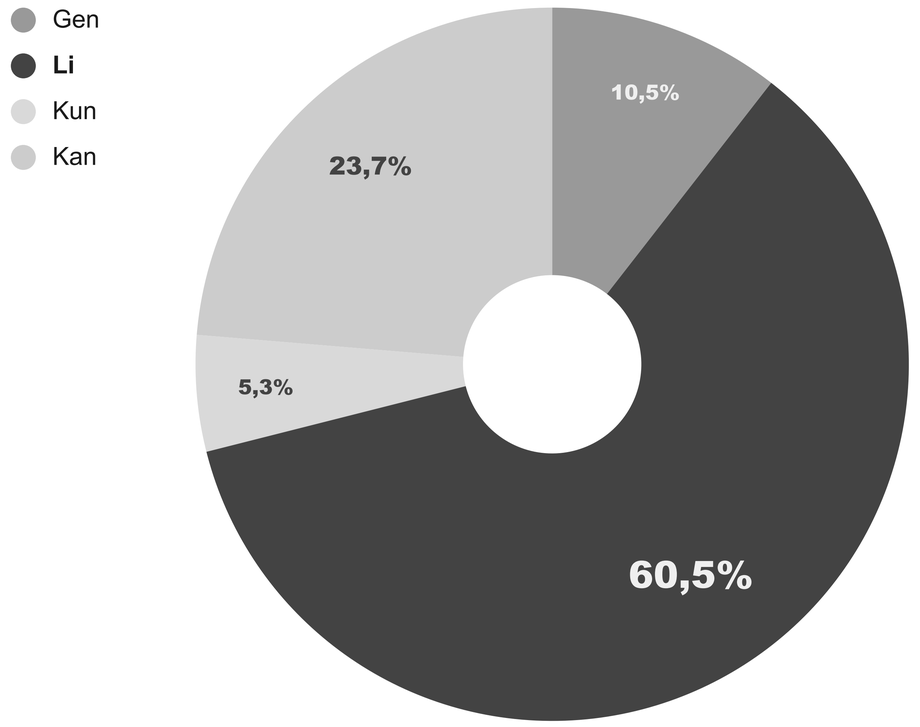
Life destiny females
= (year of birth-4)/9

Take the two last digits of the birthyear - 1997 is 97 for example - and use the formula. **Then take the unit digit** from the outcome to find a matching house arrangement.

Single unit	House arrangement
0	Li
1	Kan
2	Kun
3	Zhen
4	Xun
5	Kun/Gen
6	Qian
7	Dui
8	Gen
9	Li

Figure 3: *Each unit corresponds with one of the eight trigrams in the Later Heaven Bagua.*

Age	Birthyear (20..)	Life destiny Male	Life destiny Female	House arrangement Male	House arrangement Female
0	23	8,6	2,1	Gen	Kun
1	22	8,7	2,0	Gen	Kun
2	21	8,8	1,9	Gen	Kan
3	20	8,9	1,8	Gen	Kan
4	19	9,0	1,7	Li	Kan
5	18	9,1	1,6	Li	Kan
6	17	9,2	1,4	Li	Kan
7	16	9,3	1,3	Li	Kan
8	15	9,4	1,2	Li	Kan
9	14	9,6	1,1	Li	Kan
10	13	9,7	1,0	Li	Kan
11	12	9,8	0,9	Li	Li
12	11	9,9	0,8	Li	Li
13	10	10,0	0,7	Li	Li
14	9	10,1	0,6	Li	Li
15	8	10,2	0,4	Li	Li
16	7	10,3	0,3	Li	Li
17	6	10,4	0,2	Li	Li
18	5	10,6	0,1	Li	Li



DISCOVER

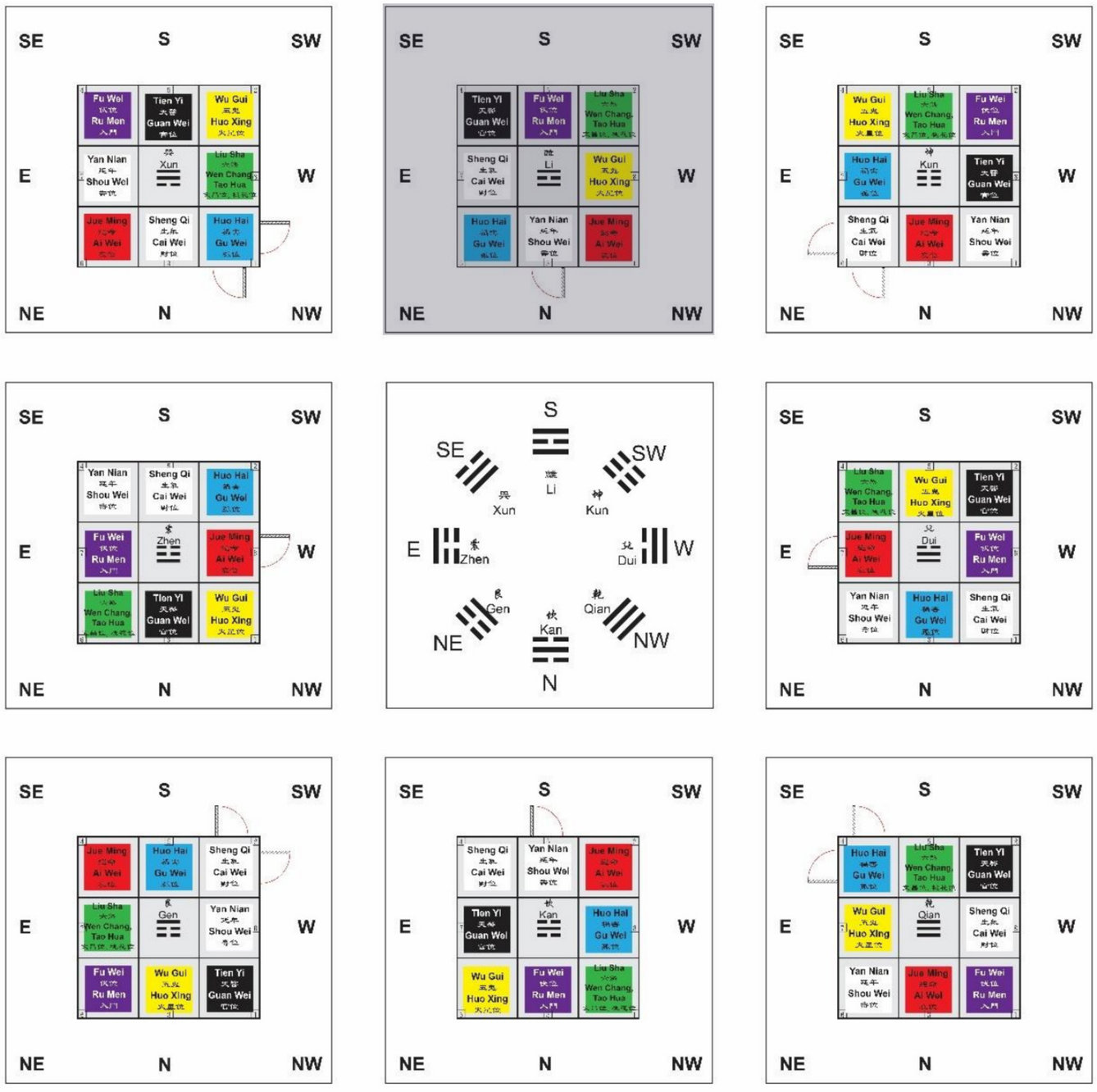


Figure 4: 8 house arrangements linked to either one of the life-destinies with Li at the top.

Wu, Shih-Jung, "Feng Shui: A Comparison of the Original Concept and Its Current Westernized Version" (2019). Thesis. Rochester Institute of Technology.

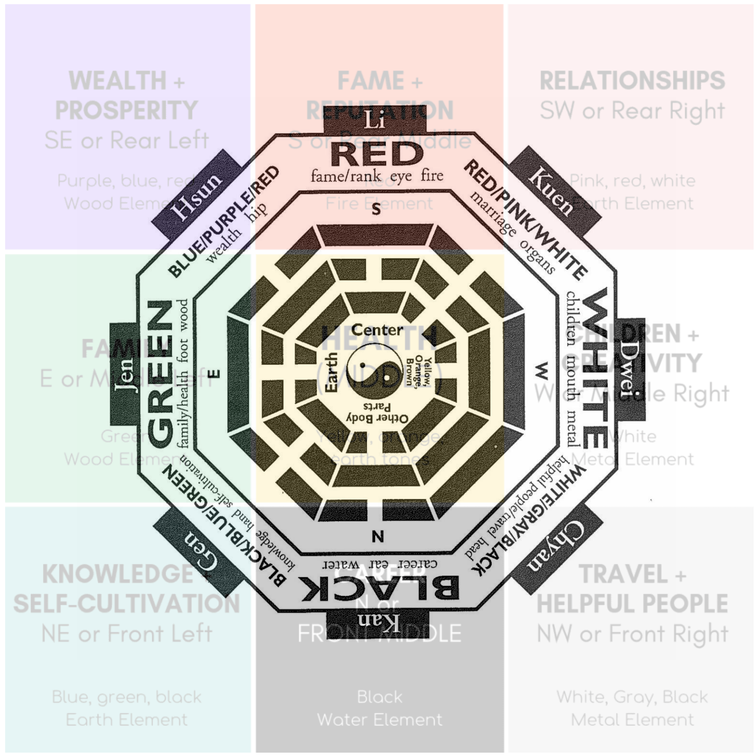
Which layout do we need for the ideal daycare?

For this project, we consider the homeowners to be the patients, since the design is mostly centered around them. If we calculate the life destiny for children ranging from 0 to 18, arrive at a majority preference for the Li configuration, as can be seen in figure 4. This configuration is used as inspiration for the floorplan of the new daycare, which is further described in the development section of this report.

DISCOVER

How does the modern method work?

The modern method simplifies the process of determining the position of the 9 life areas. It considers one universal configuration based on the Bagua map shown in figure 5 (left image). Orientation is determined by the position of the front door, which should always align with the Gen, Kan and Qian side of the octagon - the Knowledge, Career and Travel areas respectively. The Bagua is transformed into a rectangular grid (middle image) that can be superimposed upon any existing floor plan (right image) to determine which life-areas overlap with what rooms. The appropriate cures can then be applied to each area, in order to optimize the flow of energy. Shih-Jung Wu (2019) discusses nine basic cures, which are found in the book by Rossbach and Lin from 1998: *"Feng Shui Design: From History and Landscape to Modern Gardens and Interiors".*



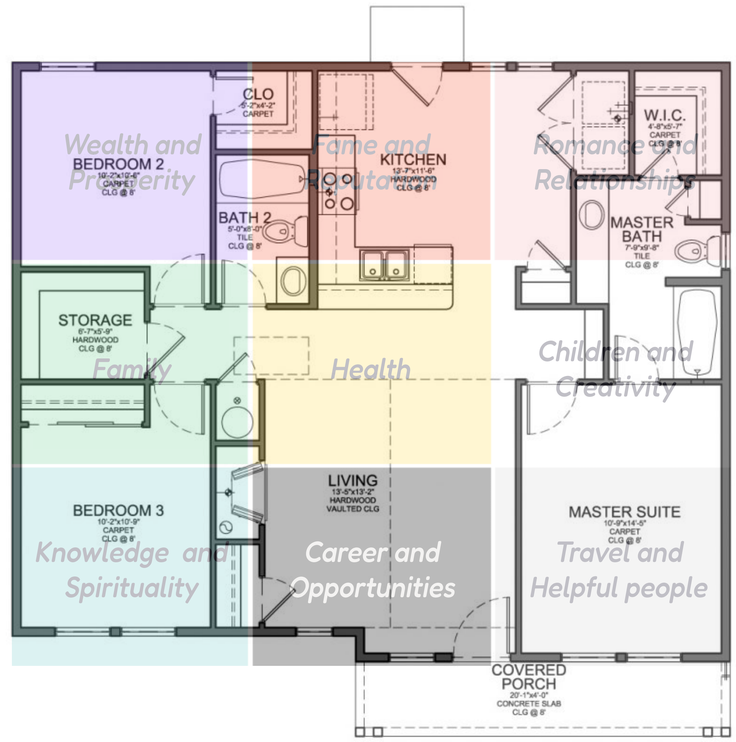


Figure 5: The origin and application of the Modern Bagua.

What if we use the current situation?

By applying the method to the current interior (figure 6), we can identify several opportunities for improvement inside the current daycare, based upon the modern Feng Shui principles.

The daycare overlaps with the wealth and family areas. The room is quite small, so adding mirrors is a suitable cure to make the room look larger or improve sight-lines. The addition of plants would be beneficial, adds to the wood element, plus it will add a necessary touch of green, which stimulates tranquility and growth. More wooden chairs here could promote relationships with the parents. For frequent visitors, one can experiment with family photos on the walls.

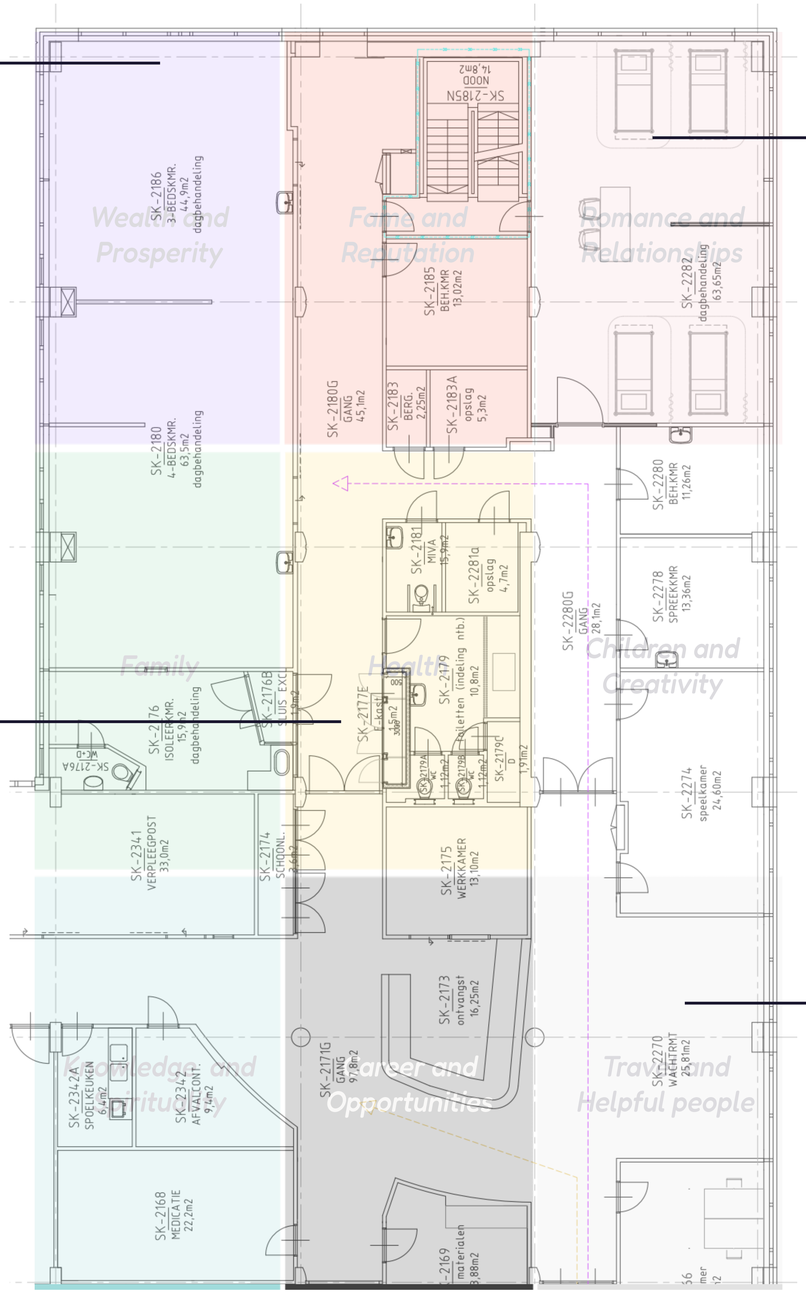


Figure 6: *The modern baguamap superimposed upon the current floorplan*

The romance and relationship area overlaps with the current breakroom, which is a perfect fit. A mirror at the entrance could open up the narrow hallway there. Place heavy objects to help stabilize stress or unsettling situations that happened on the daycare. Artwork that relates to love and intimacy could improve the energy flow as well as encourage collegial relationships.

According to Feng Shui principles, the central area sets the tone for the space and should be kept open and clutter free. In the current situation, this is quite the opposite. The space is occupied by the staff's dressing room, toilets and a narrow hallway, which are quite cramped and cluttered. This 'cramped' atmosphere can indeed be felt across the entirety of the daycare as it manifests itself in all the rooms.

The entrance is situated in the helpful people and travel area. Energy in this room can benefit from a photo wall of all the personnel of the daycare and pictures that inspire hope.

INSIGHTS

The traditional Feng Shui method can serve as a solid starting point for the floor plan ideation in the development phase. It is however important to **use it as inspiration, not as a guideline**, since there are several aspects of the method that were taken loosely. Firstly, Feng Shui is mostly used for homes, not hospitals. Furthermore, the life destiny - and therefore the configuration of the floorplan - is normally determined by a single person instead of a group. As the calculations showed, some children benefit from a different configuration then Li. This is amplified by the fact that the birth year of children from 0-18 changes as time progresses, as will their life destiny and the matching configuration.

The modern method is simplified to promote ease of use and can be applied to provide a few basic areas for improvement of the current situation. Its usefulness is limited in this case, since we can only consider a relatively small area for short term change.

DISCOVER

2 BENCHMARK RESEARCH

Erasmus MC is not the only hospital that facilitates a daycare like Sophia. Utrecht MC is home to Wilhelmina (WKZ) - another daycare that was recently renovated - with an interior that matches very closely to the vision of Erasmus.

WKZ

Utrecht MC Wilhelmina, a.k.a.
Wilhelmina Kinderziekenhuis - or 'WKZ'

SKZ

Erasmus MC Sophia, a.k.a.
Sophia Kinderziekenhuis - or 'SKZ'

WKZ

WKZ has recently been renovated, they could provide us with some valuable insights

A company visit combined with an extensive discussion with the staff was organized, in an attempt to gain some insights into how the Wilhelmina daycare deals with issues that are undoubtedly familiar at Sophia. Next to achieving a deeper understanding for the staff's needs and wishes, the visit served as great inspiration for interior aspects, relating to sightlines, positioning of the beds and design of the nursing post. A concrete set of questions resulting from the initial research into the situation at Sophia, formed the baseline of this analysis. It included 5 staff members, of which 3 from SKZ and 2 from WKZ.

Children usually choose their own spot to sit or lay down.

No need for age based division. Children are very used to different ages.

How do you divide children on the daycare?

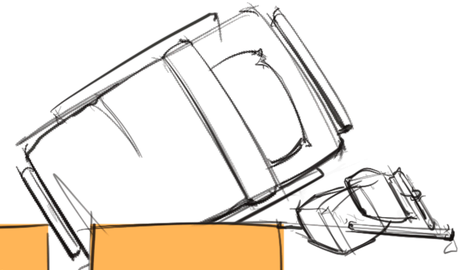
Teenagers said to want a more quiet place to hangout or do homework, somewhat secluded from the daycare.

High priority patients are placed closer to the nursing post than others.

The beds are separated from the rest of the daycare by a half height wall, which diminishes sightlines and sounds, while maintaining a good level of oversight.

Sometimes it is quite busy at the daycare because of playing children, which is quite annoying. Be careful not to make it a playground.

How do you separate sleep and play areas?



All the medical equipment is neatly stored in cabinets above the beds, which is both accessible and astheatically pleasing.

Beds are the biggest 'hospital factor', hence they are best located out of sight and out of the way.

Use lots of colors that contribute to the theme of the room. Both treatment rooms had their own animal name and corresponding color for example.

How do you eliminate the 'hospital feeling'

They work a lot with analogies and play on words, and call rooms by their animal names.

Next to the beds they usually sit on foldable chairs, which is suboptimal. We have some fauteuils but they are limited.

Perfectly located, next to the entrance, in a central spot which is close to the beds.

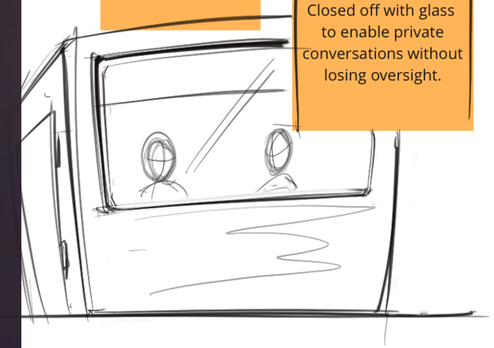
Amazing!

How is WKZ doing?

How does the nursing post work for you?

Perfect place for having a small conversation with parents.

Closed off with glass to enable private conversations without losing oversight.



There is a separate room available for patients that do not want any external input.

How do you deal with the variety of children and their needs every day?

Nurses are good at improvising and gauging moods. Every child is different, and their needs vary from day to day. It's difficult to prepare for this, but easy to adapt to it by asking about the situation of the child upon entry.

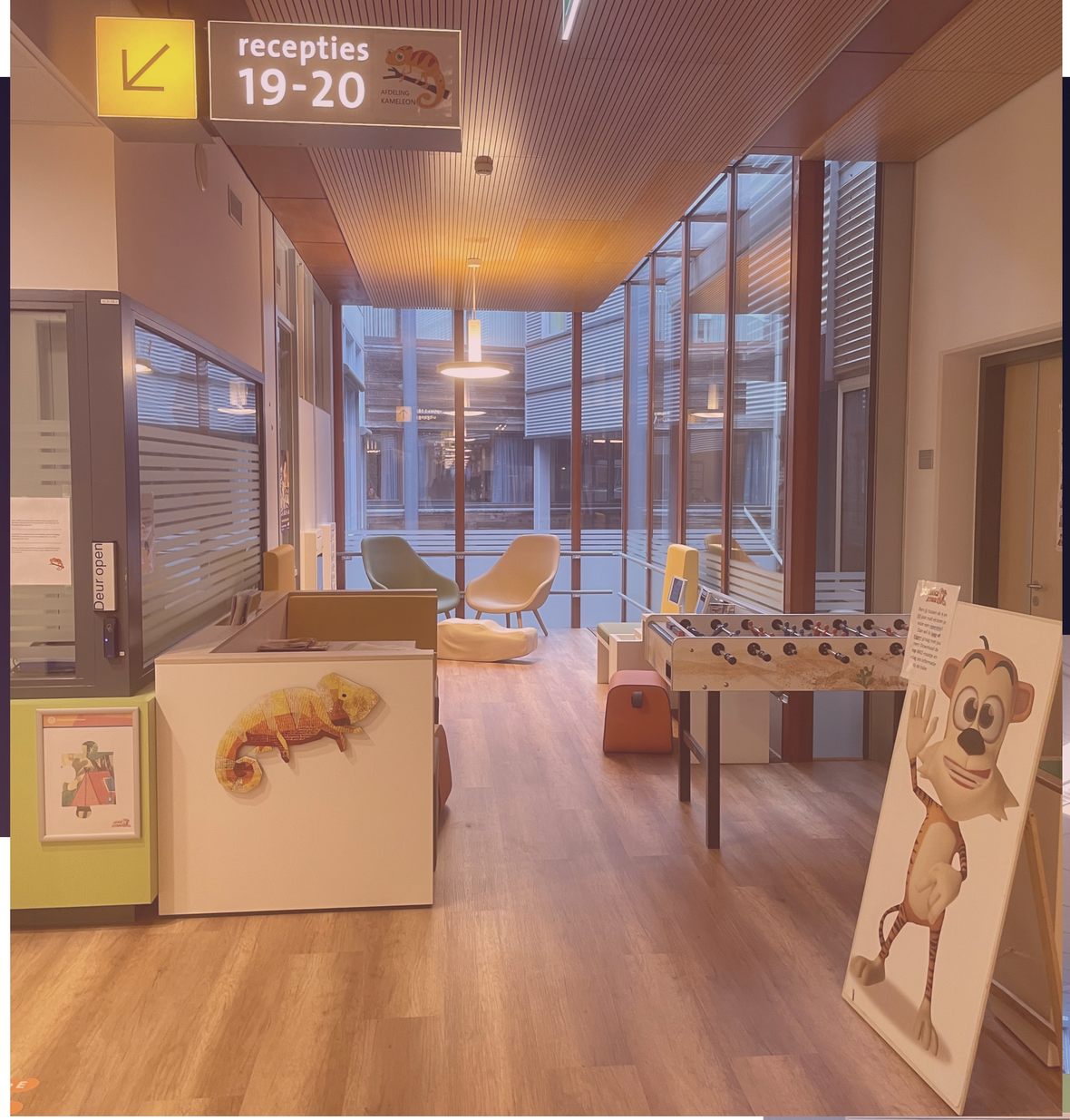
We have toys for all ages available, which are taken out of storage upon request. Think Lego's, puzzles, books and boardgames.

They handle a design for all ages philosophy. There is multiple sized seats scattered across the daycare and patients can choose their own seat.

Are there spaces for family to sit?

In the common room there is a lot of couches and tables available to sit at with their child. The large central table is especially appealing and often a neutral gathering spot.

DISCOVER



A lot of animals were used to make the space seem less like a hospital

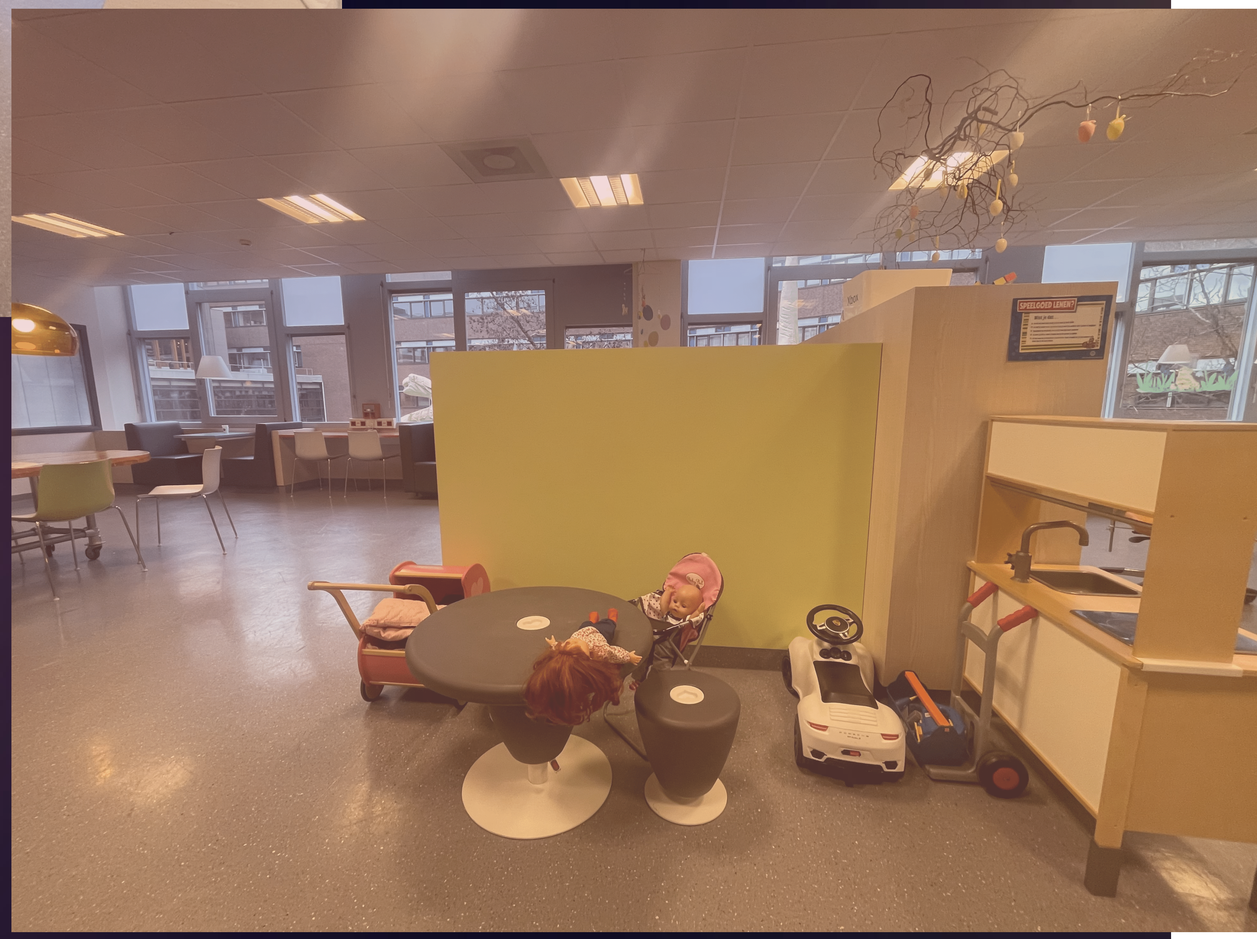
Upon entering, the space immediately felt playful and welcoming. There were references to animals everywhere, small seating areas and tables scattered around, and the colors created a very warm ambiance. Furthermore, the waiting room was located ón the way to the daycare, instead of ín the way like at Sophia, which reduces unnecessary traffic to and past the waiting room. The only way in was past the nursing post, which convieniently functioned as front desk as well.

The beds are neatly packed away in a corner of the room

After passing the nursing post, we can find the bedspace immediately to the right. It was located close to the nursing post and slightly darker than the rest of the daycare. Enclosed with a half-height wall, it provided both privacy and overview, while at the same time blocking a lot of noise coming from the play area of the room. Not only that, the wall was also a convenient storage space for games, toys and sheets.

There is even a kitchen counter right on the daycare..

To the left after the entrance, we find an island with coffee, water and a microwave. Behind the counter we can spot the separate isolation rooms for the stimuli intolerant patients. Further down the hallway along the left side, we find the treatment rooms, each with its own color or animal name. The hall ends in the personnel area, which includes some office spaces, meeting rooms and a breakroom. No patients are allowed beyond that point.

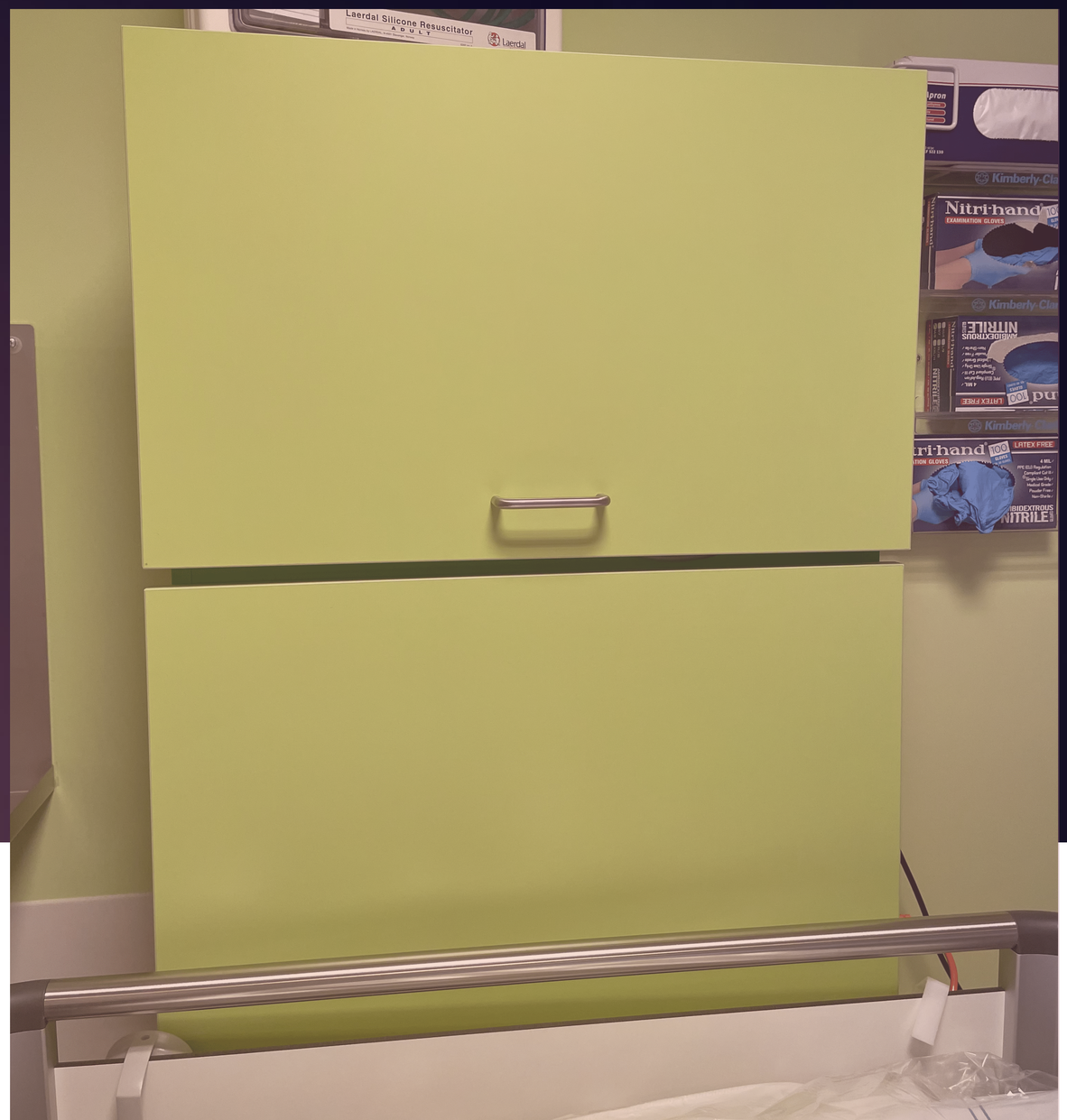


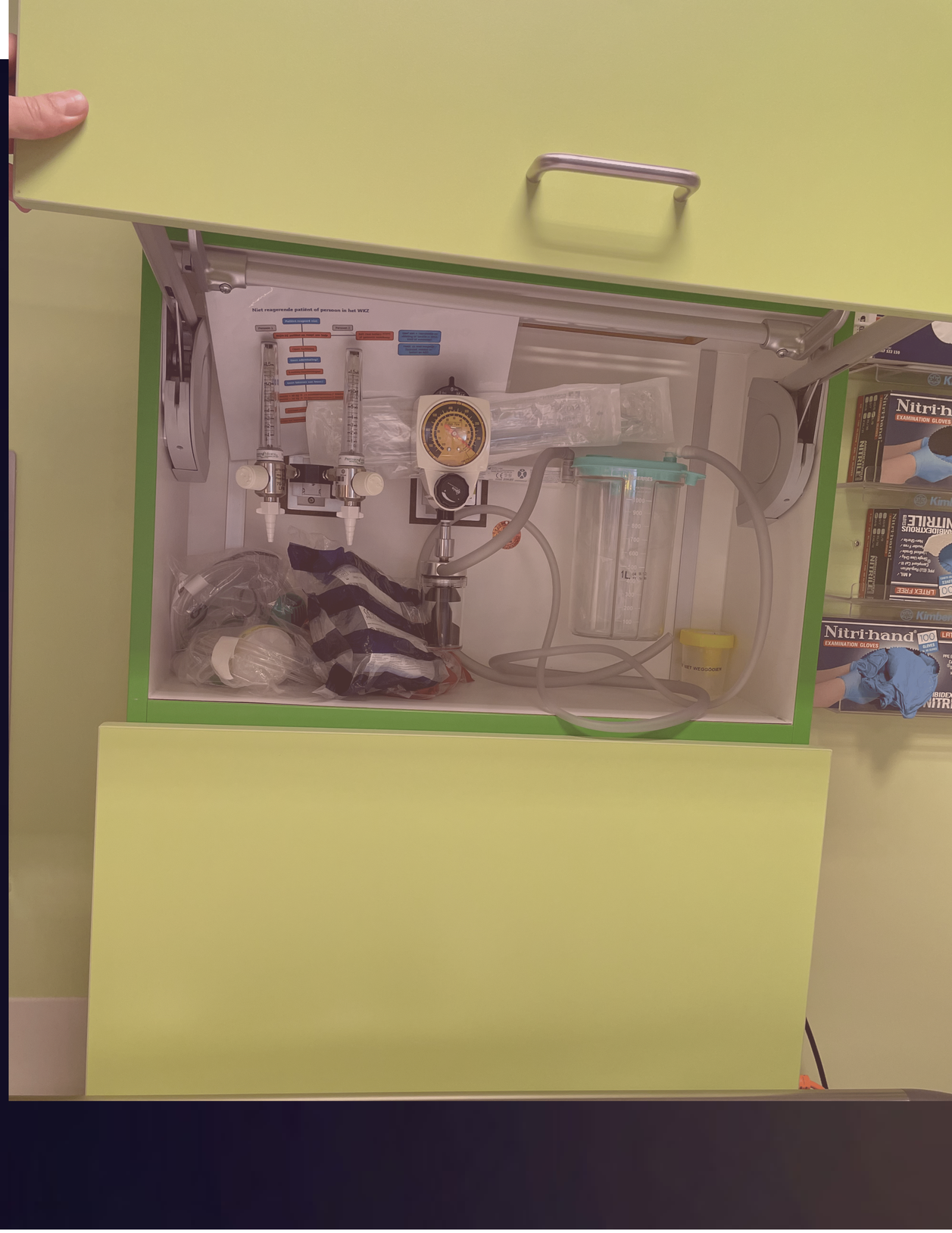
Easily (re)movable and adaptable toys for children of all ages!

The play area was quite spacious, with a long table in the middle, surrounded by smaller seating areas and play corners. Along the window on the side, there was a setup resemblant of a restaurant, where kids could sit with their parents or do their homework. Treatments were often done right at the table if possible and the patients were allowed to choose the spot themselves.

Nothing to see here..

All medical equipment was neatly stored behind doors. With everything closed, the room looked completely normal, just like any after-school daycare. The nurses could however still access all the necessary supplies quickly, as these cabinets were installed at the head of the beds.





The treatment rooms were extremely spacious and tranquil

Not only on the daycare itself was everything neatly stored away in the ward, the treatment room also looked calm and sleek. Everything was built-in and concealed. It eliminates the hospital atmosphere and visually creates a sense of calmness. This provides a beautiful counterbalance to the occasional chaos that may occur during the day.

WKZ is an efficient and modern design that feels little like a hospital. The challenge is now to achieve the same at Sohpia, but with limited amount of space.

Information gathered from this benchmark research can be clustered into 5 important insights.

DISCOVER

INSIGHTS

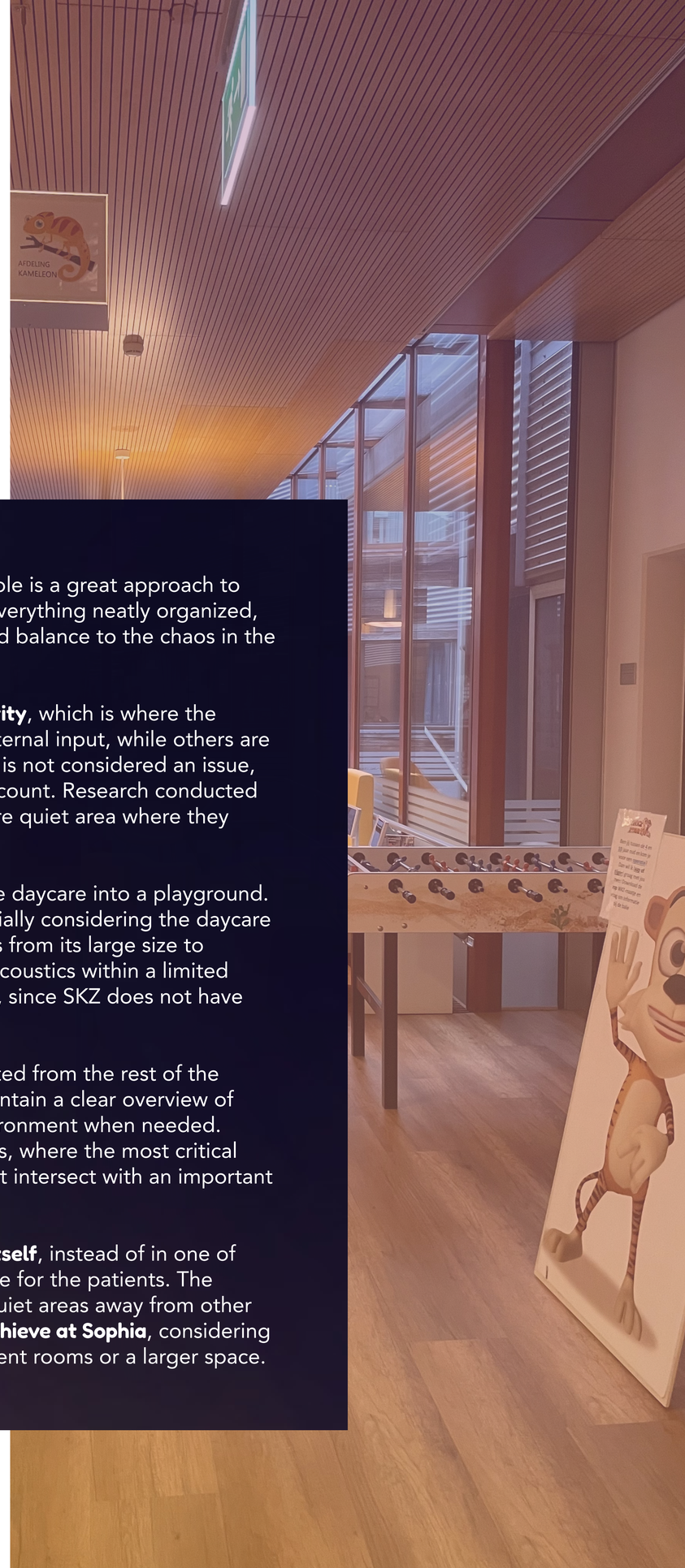
Incorporating medical equipment into the furniture as much as possible is a great approach to soften the intimidating appearance of medical equipment. It keeps everything neatly organized, within reach, and also creates a calm visual which forms a well-needed balance to the chaos in the daycare; a win-win situation indeed.

One does best to **distinguish children based on their sensory sensitivity**, which is where the most significant value gap lies. Some children cannot tolerate any external input, while others are bored without it. Having children of different ages in the same space is not considered an issue, as long as their needs related to privacy and stimuli are taken into account. Research conducted by WKZ, showed a large need amongst highschool children for a more quiet area where they could chill and/or do their homework.

While creating more space to play, it is important to avoid turning the daycare into a playground. **The interior should exude a sense of calmness and tranquility**, especially considering the daycare at Sophia is significantly smaller and more noisy. Where WKZ benefits from its large size to improve noise, SKZ needs alternative interior facilities that enhance acoustics within a limited space. It also limits the sources of entertainment to mostly static play, since SKZ does not have the space for children running around.

Having **a nursing station with one-directional sound isolation** separated from the rest of the daycare is considered by the staff to be a huge benefit. They can maintain a clear overview of the daycare, while still having the option to create a soundproof environment when needed. Its location is also important, preferably in close proximity to the beds, where the most critical patients are. Near the entrance is also beneficial, provided it does not intersect with an important traffic route, which is currently the case at SKZ.

The caretakers at WKZ often **administer treatments on the daycare itself**, instead of in one of the designated treatment rooms, in order to normalize the experience for the patients. The spaciousness of the room makes this possible, as there are enough quiet areas away from other patients when some privacy is needed. **This will be complicated to achieve at Sophia**, considering the difference in size, which emphasizes the need for isolated treatment rooms or a larger space.



SKZ

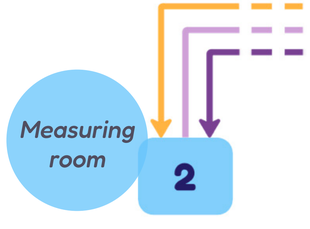
User observations helped to gain lots of insights into the situation at Sophia

A good number of insights in this project has been gathered by live observing the users of the daycare as a fly on the wall, in order to get the most uncurated impression of the situation. The goal was to discover how the users' different values manifested themselves in their interaction with - and travel between - the rooms. This chapter discusses the benefits and pain-points of the most important areas, as well as the traffic between them. A full workday was spent at Sophia, including conversations with 5 different staff members, 1 parent and 1 child.

Where is everyone going?

Both users and their intensity of traffic have been taken into account, as can be seen in figure 7. The intensity is indicated by the saturation of the line, while the color indicates the stakeholder. Parents and children have been combined into a single group 'visitors' considering their routes have significant overlap.

Staff
Visitors



In reality, the measuring room is even further away.

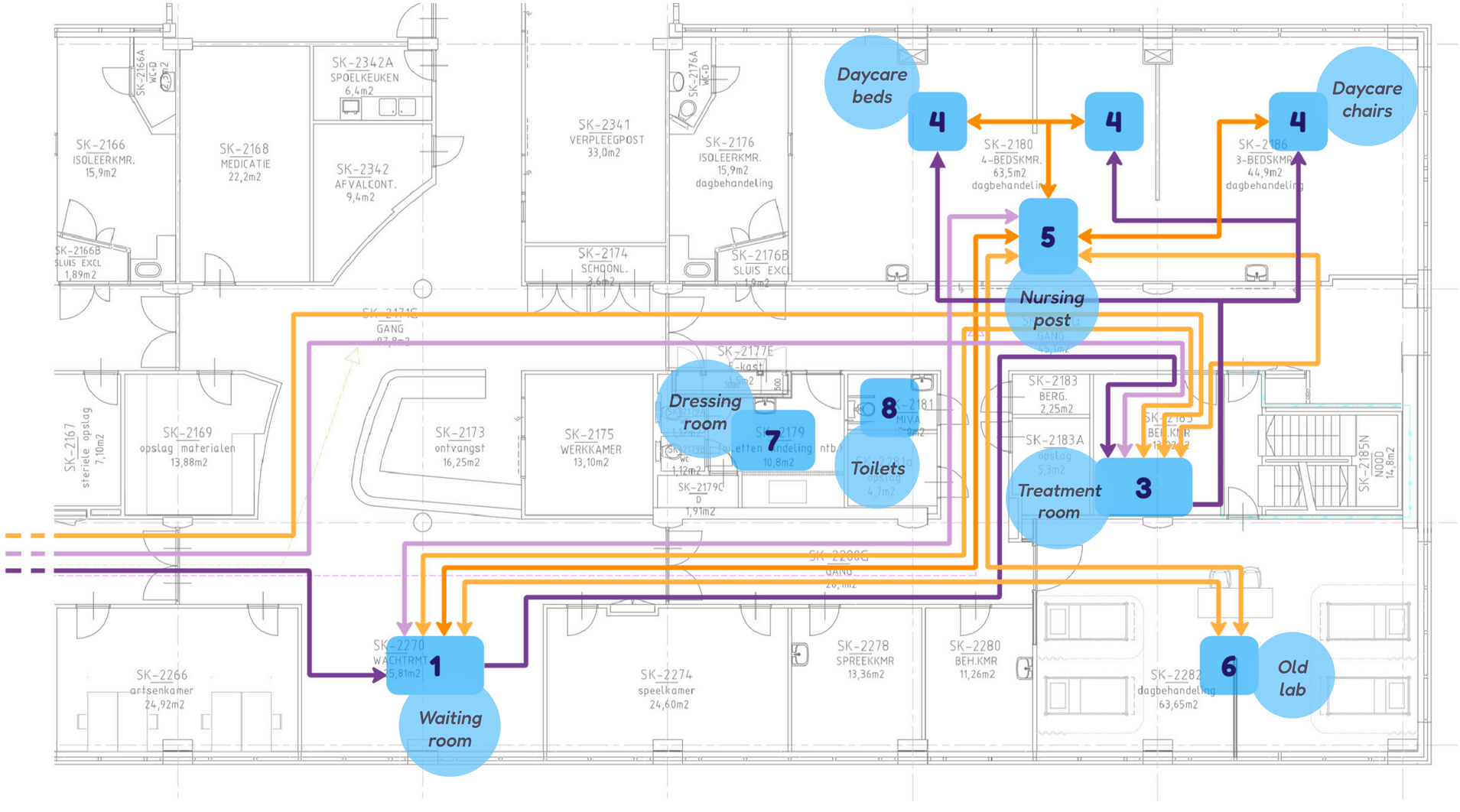


Figure 7: *A flowchart indicating the traffic routes through the buidling. Orange indicates staff, purple indicates children and parents.*

Waiting room

Located in the middle of the two hallways leading towards the daycare is the front desk, with the waiting room situated on the right hand side. Upon arrival, the patient must check in at the reception desk and then take a seat in the waiting area. They will be assisted as soon as one of the nurses is available. This is also where most of the staff members get their coffee, since it is the only machine in close vicinity. Sometimes, patients have to return to the waiting room after being measured and weighed, before they can proceed to the treatment room.

What needs to change?

The coffee machine in the waiting room is the only one in the vicinity of the daycare. This results in not only parents and patients using the machine, but also the staff.

The situation occasionally prevents children from being measured and weighed before they get attached to their IV drip. Since this is done in a room outside of the daycare, treated patients have to walk past the waiting room with their IV pole.

What needs to stay?

Environment looks very calming and there is enough space available for everybody to sit, including spots for smaller children.

The little swimming stairs next to the front desk is very well received amongst tiny visitors.

Measuring and weighing room

This is where children are weighed and measured, usually before they are given injections. Sometimes it is done after the injections if the room is occupied and it hampers patient flow. It is a very tight space and there is usually no room for IV poles/wheelchairs, etc. It is also far from the other locations, not ideal for patients with mobility issues. Parents are often seen carrying their children and the IV along.

What needs to change?

The room is quite small and incoveniently placed. It would be ideal if measuring, weighing and treatment can be done in the same room.

Some paint might help.

DISCOVER

Treatment room

This is where children are given injections and put on intravenous drips. It is a relatively small room that is optimally furnished. It is preferable not to perform treatments in the ward, not only for hygiene reasons but also for privacy. Many patients already have a fear of injections due to past experiences. Patients proceed from here to the daycare area. In some cases, traffic goes the other way if there is something that cannot be resolved immediately in the ward.

What needs to change?

The room is already quite optimised, the only downside is the lack of space. and how it looks.

Medical equipment could be more neatly hid inside closets like at WKZ.

Daycare beds

On one side of the daycare, we find four bedspaces, two of them located with their headrest against the wall, two of them in front of the nursing post. This is where children (and parents) can sit or lie down after treatment. The beds can be easily swapped out for another size to match the patient's needs. The children are often on their phone or tablet when awake, otherwise they mostly sleep and rest during their stay. They don't talk much or converse mainly with their parents. They also tend to stay in the same place, but there isn't really any space for other activities either.

What needs to change?

There is no real privacy for any of the patients when they have to lay in bed. Discussing private information happens right next to the beds, due to lack of other availability.

Curtains are a subpar solution in an attempt to create some privacy for the patients. Although good for visual privacy, it causes the people behind the curtain to speak up, making their conversations even easier to hear.

What needs to stay?

The beds are all very easily accessible from both sides and are situated close to the entrance in case one of them needs to be wheeled out.

The spot right in front of the nursing post is the 'favorite' of many patients that require a bed. It is the most private, while adjacent to the nursing post in case of emergency.

Daycare chairs

Opposite to the beds on the other side of the room - past the nursing post - we find the five treatment spots meant for children that do not require a bed. It is a larger open space with chairs on either side against the wall.

What needs to stay?

Placement of the facilities along the walls opens up the walkway in the middle which in turn makes the rather small space look a lot bigger

What needs to change?

There is no privacy, everybody can see each other as a result of the inconvenient placement of the treatment spots. The alternative of sitting behind a curtain is not appealing as well.

The tv screens above the chairs are rarely used. Patients spend the most of their time on their phone, due to lack of better facilities.

A patient (16 yr) claimed that the whole room should be more modern and less depressing. The chairs made it look like a real hospital, which was considered negative by the patient.
No comfortable places for parents to sit. The only option available is positioning stackable chairs in the vicinity of their child.

All medical equipment is visible, making for a chaotic and intimidating appearance.

There is no space available to discuss private business with parents and patients. This now happens right next to the chair, resulting in uncomfortable situations.

No solid opportunity available for parents and patients to do some (home)work. The small tables attached to the chairs are insufficient and the access points to power are quite inconveniently located.

Nursing post

This is where the nurses spend most of their time doing administrative work, preparing medication, collegial discussions and the occasional coffee break. It is situated in the center of the room, facing the window. There is a lot of traffic between the different treatment areas in the daycare and some occasional traffic to the waiting room to admit a patient or get coffee. There is always at least one nurse on the ward, either at the nursing station or with one of the patiënts.

Erasmus MC Sophia

What needs to stay?

The central location improves accessibility to all treatment spots massively..

What needs to change?

The back of the nursing post is facing the entrance, making sure that everyone who comes in can look straight into the computers with personal data. There is also continuously ongoing traffic behind the nursing post by all users, which is not ideal.

The whole daycare is very noisy and since the nursing post is situated right in the middle of the room, any (private) conversation can be overheard by everyone in the room.

There is no private space available in case the staff needs to discuss sensitive business with patients, parents, or each other.

The closet behind the nursing post is often used as a workstation to prepare medication, which is not ideal in regards to hygiëne and safety. IV bags often end up right next to someone's food or coffee and everyone has access to the materials laying on the countertop.

There is not a nice place for coffee or tea close to the nursing station, causing the staff to have to go all the way to the waiting room.

There always needs to be at least one staff member present at the daycare with respect to oversight and safety. Sophia therefore works with a buddy system in order to improve movement freedom, which tends to fail often due to shortness of staff.

Bruce Haantjes

Old lab/breakroom

This is the space that is currently being used as storage- and breakroom, but will receive four new bed spaces according to the initial renovation plans. Throughout the day, staff members come and go, but their stays are often short. The room is mostly filled with old chairs and medical equipment, with a small table in the middle of all the chaos and a makeshift bed in the back in case someone feels the need to rest.

What needs to change?

The room is currently used as storage and the chaos is very unsightly. The staff shared many complaints concerning the surroundings and how they had to sit in the middle of all the rubble.

The chairs are very basic and uncomfortable.

Four new bed spaces here will aggravate the issues imposed by the combination of shortness of staff and the requirement of constant presence at the daycare mentioned earlier.

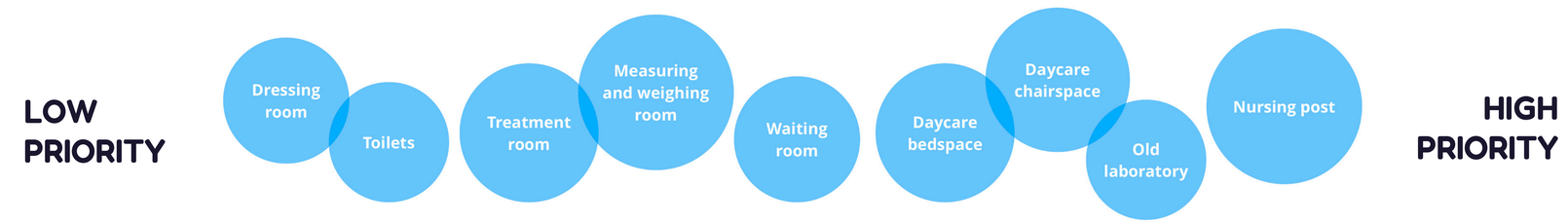
What needs to stay?

The location is separated from the daycare, which is a welcome opportunity for the staff to spend some private time away from the sights of patiënts.

INSIGHTS

THE IDEAL DAYCARE

Erasmus MC Sophia



A space's priority is based on the design opportunities within it as is displayed above. For example, the treatment room is already optimized, therefore requires less attention than the problematic nursing post. Time spent in the dressing room is negligible compared to the rest of the day, therefore it has a lower priority than the frequently visited daycare.

The vast majority of pain points found their origin in **issues related to privacy and noisiness**, the most crucial being the need for an improved way of discussing sensitive information with patients and parents.

The nursing post requires a redesign and/or relocation. The central spot is beneficial in terms of accessibility, however does not outweigh the downsides of the noisiness, traffic, privacy infringements and safety/hygiene related issues concerning the preparation of medication.

The staff indicated a **definite need for breaks away from the daycare**, while the patients also indicated they required more privacy, especially the ones who are using the chairs. This is ratified by the fact that the 'favorite' spot on the daycare is also the most isolated.

Measuring and weighing (a standard procedure for every treatment) had to be done far from the daycare, in an incredibly cramped room. This room is also used by the other departments of the floor, which is why it is situated where it is. Children in wheelchairs couldn't fit in there, and if the measuring had to be done after the needle insertion, it caused a lot of complications with the IV pole. Besides this, the main route from the treatment room to the weighing room goes past the waiting room. This causes uncomfortable and intimidating situations where treated patients have to walk past unexpecting bystanders, possibly instilling even more fear upon children who are waiting for their turn. The ideal daycare must include a logical route through the building.

The vast majority of **children (and parents) often remained seated in one spot**, engaged with their phones or tablets. This was partly due to lack of movement freedom and partly caused by need. The latter can also be explained by the increase in screen time amongst children, also discussed by Qi et al. (2023) in their paper on *screen time among school-aged children of ages 6–14: a systematic review*. The average screen time turned out to be 2.77 hours per day, with entertainment, socializing and learning being its main use cases - in that order - which was confirmed through interviews and user observations. Children might want to be on their tablets and phones.

A more inviting, central place for coffee/tea and water is desperately needed; everyone drinks far too little, also according to some of the staff members. There is a small coffee machine in the waiting area, but its location is quite inconvenient for the nurses who can't always leave the daycare, plus it does not look inviting at all. Having a more central location would also limit the amount of extra traffic to the waiting room.

The old laboratory should accommodate 4 extra beds - in order to be able to treat more patients - which is controversially quite impractical. According to the staff, a separate room will only divide the department into two and impose extra complications onte the already high workload of maintaining constant oversight. The additional problem of staff shortage makes it even harder to cover both rooms and aggravates the issue of not being able to leave the daycare when needed. Furthermore, the bottleneck here is the treatment room; having a single treatment room limits the workflow and creates delays, since only one patient can be treated at any given time. Extra bed spaces will only be useful if enough children can be treated in time to fill them and while there are empty beds on the daycare, there are often patients sitting in the waiting room, which shows a the need for patients to be treated simultaneously. Administering treatment on the daycare itself is possible, but considered by the staff to be suboptimal due to the lack of privacy, convenience and intimidation factor, emphasizing the need for multiple secluded treatment rooms. In other words: **if the hospital wants to host more patients, extra beds should be accompanied by an extra treatment room.**

3 STAKEHOLDER ANALYSIS

DISCOVER

Who has interest in the outcome of project and how heavy does their opinion weigh?

In principle, the daycare can be approached as a product that interacts with a trifecta of user groups. The children, the staff and the parents are considered to be the highest interest stakeholders. Each of them have their own unique experience within the environment and require it to function in a way that conforms to their specific needs.

External stakeholders are the architects that will continue development of this renovation, aided by the results of this project. They require a concept proposal that fits closely to its users' needs and wishes, while conforming to several building technical regulations. While their interest in the result is lower than those of the direct users, they have more power in the decision-making stages of the project.

The highest up in the power-chain is the hospital board, which inevitably needs to be convinced of the final interior proposal from the architects. They have little interest in the results, but their standpoint is ultimately determinant for the course of the entire renovation project.

Figure 8 depicts all important stakeholders that have a certain level of interest and power related to the results of the project. Interest relates to the amount of requirements that influence the shape of the design, power indicates the weight of those requirements in the decision-making process. Each stakeholder is represented by one or two quote(s), illustrating their particular connection to the project.

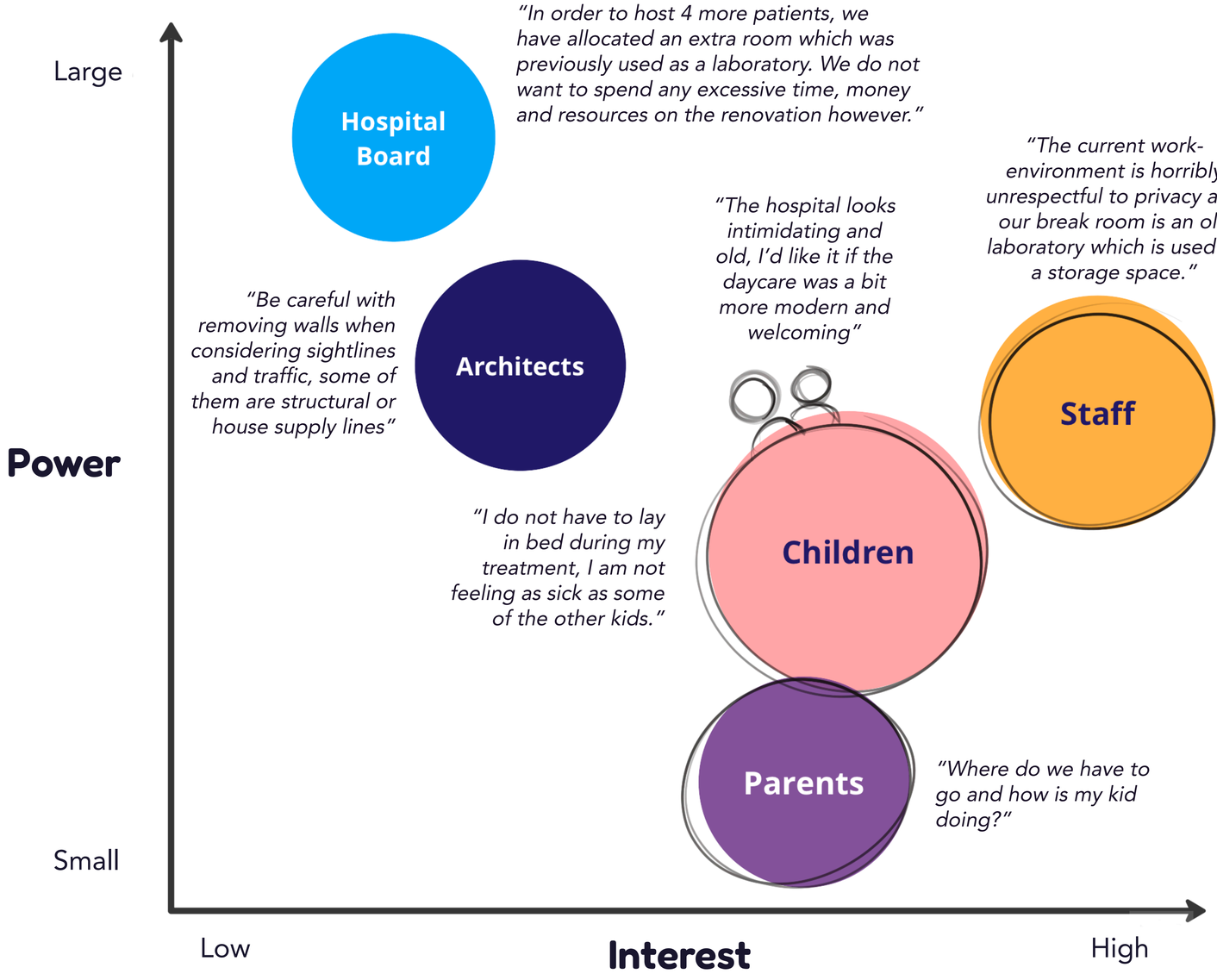
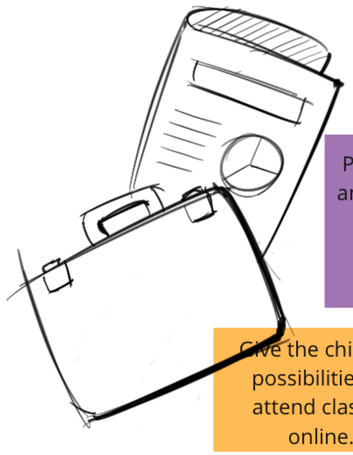


Figure 8: *A power vs. interest map to help identify the overall importance of each stakeholder.*

Staff
Parents



Core Values SKZ

Knowing where you have to be

Very unclear where you have to go or who to talk to.

"We frequently see people walking with no idea where

Much more can be done with the hallways. Not just improved signage, but also aesthetically.

Daily life

Parents need space and opportunities to continue their (work)life while waiting.

The emphasis on the illness should be minimized as much as possible.

Give the children possibilities to attend classes online.

From fear towards trust

Risk level

Age

How can you make a division between the children?

Duration of stay

Stress tolerance

"For some children, the treatment becomes a part of their lives. We need to make them leave with a nice experience."

Self-care wherever possible

"The current space is very hospital-like"

Being with your family and others

Children have little interaction with each other. Is there no desire for it, or is the barrier too high?

Possibility to bring one companion to the daycare. There is ample space around for others. Only when it is not busy or the child is young, two parents can come along

The children are at the centre of it all,

"Maybe facilitate something for family that can't come along?"

Patients can help us improve

Bring the outside world inside, think about holiday's and traditions.

Good information and transparency

We would like some facilities on the daycare for caretakers that cannot leave when they want to.

A soundproof nursing-post, closed off from the daycare.

There is not a nice space to discuss private information with parents.

Good care for employees

"We need a proper spot to prepare medication"

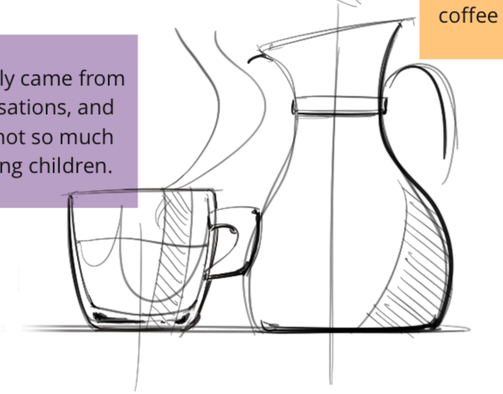
Arbo regulated workplace

There is no need for an extra room, just a designated place will suffice

There is no nice spot to have short break close to the daycare.

We need movable drawers in which we can store all the necessities for treatment

Something with a table and some coffee and tea.



"We want to offer children a lot of freedom, but we need to be careful that it doesn't turn into a playground."

Parents do not have a suitable meeting/gathering spot.

"A coffee counter close to the kids would be nice"

A nice environment

Baby room 0-1 year

Chill and study place

Spaces for different ages?

Play corner 1-12 year

Possibilities for rest, work and play

The selection of patients (and their needs) varies from day to day. Flexibility and safety in the work environment should be a priority.

At WKZ the kids could pick their own treatment spot on the daycare.

There is a total of 10 spaces, 4 beds, 1 crib and 5 chairs. The extra 4 bed spaces are to be in the old laboratory.

The treatment room is overloaded. Possible treatment spots in the ward to treat multiple children at the same time?

The daycare is often very noisy. A flexible soundproof wall that can be moved?

It's important to maintain a sense of calm. At WKZ, the department was sometimes chaotic. This isn't always pleasant.

The noise mainly came from beeps, conversations, and clinic clowns, not so much from the playing children.

Maybe a central play area with several corners for study?

Core values brainstorm with staff and parents

In an attempt to formulate how the core values of Sophia would translate into concrete consequences for the new interior, two sessions were held. The nine core values are used to guide the discussion between parents and staff. Some core values were primarily applicable to the workflow, while others resulted in interesting and occasionally specific requirements for the interior. The sessions were conducted with a total of 15 participants - 13 staff members and 2 parents. The results were clustered per core-value, after which they could be analized for overlap or contradictions.

SKZ is a noisy work environment, it looks uninviting and there is a huge shortage of space, both on the daycare and in the breakroom.

The information gathered from this brainstorm session can be clustered into 6 important insights.

DISCOVER

INSIGHTS

What often emerges is the need for a **separation between a calm working environment and a busier play area**. This seems feasible by utilizing two distinct spaces for these purposes. It is important, however, to maintain tranquility in the play environment, the interior should primarily emanate a sense of calmness.

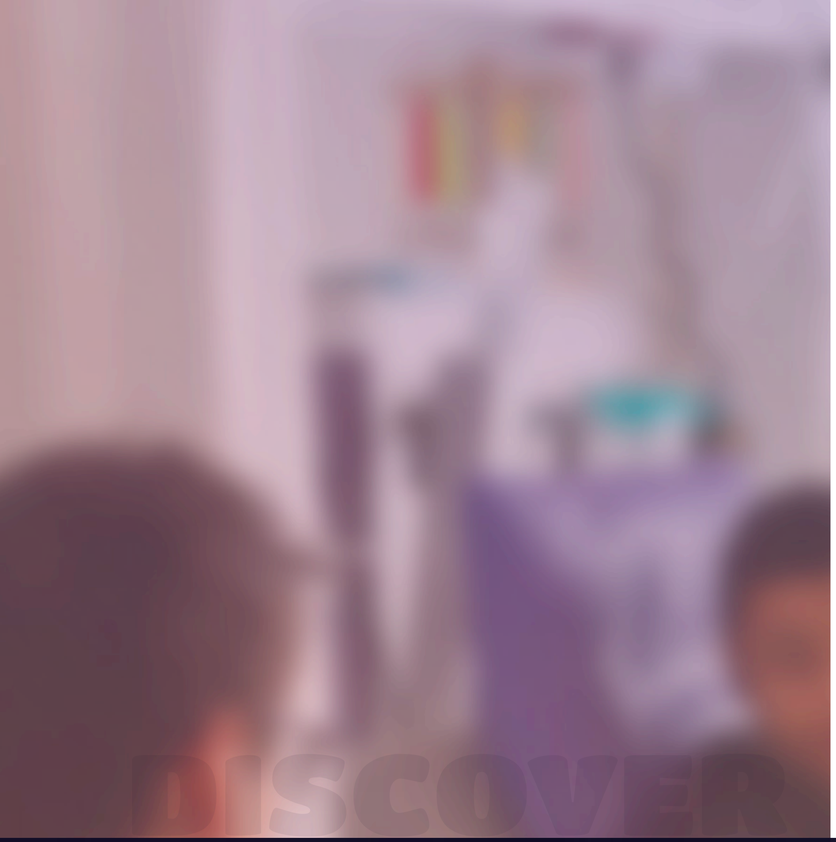
Erasmus MC Sophia aims to **eliminate the 'hospital feeling'**. The visual image is mainly dominated by equipment and clinical design, which can have a negative impact on the child's experience. Removing equipment, incorporating more colors in the rooms and adopting a different design for treatment areas, were some of propositions made by participants.

Flexibility and safety are paramount. The department should be designed in such a way that different combinations of patients can be easily treated. Every day, a different group of children with different needs arrives. It is important that the interior can adapt to these needs while ensuring safety at all times.

One of the highest priorities is **a space where nurses can discuss private matters with parents.** Currently, this happens behind a curtain near the bed, which only provides visual privacy and is inconvenient for everyone in the vicinity. Additionally, a closeable nursing station where medication can be prepared is also highly desired as indicated by multiple staff members.

The daycare is difficult to find and complicated to navigate. For parents coming for the first time, it is often confusing where they need to go and who they should report to. Better signage in the hallways and better information on whom the patients should report to are urgently needed.

Besides all the hectic activities, there is also a need for a proper break area. Currently, the nurses have improvised a small spot for themselves in the corner of a table in the old lab. **Having a place with coffee/tea, a microwave, and power outlets** would make a significant difference. This need is not only expressed by the employees and would also greatly please the parents.



Value discovery interviews with children and parents

Throughout the analysis, questions in relation to the values of the patients and parents rose above. How do they interact with the current room, what are their likes and dislikes, what are they missing, what would they like to have? These questions can only be partly answered by observation. Qualitative research has been conducted in the shape of live interviews with the children and their parents, in order to find similarities or discrepancies between observed and experienced behaviour. A total of 10 subjects participated in the informal interviews, 5 children and 5 parents. The setup of the conversation can be seen in figure 9, while the following pages show the results clustered by question. All participants signed an informed consent form, which can be found in the appendix.

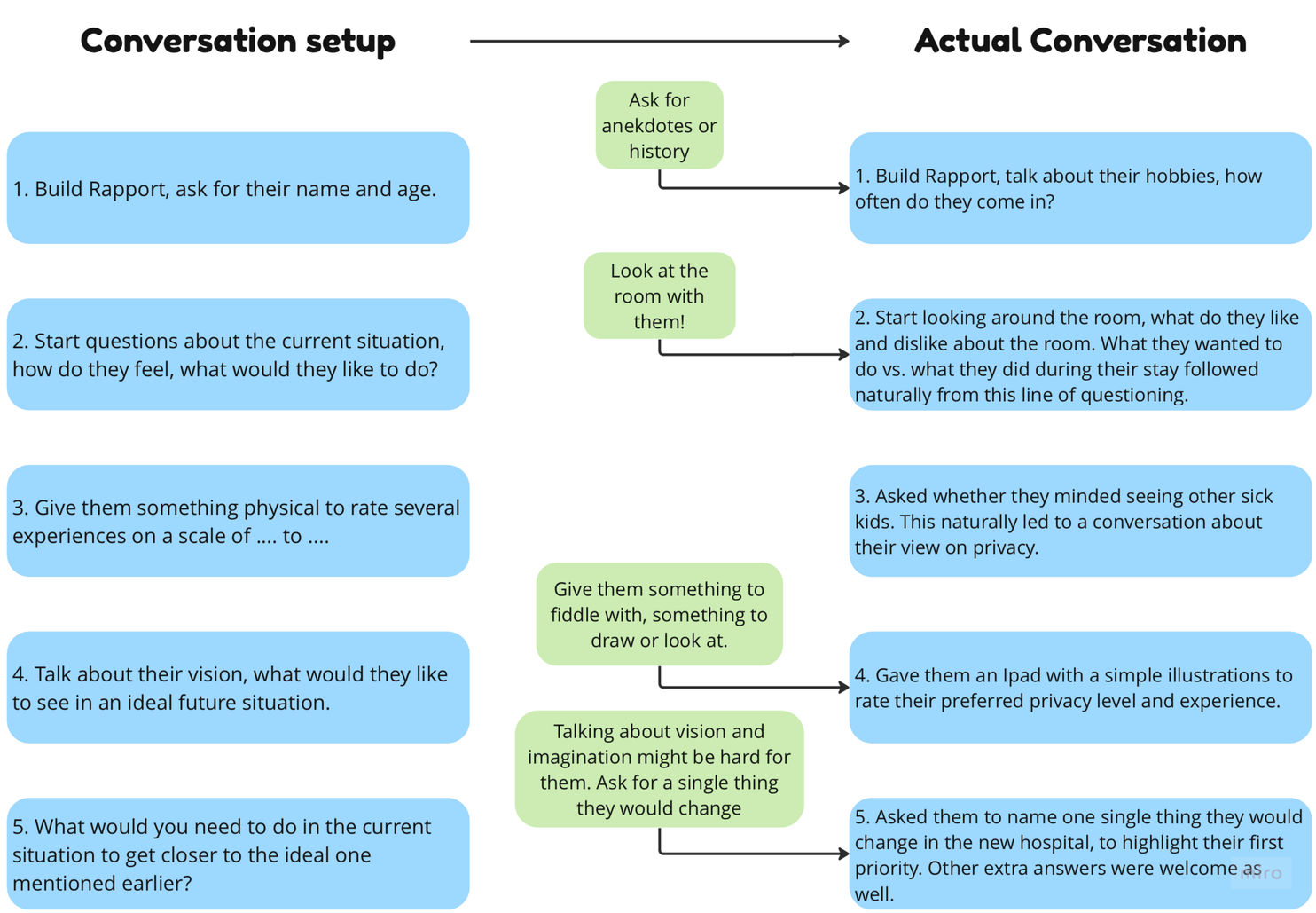


Figure 9: *Buildup of the interview structure*

DISCOVER

Do they mind seeing other kids that are sick/bald?

Not really mind seeing other sick kids. One patient actually found it interesting, another one cute.

A problem with the noise was noted. Sometimes the younger kids in the 'private' space in front of the nursing post will cry and scream.

Parents said it is worse for the kid who is actually bald or sick, seeing others looking at them.

They do mind when other people see them when they are discussing private business with staff

What do they think about the current privacy situation?

Even though sitting together with other patients was no problem, the way all the seats are facing each other now is a bit too much.

"It is not really nice to sleep here, there is so much noise"

Noisyness was mentioned multiple times, especially during private conversations it was a bit of an issue.

It is nice to have both options available, it is so dependent on the child what they want.

The children didn't mind sitting in the room together with others, they often actually preferred to.

What kind of privacy levels do they require?

Open area ⟷ **Private room**

"I don't really mind, anything is fine. I'm only here for 2 hours"

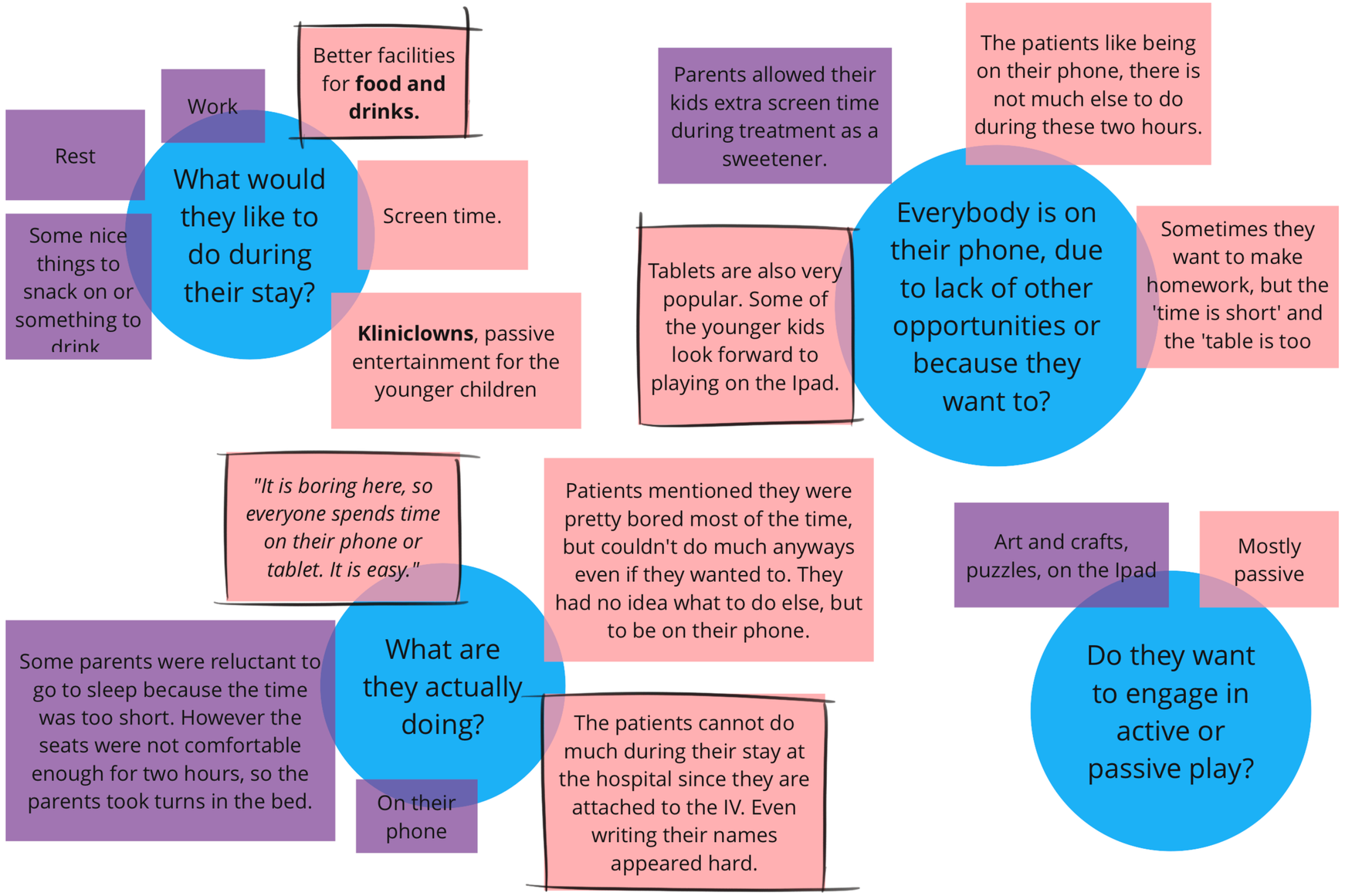
"I would feel a bit bored when I'm alone, so preferably a bit more people around"

"We have to take care of our child so we just want a bit of privacy to rest"

"I would like to speak with some people while I'm here, but I'm not going to seek it out."

Children
Parents

Children
Parents



DISCOVER

Most patients didn't fully dislike the experience there, the waiting is just a bit boring. One of them preferred to go home immediately.

How would they rate the whole experience on a range from 1 to 10?

Parents were either tired or bored. Most of them mentioned the quality of their experience was largely based on interactions with the staff. The second biggest influencer was the availability of food and drinks.

I don't like it here ⟷ **I like it here**

"The staff is friendly and you get helped fast. The waiting is just boring"

"I think it is a punishment to be here, but you do it for hér, you know?"

"I quite enjoy the calm environment here, only downside is that you can hear everything"

"I want to go home as soon as possible, the waiting is so boring."

"I don't mind, it is not fun, not horrible. And I only come once every two months. It's fine."

"It is fine here, I am enjoying myself on my Ipad. I wouldn't mind some better food and drinks though."

"Can we go see the cliniclowns? I am bored"

"Make it more 'gezellig'"

There is no sufficient place to work. Insufficient being a table that fits a laptop with an easily

What is the first thing you would change about the current room?

Some bar with better drinks and food, close to the day care. Preferable ordered and delivered at the bed.

Better food and drinks. At WKZ they apparently got everything, at SKZ they got a sandwich.

Anywhere near their child if they are young.

Where would they like to sit/lie down during their treaitment

Somewhere where they can work on a nice chair, especially when the child is older

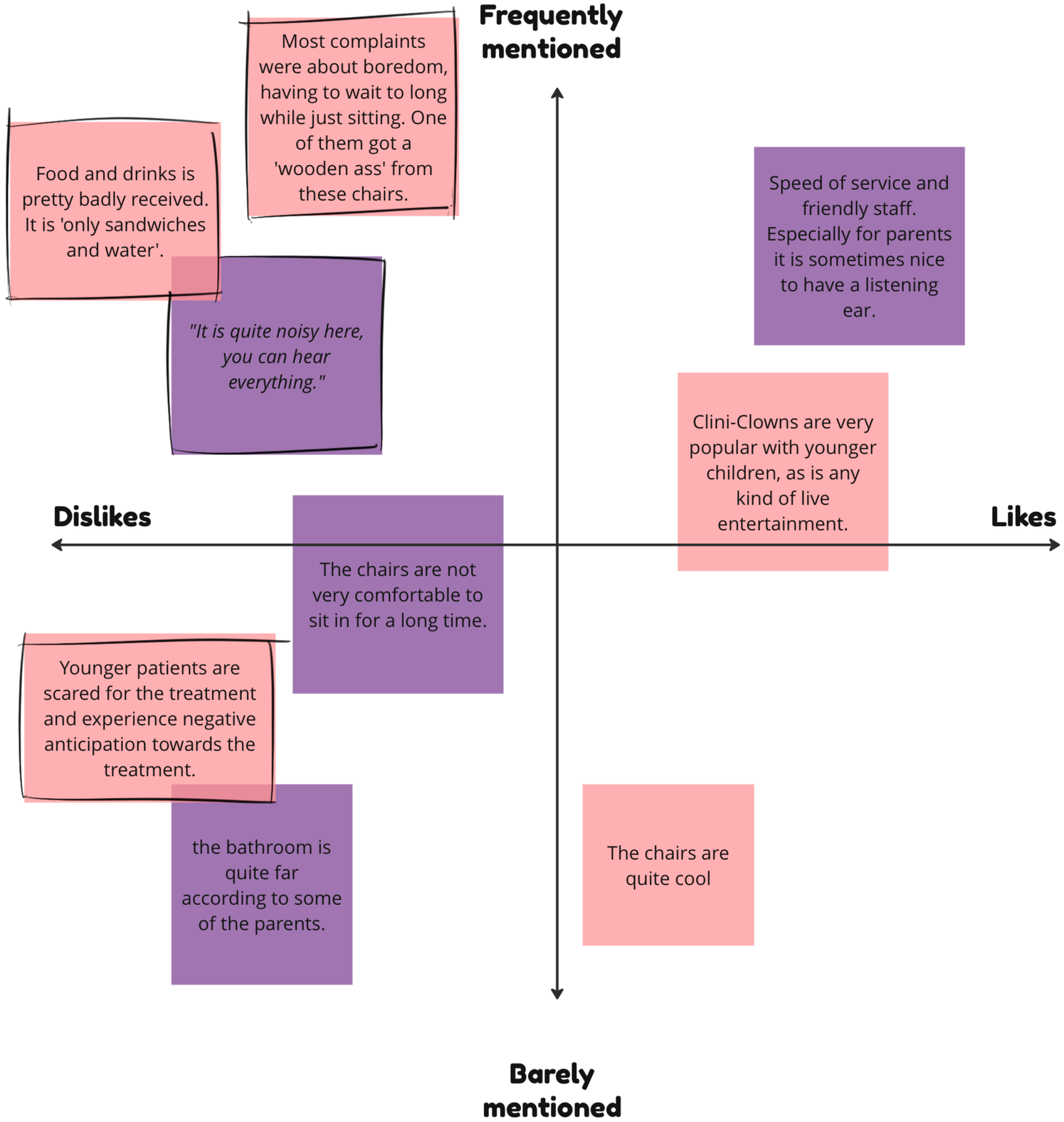
Most children didn't mind sharing the room with others, but didn't want to face them directly.

Most children did not really care. when pressed, most admitted they wanted to sit near the window.

DISCOVER

Children
Parents

Children
Parents



DISCOVER

Children and parents all agree on the boredom of waiting that dominates their experience. We must either eliminate the boredom or make the waiting not feel like waiting.

The information gathered from interviews can be summarized into 5 important insights.

DISCOVER

INSIGHTS

Most children were on their phone or tablet because they wanted to. Some parents with younger children actually used it as a ‘reward’. Even when prompted with entertainment methods that matched their hobbies, patients preferred the phone or tablet. It was fun, but also easily accessible, while the tables attached to the chairs were too small for a laptop or board game anyway.

The most surprising frustration that was mentioned by all parents and children: **the lack of better food and drinks.** WKZ apparently serves the patients whatever they ask for, whereas at Sophia they get *“a sandwich and some water”*.

Even though enough patients and parents find their entertainment fulfilled by screen time, they were also **all bored because of sitting still**. Since decreasing the waiting time is not really an option, it is important to think of a way to make the waiting feel less like waiting. Something besides screentime, as is proven by the tv’s above the beds that are never used.

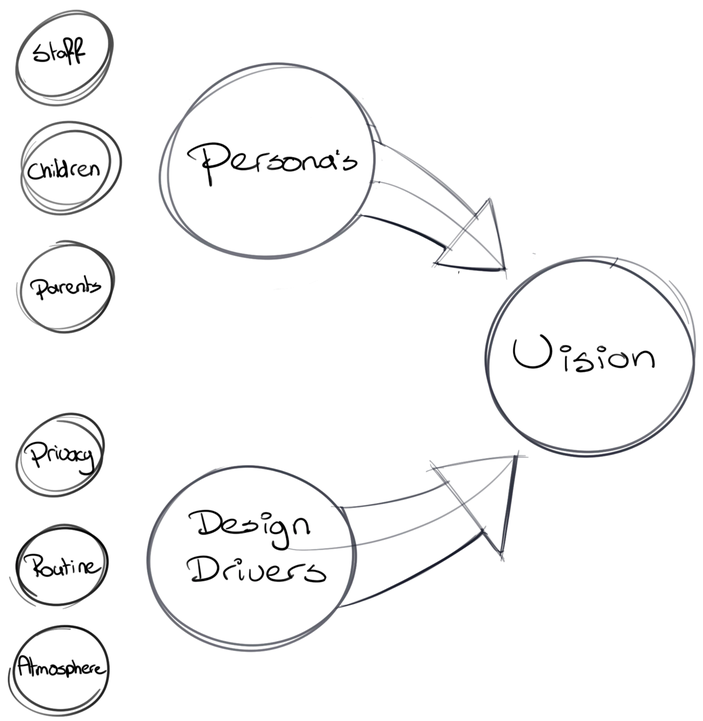
Forms of entertainment should be passive, the patients cannot move around too much with the IV in their arm. Screen time is preferred, but live entertainment from Clini-clowns is also highly anticipated. Anything where the patients can just sit and ‘be entertained’ is fine.

No one really minded to see other sick children, nor to share a room with them. Most privacy related issues could be traced back to the **noisiness of the room**. Looking into ways to improve acoustics could help to improve the whole experience for everyone.

Converge

DEFINE

Now that enough insights have been collected, we can more accurately **define what the ideal daycare should look like.** The persona's illustrated in chapter 4, in combination with the design drivers in chapter 5, eventually lead to a set of visions described in chapter 6, which form the baseline for the development phase.



Who are the users?

How does this translate into 'the ideal daycare'?

What motivates the requirements?

4 USER PERSONA'S

The personas described in this chapter are inspired by real users and are a result of deduction from observations and interviews. Note however, that they are fictional representations and may not reflect the exact experiences and characteristics of every individual stakeholder. Written versions of the personas can be found in the appendix.

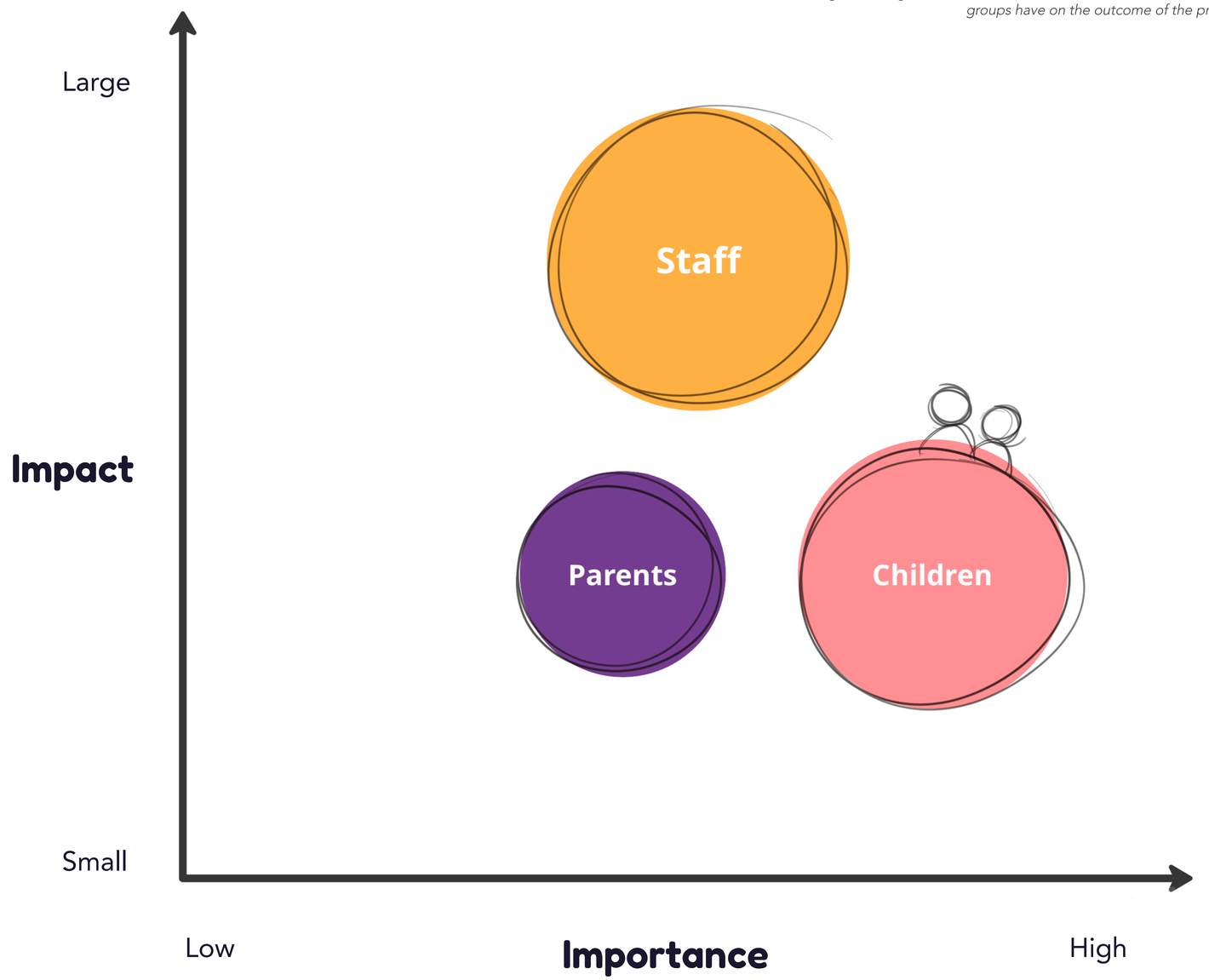
DEFINE

How can a persona be of use in this project?

The methodology serves as a valuable tool in understanding the unique needs and preferences of different stakeholders involved in using the same product-service. In the case of Erasmus MC Sophia, the groups that hold the biggest stakes are the children, the staff and the parents. By creating personas that embody their characteristics and values, we can formulate a workable set of visions that will eventually shape the design down the line.

Figure 10 maps the three user groups based on their influence and importance. Even though the children are considered to be the most important stakeholder in this project, the staff's wishes have the biggest impact on the environment. This can be explained by the fact that they interact with the space the most and indicate the most pain points relating to the interior and its (lack of) facilities. Parents have the smallest impact and lowest importance, considering they will not always come along when the child is older.

Figure 10: *A grid that indicates how much influence the three user groups have on the outcome of the project*



DEFINE

Three different user groups, six different personas

Parents

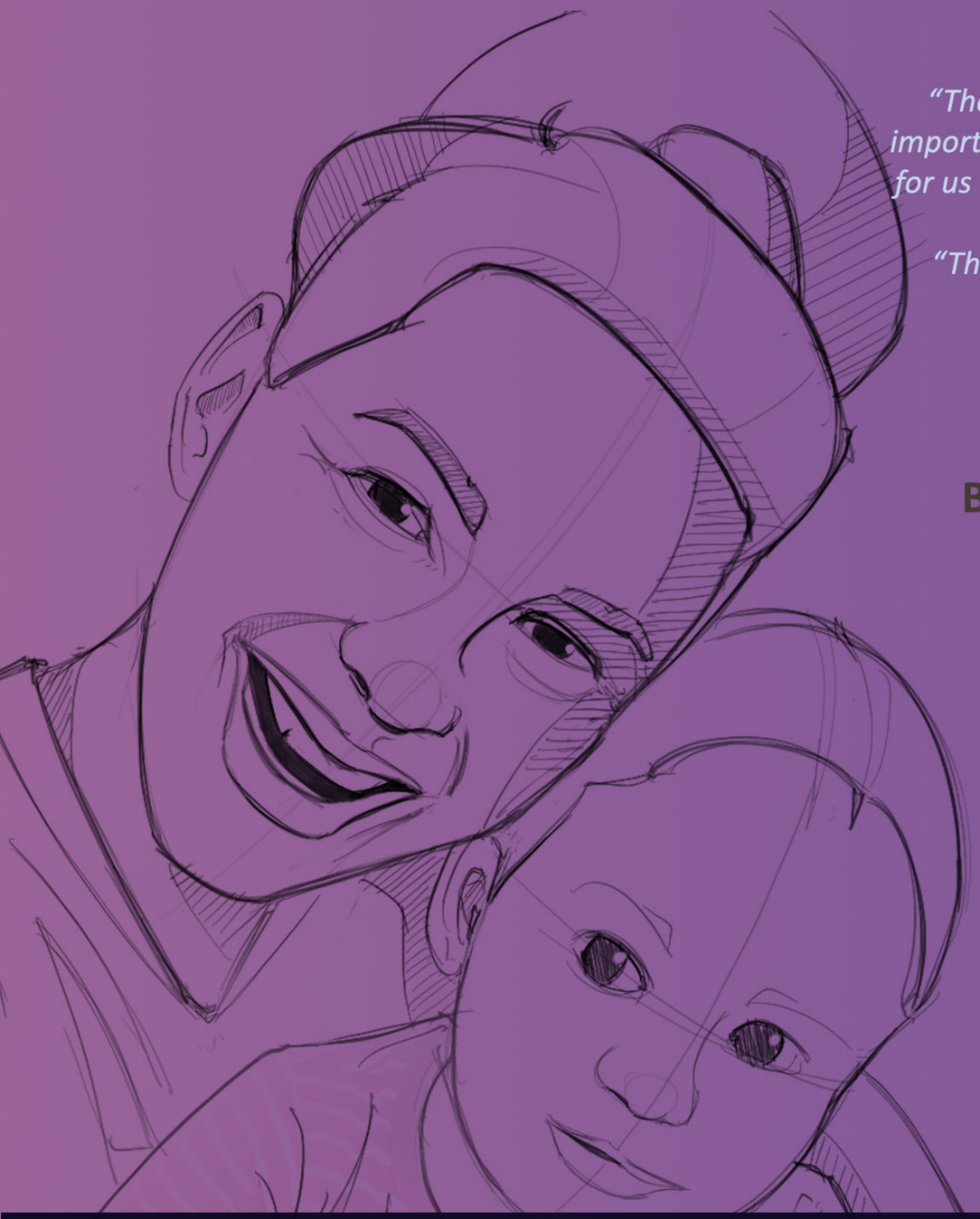
The children are often accompanied by one or multiple parents. Since the space on the current daycare is limited, guidelines say to only allow one accompanying family member on the daycare. By developing **two personas**, we aim to differentiate between attitudes towards their child's care. Some parents stay during the whole treatment, others only come for delivery and pick-up or not at all. At first glance, the latter seems quite irresponsible, but can be easily understood by considering the (emotional) stress on the parents or simply the child's age: some are old enough to go by themself. The two persona's **Julie and Matt** represent these different levels of involvement and shed some light on the reasoning behind them.

Children

Through the development of **three personas**, a differentiation can be made between the factors that cause the largest discrepancies between the sets of requirements amongst the children: age and condition. The Erasmus MC Sophia daycare hosts patiënts ranging from zero to eighteen years, and every one of them has a different medical condition. Adolescents have vastly different interests compared to toddlers, and children who are feeling more sick than others can sustain significantly lesser amounts of external stimuli. The three personas, **Ethan, Olivia and Jackie**, represent different age groups and varying medical conditions, highlighting their different values and experiences.

Staff

The staff is approached as one team with overlapping interests, since there are no factors that cause a large separation in value sets. This enables the opportunity to capture the staff into **a single persona**, while still achieving a close representation of the real life user. Note that there are differences in tasks between the different staff members, some will administer more treatments, others engage more often in administrative work. **Sarah** represents the values and wishes of the daycare staff



Parent
Stays for
5 hours

"The wellbeing of my child is the most important to me, but some proper chairs for us would be very much appreciated."

"The treatment is already hard on my son, can we at least get him some comfortfood he likes?"

JULIE

36 years old

Child's condition

Sick — *Healthy*

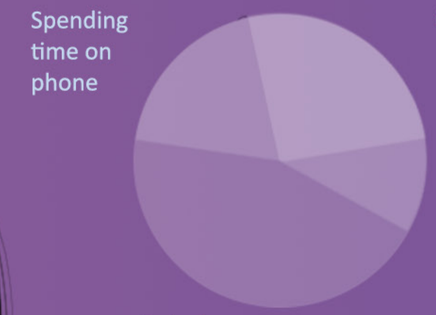
Involvement

Low — *High*

Goal & Motivation

Ensure the **well-being and happiness of her son** by providing constant care, support and attention.

Behaviors



Needs

A **comfortable and private place** to sit with her child during the long treatment.

F**acilities to work online** while monitoring her child.

A listening ear from the staff to help vent the stress of the situation.

Pain points

The **lack of proper sitcomfort** at the daycare

Lack of tasty food and drinks and public kitchen facilities.

The daycare is **hard to find.**

P**rivate conversations** held right next to the beds for everyone to hear.

Parent
Stays for
0 hours

MATT

41 years old

Child's condition

Sick — Healthy

Involvement

Low — High

"My son is old and brave enough to go by himself, I am just there for the taxi ride back home."

Goal & Motivation

Maintain a sense of normalcy and freedom in his own life while supporting his son's journey, by putting his trust in the expertise of the daycare staff.

Behaviors

Dropping off or picking up his son

Other

Needs

Needs **assurance** that their child is in safe and capable hands during the daycare hours

Wants **regular updates** on their child's progress and any changes in the treatment plan

Pain points

The daycare is **hard to find**

It looks quite outdated and not very welcoming for parents to stay.

Child
Stays for
6 hours

ETHAN

4 years old

Medical condition

Sick — *Healthy*

Tolerance for stimuly

Low — *High*

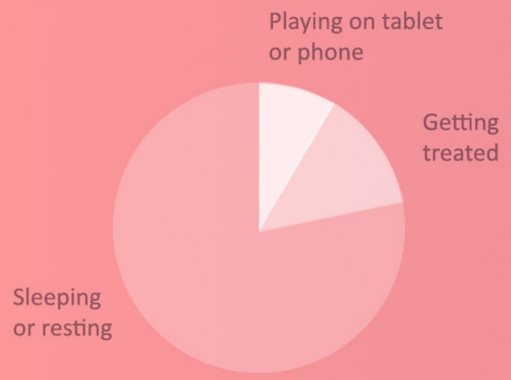
"I just want to sleep when I'm in the hospital. Or play on the iPad!"

"I hate the needles in my arm, can we go see the Cliniclown already?"

Goals & Motivations

Maintain a sense of **comfort and privacy** during his treatment, with as little external input as possible.

Behaviors



Needs

Requires a **cozy and calming space** that facilitates rest and sleep

Greatly values the presence of his **parents or highly familiar staff members**

Pain points

May experience **fatigue** and physical discomfort that requires **immediate attention**

Troubled by the **lack of privacy** on the daycare.

Sits in a **wheelchair** and needs to be carried to the bathroom or when being weighed.

Child
Stays for
3 hours

OLIVIA

10 years old

"I think the hospital is super boring. I am just on my phone most of the time"

"A tasty meal would make the waiting a lot less bad!"

Medical condition

Sick — *Healthy*

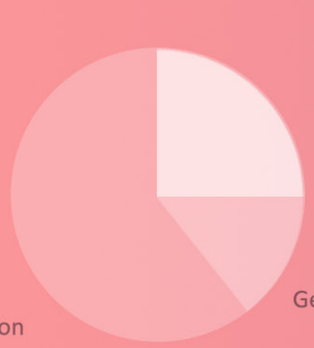
Tolerance for stimuly

Low — *High*

Goals & Motivations

Engage in entertaining **activities that counteract the boredom** and distract from the treatment .

Behaviors



Needs

Age-appropriate forms of entertainment that distract her from the treatment

Opportunities for expressive play that require **little physical activity**

Tasty food to eat to kill the time during the treatment.

Pain points

Feels limited in her movement by the IV pole and the available space.

Troubled by **lack of tasty food.**

Feels uneasy due to the **hospital environment** and is afraid to get the needle in her arm.

Child
Stays for
2 hours

"The treatment is quite normal for me by now, so I come here alone right out of school."

I just want to be able to do my own thing when I'm at the hospital."

JACKIE

15 years old

Medical condition

Sick — *Healthy*

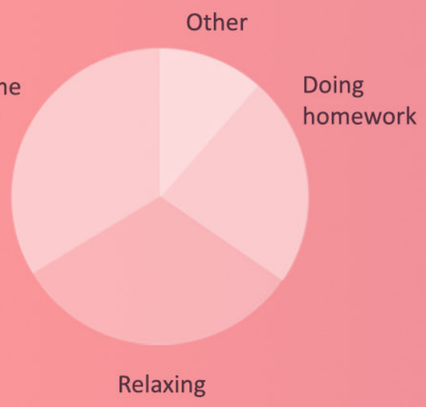
Tolerance for stimuly

Low — *High*

Goals & Motivations

Maintain a sense of **independence** and control over her life despite her medical condition, by **using the downtime during treatment** to her advantage.

Behaviors



Needs

Requires **opportunities to do her homework** while waiting for the treatment to end

Needs a **private space for conversations** with the daycare staff.

A tasty snack to pass the time

Pain points

Sometimes feels upset by the treatment **interrupting her daily life.**

Bothered by the **lack of privacy** and **abundance of noise** at the daycare.

Bored due to the lack of facilities in the room.

Staff
Stays for
9 hours

SARAH

29 years old

Stress level

Low — High

Tolerance for stimuly

Low — High

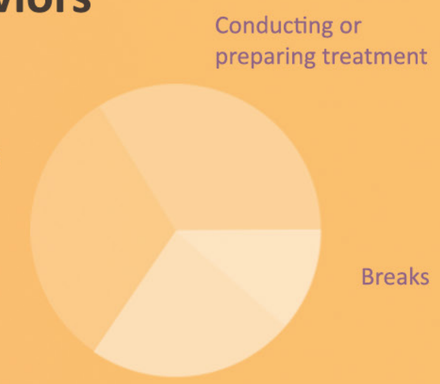
"The daycare is so small and noisy with the nursing post in the middle. There is basically no privacy for us, nor are there nice opportunities for children to play or chill."

"Maintaining oversight is the most important for us. The daycare shouldn't become a playground!"

Goals & Motivations

Maintain a **healthy work-life balance** without excessive amounts of stress and **provide a comfortable experience** for the children under her care

Behaviors



Needs

Requires a more **isolated workplace** that maintains a good **privacy-oversight balance.**

Craves a **space for private conversations** with the parents and patients.

Needs a **break area** seperated from the daycare.

Pain points

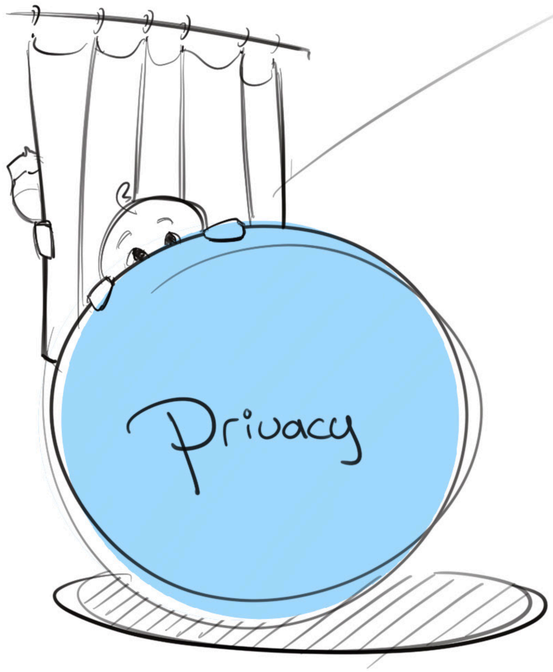
The need for a **constant presence at the daycare** restricts freedom and obstructs the workflow.

Bothered by the **lack of privacy** and **noisyness** at the nursing post.

Staff shortage means she has to work longer and more frequently .

5 DESIGN DRIVERS

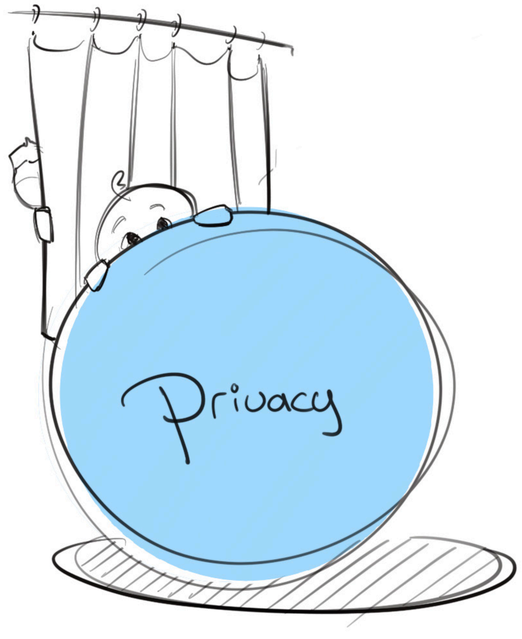
This chapter is dedicated to the 3 design drivers that form the spine of this redesign process. They are deducted from the needs, values, and behaviors of the three different user groups. Each of the groups have different requirements in relation to these drivers, which leads up to three unique visions of what ‘the ideal daycare’ means for them. A more detailed breakdown of the design drivers can be found in the appendix



The privacy driver revolves around creating a space with a sense of confidentiality and respect for personal boundaries, while at the same time maintaining the quality of care. It touches on the difference in sensitivity to stimuli, accessibility and the handling of private information.

Routine is a more systematic driver that serves as a guideline for how to allocate the different areas in order to optimize the experience for all users involved. Each of them interacts with the daycare in a different way and follows a certain journey through the building, which is ideally a logical one with little unnecessary traffic and unwanted visitors.

Atmosphere considers the look and feel of the space, in order to create an environment that stimulates healing and reduces the intimidating hospital aesthetic. The driver is aimed at optimizing different sensory inputs like sightlines or sounds and considers the influences of these inputs to develop concepts.



Guidelines for the interior

- *The amount of places from where the patients can see the beds must be as small as possible.*
- *The amount of treatment spots that are directly visible from another treatment spot should be as small as possible.*
- *The amount of treatment spots that are directly visible from the nursing post should be as large as possible.*

Parents

Parents value privacy mostly when they need to discuss sensitive information about their kids with staff members. This now happens next to the beds for everyone to hear, which is suboptimal. The new daycare should facilitate proper areas to discuss private business and provide flexible options for visual privacy, whenever they want to take a nap with their child or conduct treatment at the beds.

Children

A child's value for privacy revolves around a different need or tolerance for external input depending on their condition, age, mood and personality. Despite this enormous variety, the patients can be divided into three groups: low input, average input and high input. The daycare should facilitate these different needs and be flexible enough to provide opportunities for play, study/chill and sleep.

Staff

Staff members are concerned with privacy in regards to sensitive information, personal conversations between colleagues and accessibility to their patients. The current daycare is extremely noisy, the nursing post is too open and right in the middle of traffic. Oversight should be able to be maintained by a single caretaker - which is quite restricting in combination with staff shortage - and increasing the number of separate rooms will only aggravate this issue.

Guidelines for the interior

- *Beds must be placed closest to the nursing station and the staff should travel as little distance as possible between treatment spots.*
- *The patient's journey should be in chronological order: waiting room, measuring and weighing, treatment room, daycare, with as little distance traveled as possible*
- *The staff area should be clearly separated from the public area.*

Parents

Parents want the ideal daycare to provide a stress absorbing routine that blends in with their daily life as much as possible. They mostly value the caring attention of the staff, but the daycare itself should facilitate opportunities to work or to interact and play with their child. Proper seating comfort and tasty consumables are things that are missing in the current daycare, which should also be easier to find.

Children

The collection of children coming to the daycare differs from day to day - and so does their routine and requirements - thus it is important that the space can easily adapt to facilitate any needs the children might have. These needs mostly revolve around good comfort and counteracting the boredom of waiting, through forms of static entertainment or tasty consumables.

Staff

The staff values a balanced work and break routine, in order to provide the best care for their patients, without excessive stress. This manifests itself primarily in the needs for easy oversight, short traffic routes and a separate breakroom out of the sight of patients. Next to this, the staff craves a hygienic and ergonomic environment to prepare medication and conduct administrative work.

Guidelines for the interior

- *The visibility and noise of medical equipment should be as little as possible*
- *The environment should represent calmth and tranquility while looking modern and playful.*
- *Give the users ample opportunities to consume good food and drinks while they are waiting or working.*

DEFINE

Parents

Parents value an atmosphere that is calm and beneficial for the health of their child. Most of this results in simple needs for comfortable seats close to their kids and caring service from the staff - including foodservice. The current environment is considered quite cramped and noisy which can cause awkwardness when there are multiple people around. It also looks a lot like a hospital, which is something the ideal situation should steer away from.

Children

The ideal atmosphere for children revolves around averting from the intimidating hospital environment and providing a space that feels familiar and safe. This includes limiting sightlines to beds and obvious hospital equipment, and including comfortable furniture that one would normally find in a living room to bring the whole experience a little closer to home. It is important to consider the vast age differences as well, as playful and fun designs might be considered childish or lame by others.

Staff

The staff values a tranquil and accessible work environment in which they can provide the best care for their patients. Highly active play in the daycare is therefore discouraged by the hospital staff, since calmth and oversight should be maintained at all times. The noisiness of the space also has a great negative impact on the atmosphere, which is mostly caused by the inconvenient design of the nursing post and the sounds of medical equipment.

6 DESIGN VISION

The design vision concludes the define phase with a concise definition for what ‘the ideal daycare’ means to each of the three user groups. These are the fundamental pillars that shape the trajectory of the design and guide the creative process of the development phase. More concise requirements for the interior can be found in the appendix

DEFINE

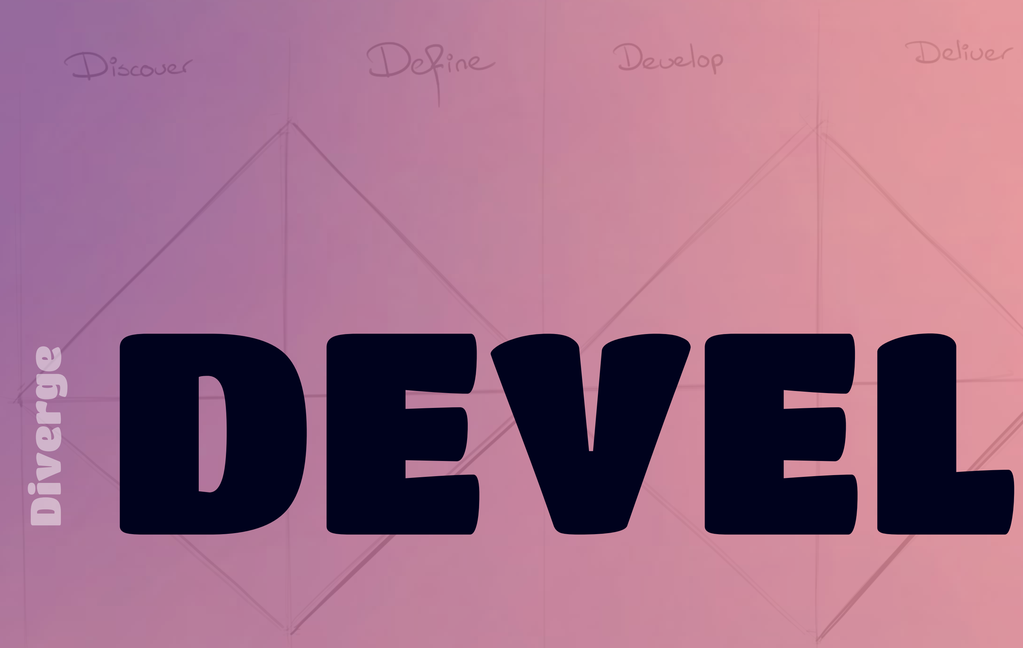
The ideal daycare is..

The daycare is - and should always remain - primarily, a work environment, not a playground. It is important to recognize this situation, and aim to bring the experience for the visitors of the daycare as close to their daily lives as possible, towards something that feels normal, welcoming, comfortable and not boring, while refraining from excessive forms of entertainment that disrupt the tranquility. Something like a restaurant or cafe, something where they feel at home.

...a stress absorbing experience which blends in with daily life, by providing quality care, tasty food and apropriate seating comfort.

...a comfortable, modern place that feels homey, with tasty food and static entertainment that distracts from the boredom

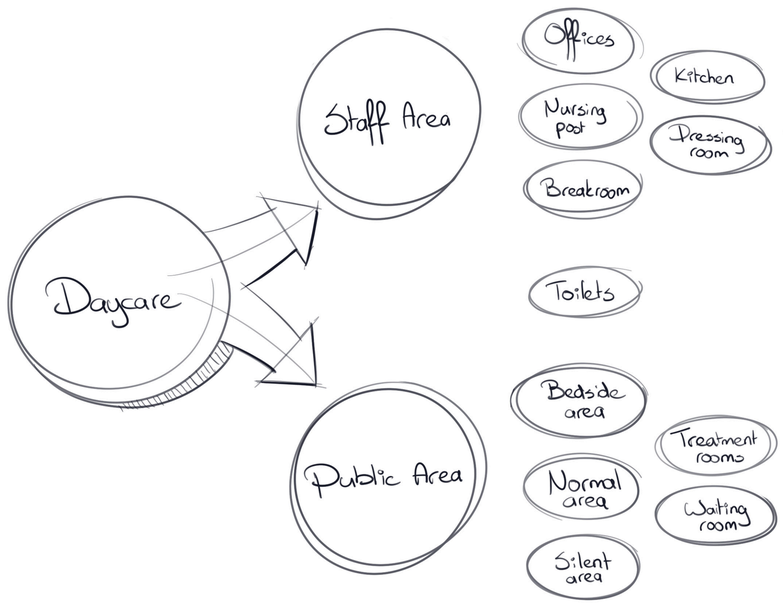
...a tranquil work environment that fosters privacy and accessibility by diminishing excessive noise and traffic.



Diverge

DEVELOP

The development phase focuses on **the creation of a design proposal, through several iterations** and simulations with stakeholders. Methods like maquette building, 3d-modeling and a morphological chart have been used in order to generate concepts for evaluation.



Each area has different design solutions, which can be combined into several concept proposals.

7 FIRST ITERATION

This chapter elaborates on the creation and simulation of the first proposals. Visualisation was done with the help of a ‘sketch maquette’ and a CAD model in Blender, after which the designs were discussed with an in-house architect.

What happened before the pivot?

The development phase started off with improving the current situation with as little change to the existing structure as possible. At this stage of the project, we still considered the area indicated in dark-blue in figure 11 as the focus of the new design.

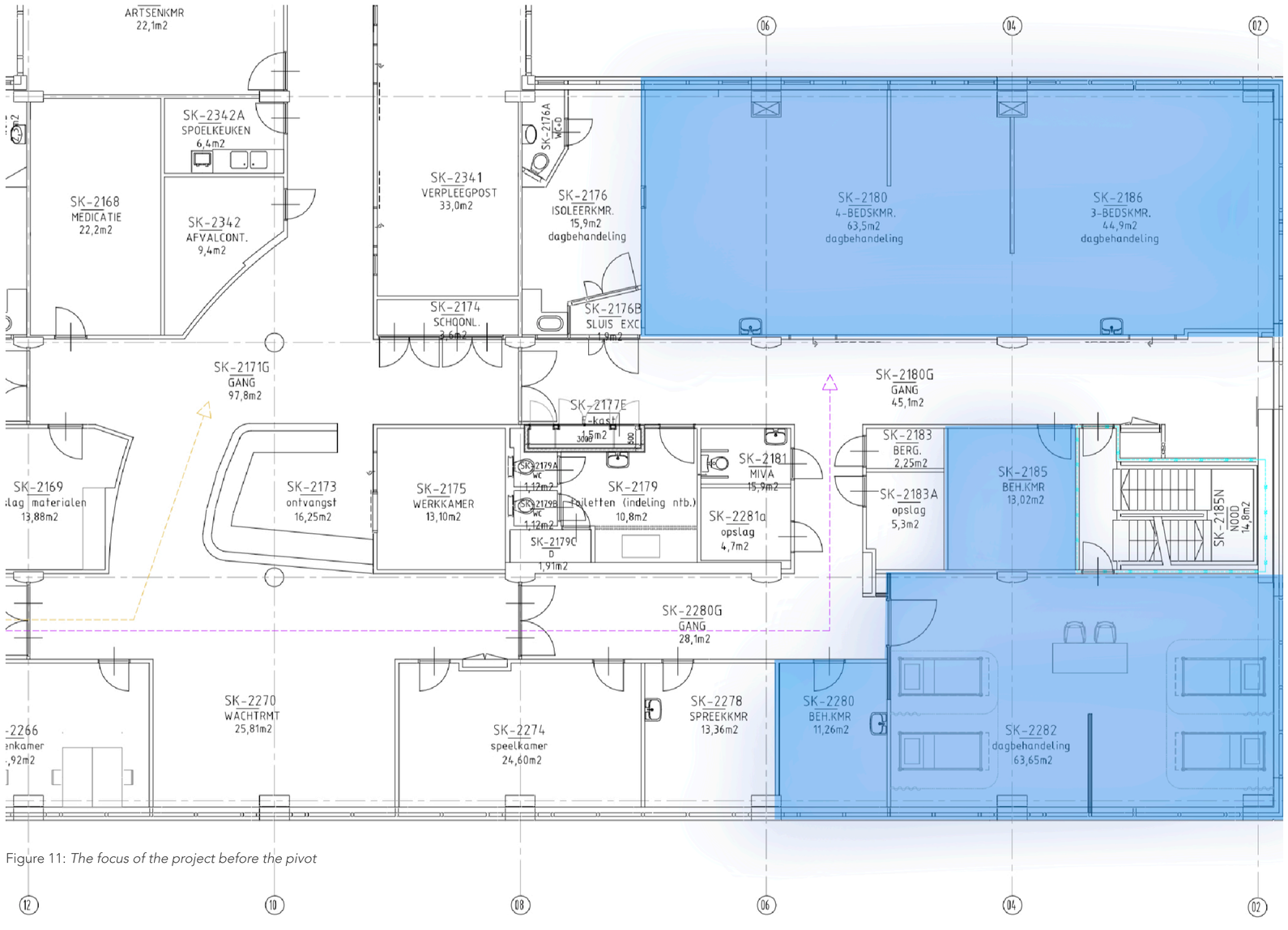


Figure 11: *The focus of the project before the pivot*

TU Delft

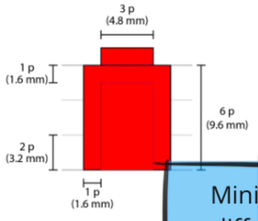
DEVELOP

What scale can we use best for the maquette?

In order to get a better feel for the shape and size of the space, a maquette was made with a scale of 1:40. The decision making process for the scale and the maquette itself can be seen in the brainmap on this page.

Bruce Haantjes

Experts in the field state a commonly used scale of 1:50 for maquette building, is this a good scale to use in this project as well?



brickarchitect.com

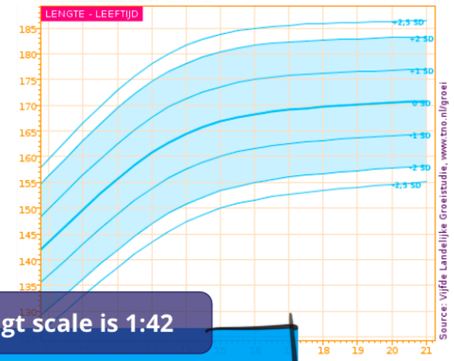
LEGO figures in Scale models - BRICK ARCHITECT

This article shows you how I calculated the "scale" for various LEGO figures as they compare to the size of real-live humans. (This revisits a topic I first explored in 2013 with the blog post calculating minifig scale. That older article now points to ...

Mini figures have two different proportions (width and height) in relation to the human body.

A toy scale would fit the theme..

Why not use the scale of Lego Mini figures?

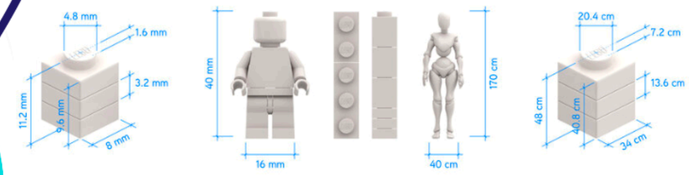


~~Width scale is 1:25~~

Minifigures are wider in proportion to a real person, so they appear small in relation to the Maquette. However, at this scale [1:25], the height of a minifigure is actually a factor of 25/42 = 0.59 smaller. An 'average' person of 170cm would be approximately 6.8cm tall in [1:25] scale. The minifigure is 4cm tall, which in [1:25] scale would result in a height of 100cm. This is suitable for children up to about 3 years old, so it's **not a very accurate representation of a human figure.**

Heigt scale is 1:42

If we take the height of a minifigure: (4 blocks, 4x9.6 + 1x1.6 = 40mm) and we compare it to the average height of a human being (170cm), we get a scale of 170/4 = 42.5. **This will result in the minifigures appearing 'thick' in proportion to the maquette.**



1:1 Scale | 42.5:1 LEGO Minifigure = 1:1 Human | 42.5:1 Scale

Doma, Oğuz Orkun & Şener, Sinan Mert. (2022). Dreamscape Bricks VR: An Experimental Virtual Reality Tool for Architectural Design. 234-258. 10.55612/s-5002-052-013.

Which scale for can be combined with the floorplan of Sophia?

1:40

A scale of **1:40** seems best. All measurements on the floorplan can be easily transferred (factor 5.0), the model will be a good size,(approx. 60x60 cm) and it will fit a mini figure with a representative length (160cm). It will also line up with the thickness of the foam we use for the outside and inside walls (10mm and 5mm respectively)

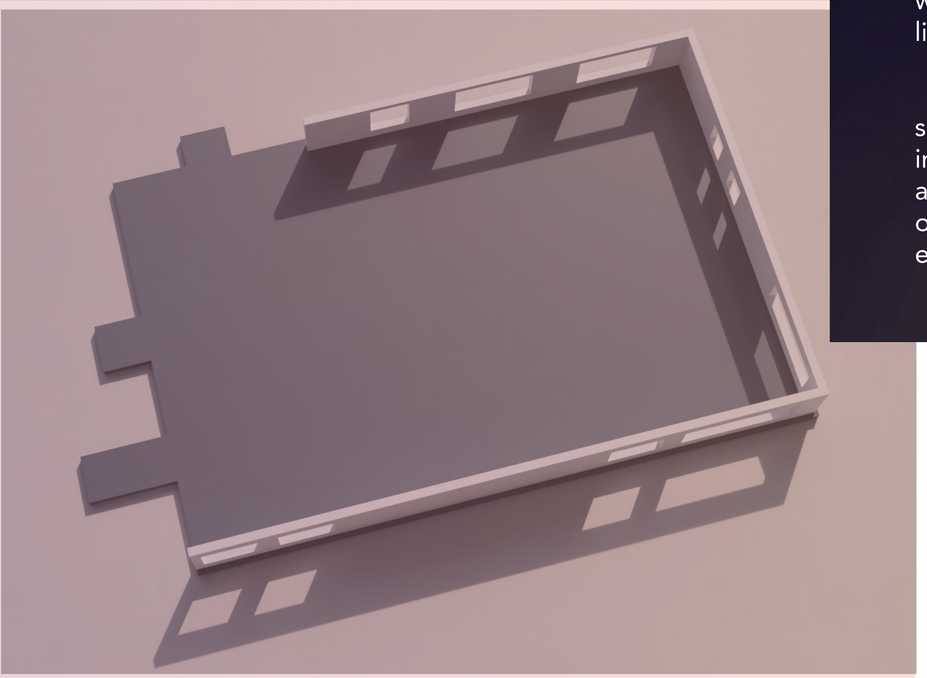
It needs to be practical in size, too small is hard to work with, too large is difficult for transport.

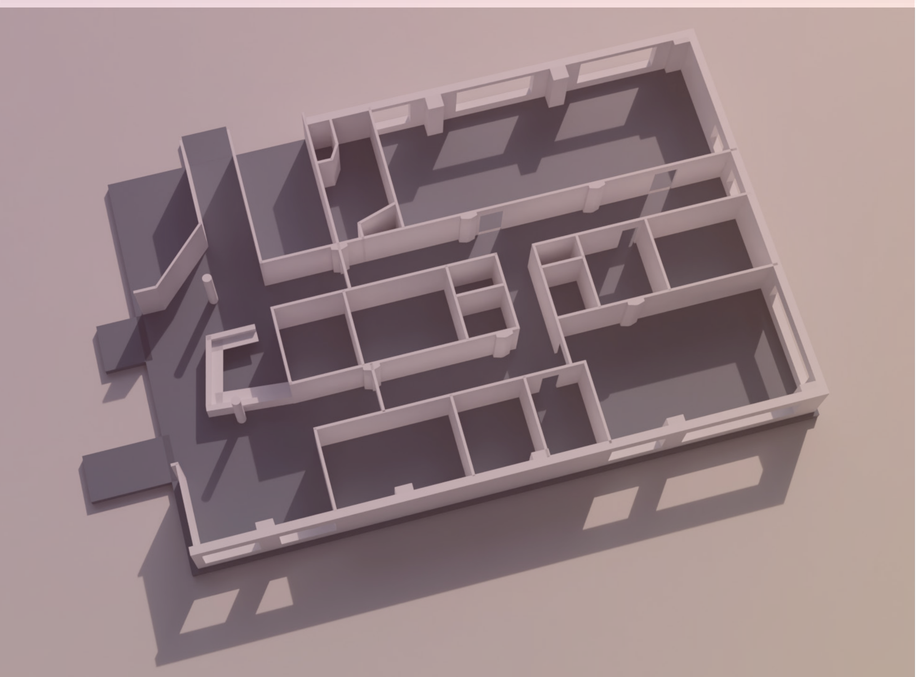
Floorplan scale is **1:200. This is easily translatable to 1:40,** which is close to the scale of a minifigure, which length would be 1.60m

A correct wall height is crucial for an accurately scaled representation

The height of the walls in the maquette and the model are based on real life measurements with a laser pointer. The maquette functioned as a great communication piece during meetings, while the Blender model proved to be more useful later, when the shapes became more complex.

Bruce Haantjes





How was the Blender model created?

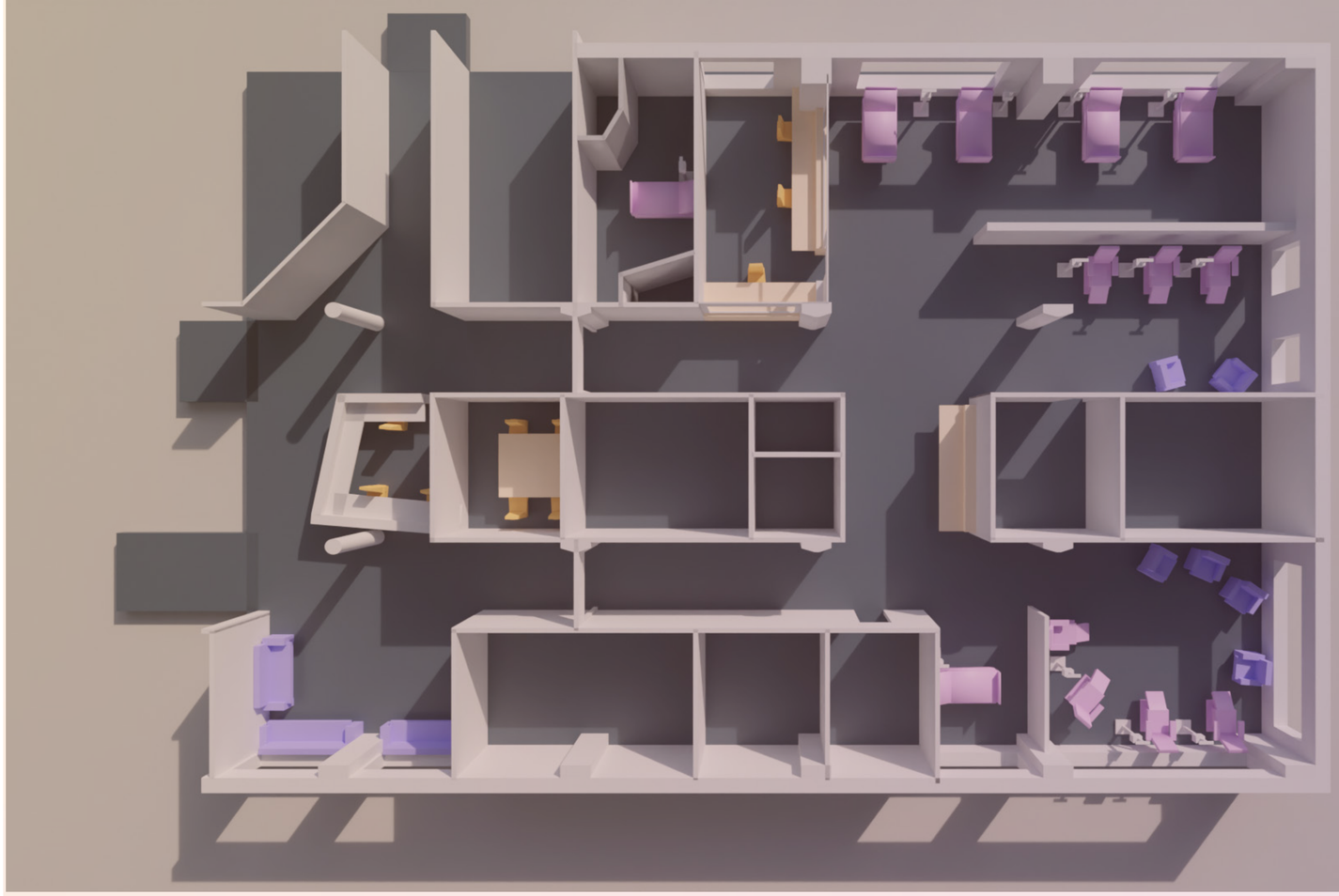
The first step was imposing the floor plan onto the structure and then extruding the outside walls to the right height to fix the scale. Entrance points to the daycare are added, after which the inside walls could be extruded. An environment and windows were added to get a better indication of incoming light.

Adding walls and furniture clearly indicates how much space there is for each of the users in a single view. Pink indicates treatment spots for the children, purple for parents and yellow are workplaces for the staff. The four beds in the old laboratorium is the hospital's initial suggestion for adding extra beds.

DEVELOP

How can we combine the two seperate rooms and make one larger daycare?

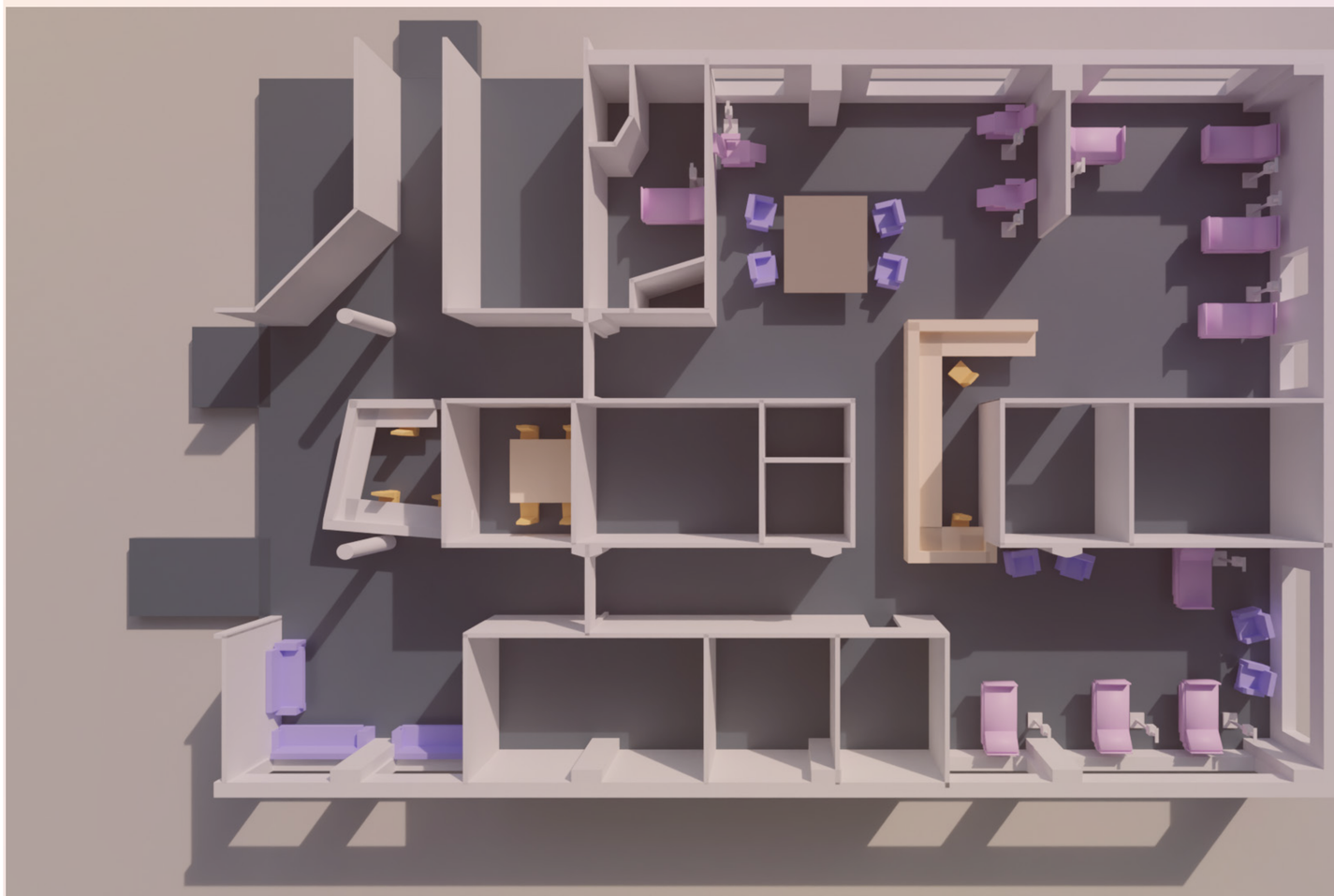
The first iteration of concepts revolved around making the whole daycare bigger and easier to oversee, while considering structural limitations like the staircase and supporting walls. This was done by removing a couple rooms that were not used anyway and opening up the hallway and shift the entrance of the daycare towards the front desk. These alterations created one large daycare, instead of two small separate rooms. This concept formed the basis of the first design iterations.



- *Private spot in the corner for the nursing post without traffic coming through.*
- *Oversight in the old lab is limited but very well accessible.*
- *Central coffeecounter.*

SIMULATION

The first simulation was a thorough analysis with the architect and project manager. During the meeting, Blender was used to walk through the two different arrangements shown on the left, which functioned as a catalyst for discussion. Since the original assignment stated that no walls could be taken away, this simulation was aimed at convincing them otherwise, by focussing on the issues imposed by traffic, staff shortage and oversight.

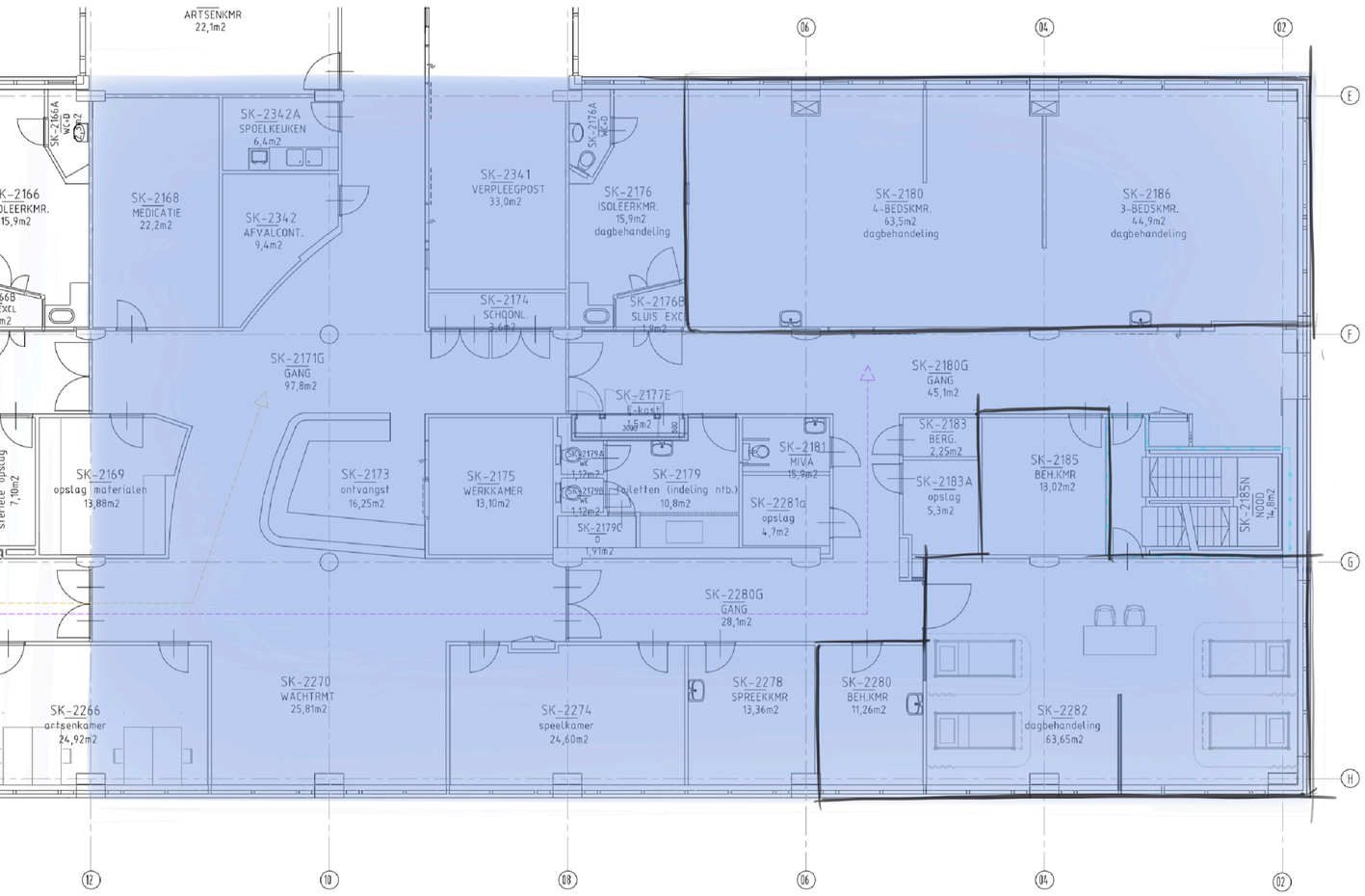


- *Central nursing post is not practical as it is too tight and right across from the toilet.*
- *Beds can de divided between the two rooms for more privacy.*
- *Large table as gathering point.*

DEVELOP

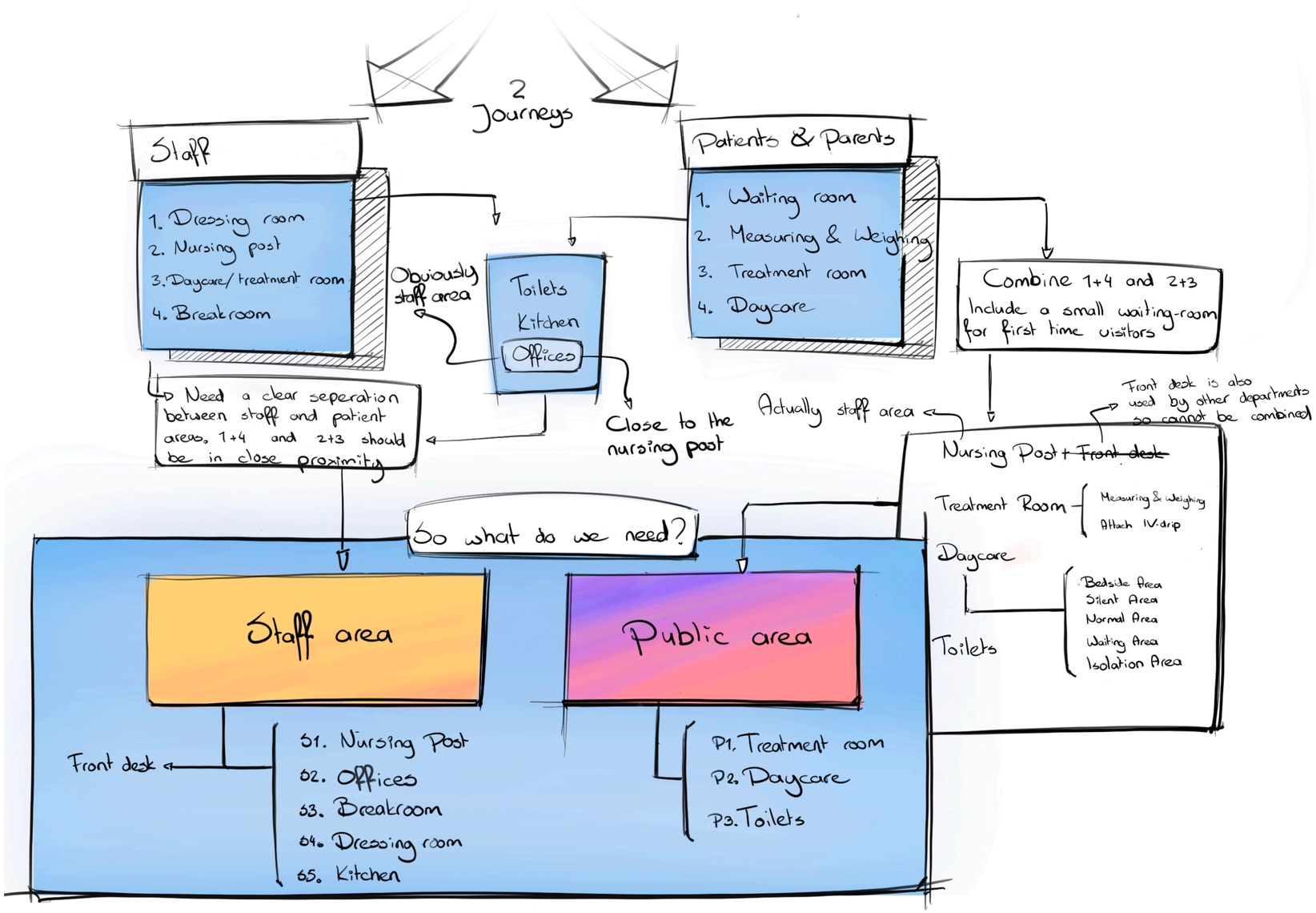
PIVOT

The conclusion of this simulation came down to the fact that **there was no budget allocated by the hospital for the removal of any interior walls**, thus rendering the first iteration round impossible. It was then agreed upon that the budget and decision making process within the hospital should not limit the creative process of developing an 'ideal scenario', to serve as inspiration for a post-renovation interior. Therefore, the project pivoted and instead considered the surface area of the entire wing, without any budget or structural limitations. Next to this 'ideal scenario', we propose a set of recommendations for the 7 years leading up to the renovation, to improve the experience for staff, children and parents in the short term.



8 SECOND ITERATION

The second iteration started off with a brainstorm session on which spaces were needed and what their ideal arrangement would be. During this process, discussions were held with the staff to provide feedback on the floor plans, which fueled the iterative process. We consider the surface area, the shape of the building and the entrance points to remain constant.

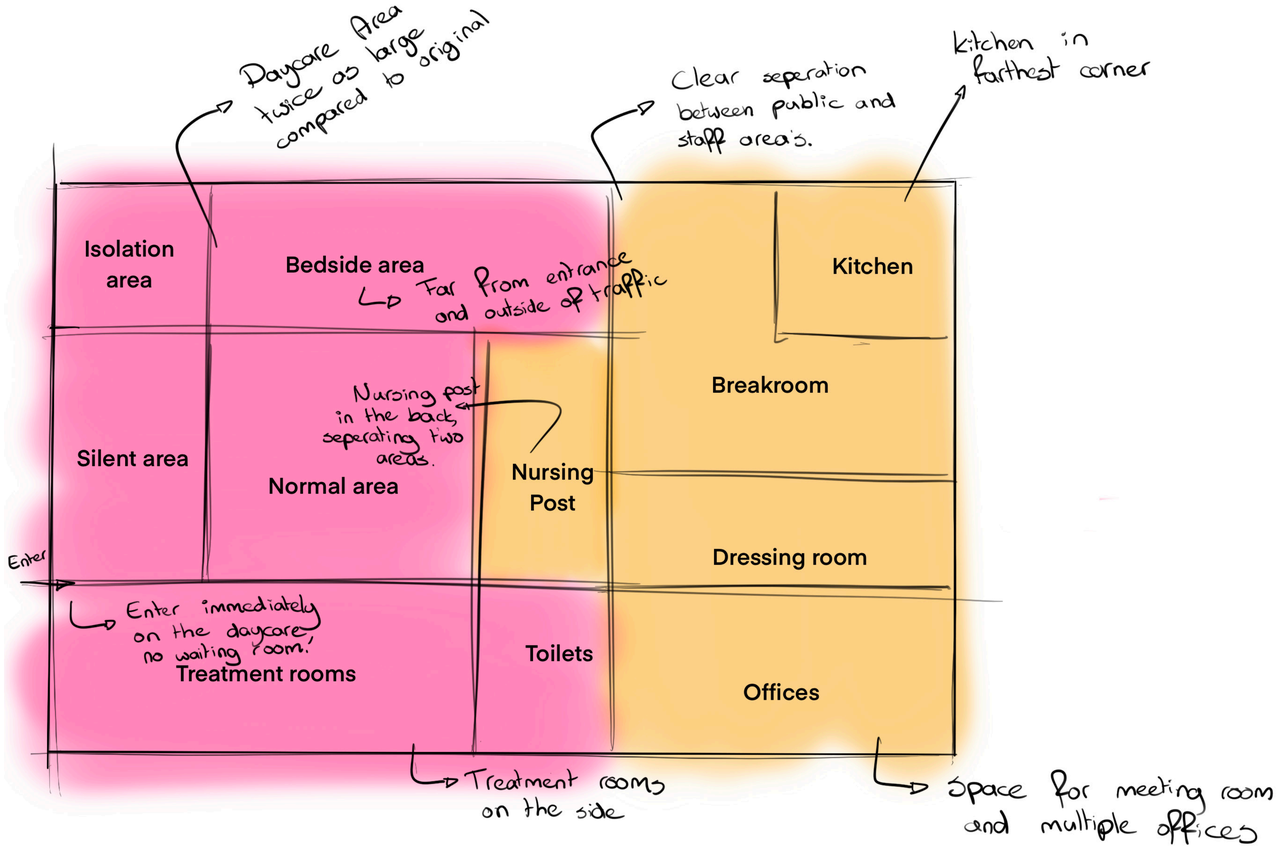


STAFF AREA

Front desk
Nursing post
Offices
Breakroom
Dressing room
Kitchen

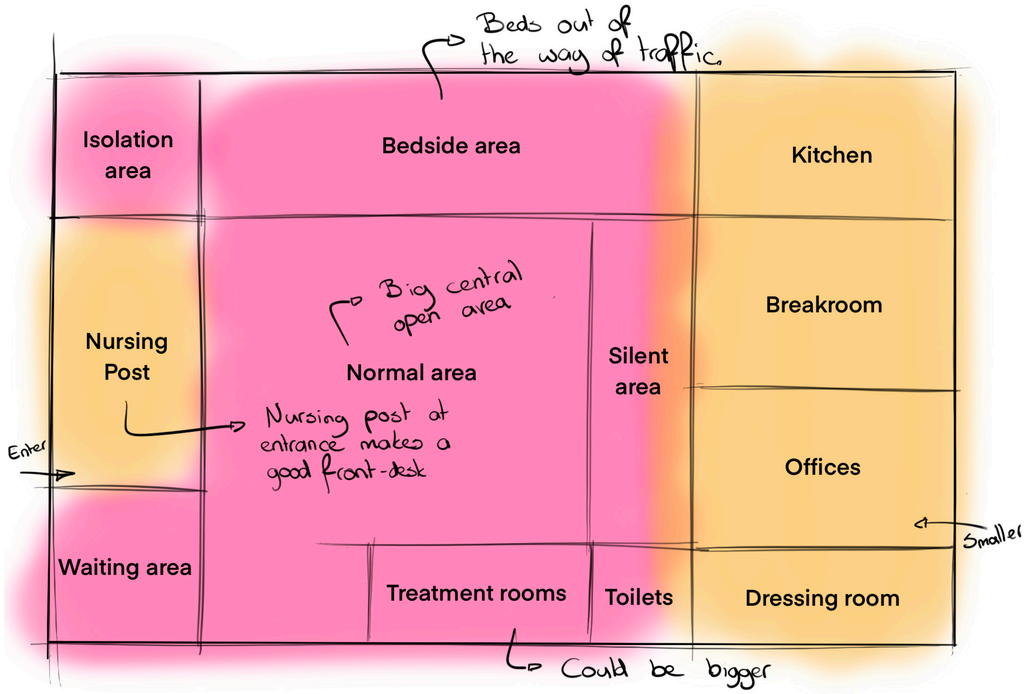
PUBLIC AREA

Waiting area
Treatment rooms
Bedside area (dc)
Isolation area
Silent area (dc)
Normal area (dc)
Toilets



1. Staff area in the back?

The first arrangement made a clear separation between staff and public areas and clustered them all together. This created more insights on size and location of several areas, for example the silent area overlaps with the entrances and the break room is too large.

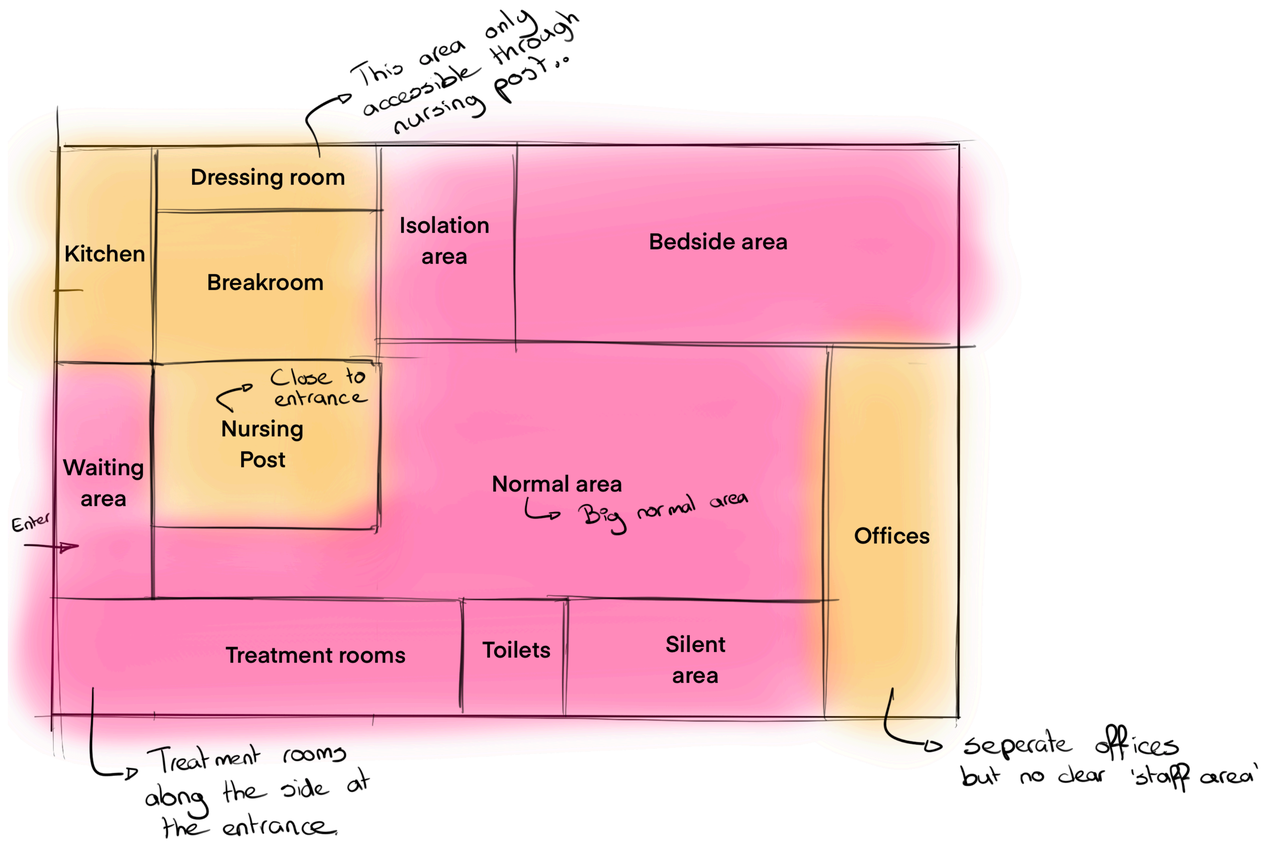


2. Nursing post as the front desk?

Moving the nursing post to the front created a logical entrance point, but divided the staff area in two, which is not ideal.

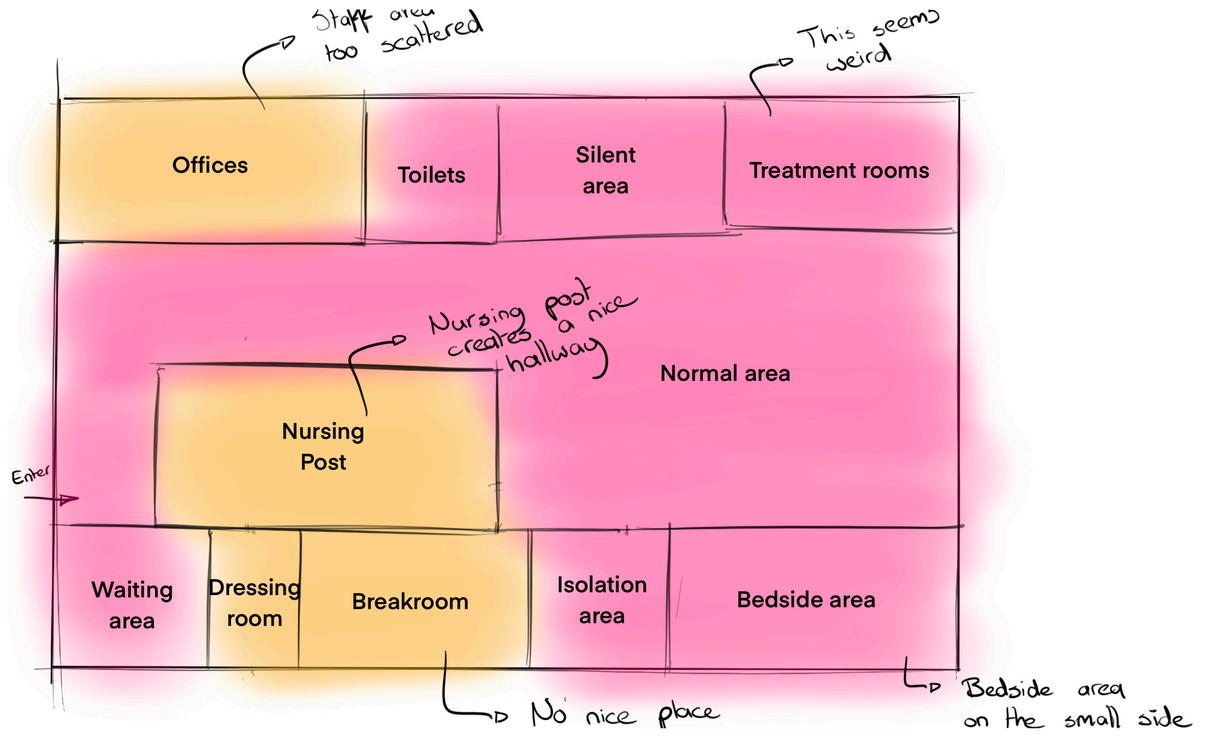
3. Seperate offices?

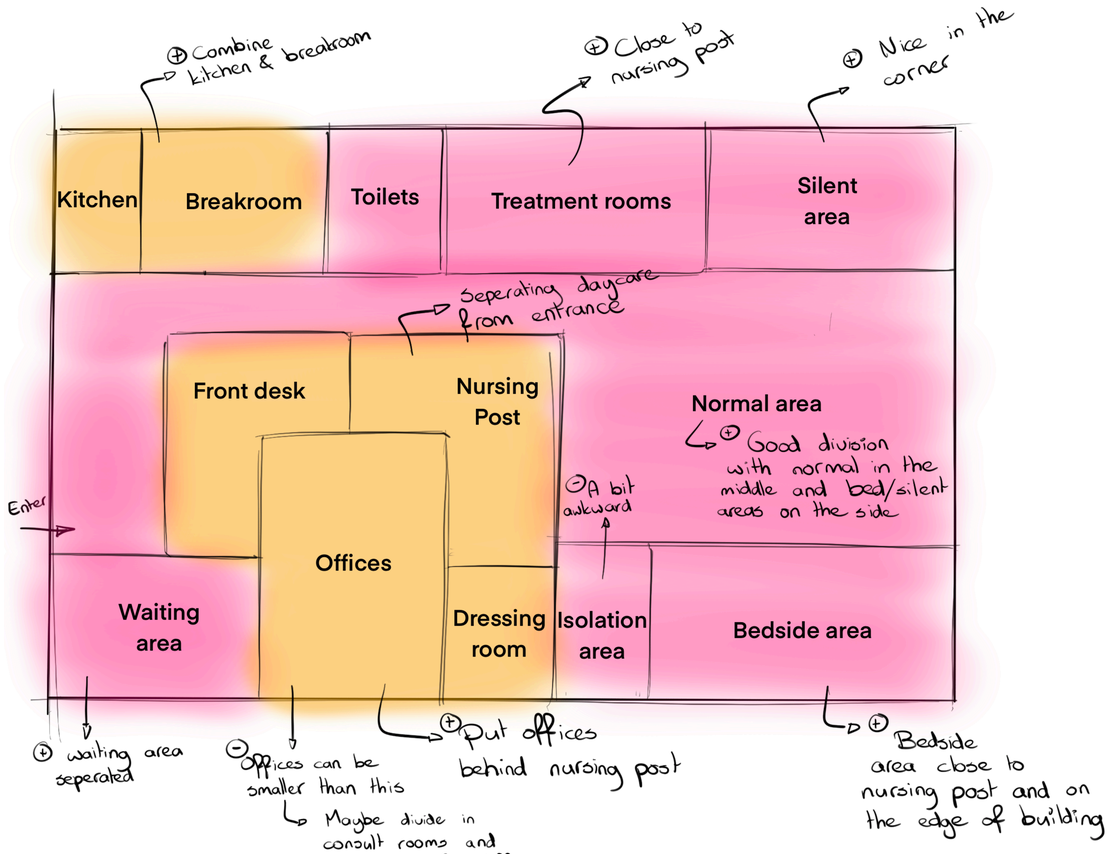
Pulling more of the staff area towards the front created a nice buffer between the waiting area and the rest of the daycare, which was nice. However, the breakroom and dressing room are now only accessible through the nursing post, which is suboptimal.

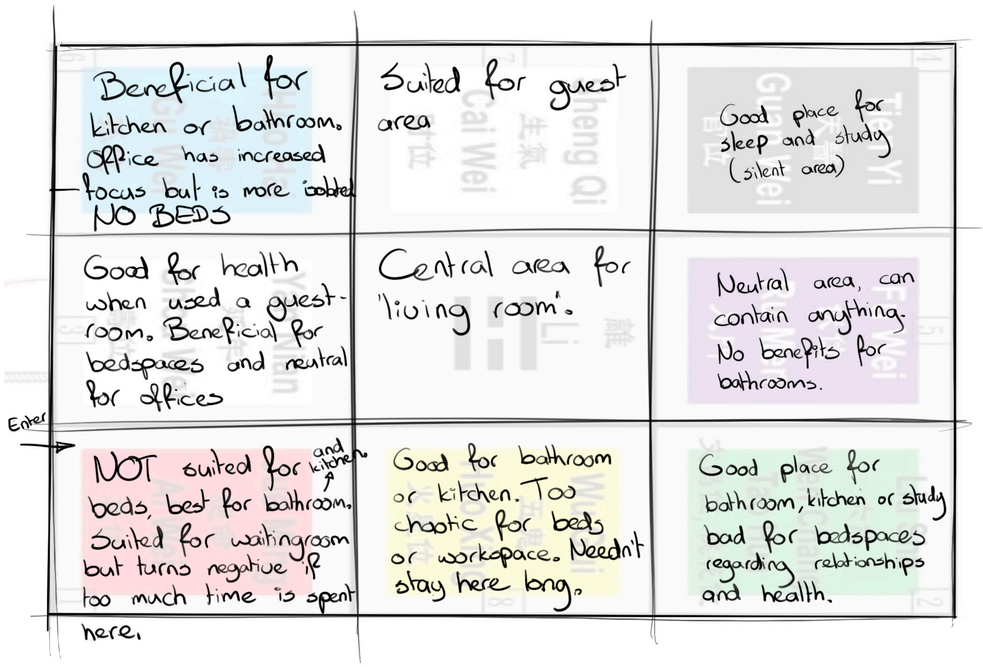


4. Central nursing post?

The next iteration created a nice hallway towards the daycare and pulled the offices towards the front as well. This arrangement left no place for a kitchen, plus the staff indicated that the nursing post would better sit next to the offices and needed to be separate from the front desk, considering other departments make use of the front desk as well.







5. Separate front desk?

By separating the front desk and the nursing post, and positioning the offices in between, we can create a shared, private space for administrational work. This arrangement ensured quite logical traffic routes, but needed some alterations of several room sizes.

6. What if we use the Bagua map?

The following iteration attempted to apply the Feng shui principles to the daycare, which gave some interesting insights that overlapped with logical positions for certain rooms. For example, it positioned the bedroom in the back of the building, the nursing post as the central area and the waiting room at the front next to the entrance.

Where do the rooms go and how large should they be?

Waiting area

- *Close to the entrance.*
- *Adjacent to the front desk.*
- *Out of sight of the daycare.*
- *Small area, only needed for first time visitors or consult appointments.*

Treatment room

- *Not visible from the waiting room.*
- *Place along the side of the building.*
- *Reachable without having to cross the daycare.*
- *Close to the nursing post.*
- *Space for measuring, weighing and IV shot.*

Normal area

- *Place in the center of the daycare.*
- *Should be the largest area*
- *Visible from the nursing post.*
- *Minimum of 6 treatment spots*

Silent area

- *Place along the edge of the daycare.*
- *No intersection with mayor traffic route.*
- *Visible from the nursing post.*
- *Minimum of 4 treatment spots*

Bedside area

- *Visible from and close to to the nursing post.*
- *Limited sight from the rest of the daycare.*
- *Place along the edge of the building close to the windows.*
- *No intersection with mayor traffic route.*
- *Minimum of 5 beds*

Isolation area

- *No intersection with mayor traffic route.*
- *Out of sight of the waiting room.*
- *Place along the edge of the building*
- *Close to the nursing post.*
- *Minimum of 1 bed, toilet and an isolation tunnel.*

Toilets

- *Anywhere reachable on the daycare*

Front desk

- *Close to the entrance.*
- *Adjacent to the waiting room.*

Nursing post

- *Not in the way of mayor traffic route.*
- *Directly adjacent to the offices.*
- *In line of sight and close to all areas of the daycare.*

Offices

- *Not in the way of mayor traffic route.*
- *Adjacent to the nursing post.*

Breakroom

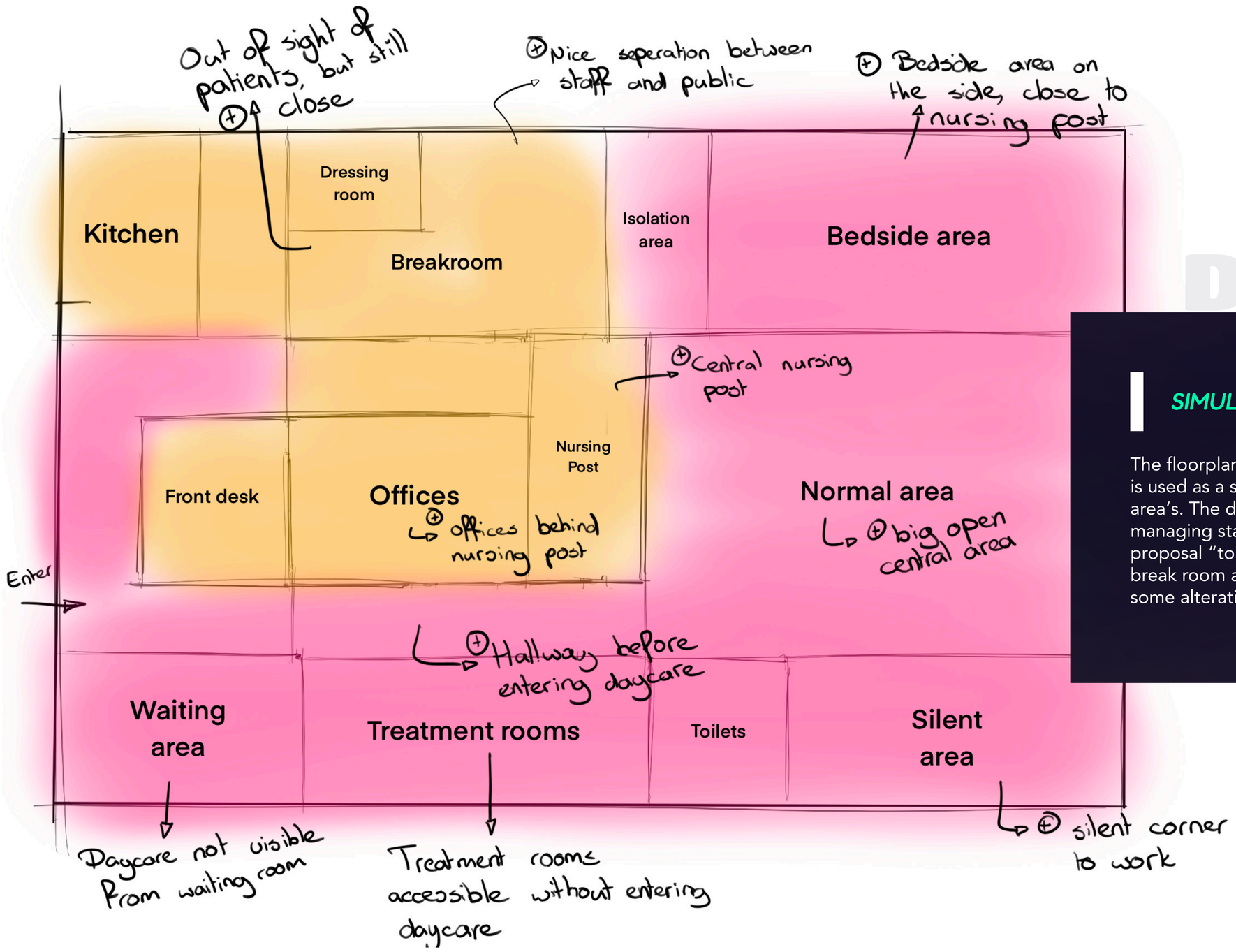
- *Separated from the daycare, no sightline to patients.*
- *Could be combined with kitchen.*

Kitchen

- *Small space.*
- *Close to the breakroom.*
- *Position is fluid and can be placed last.*

Dressing room

- *Small space.*
- *Close to any other staff area.*
- *Position is fluid and can be placed last.*



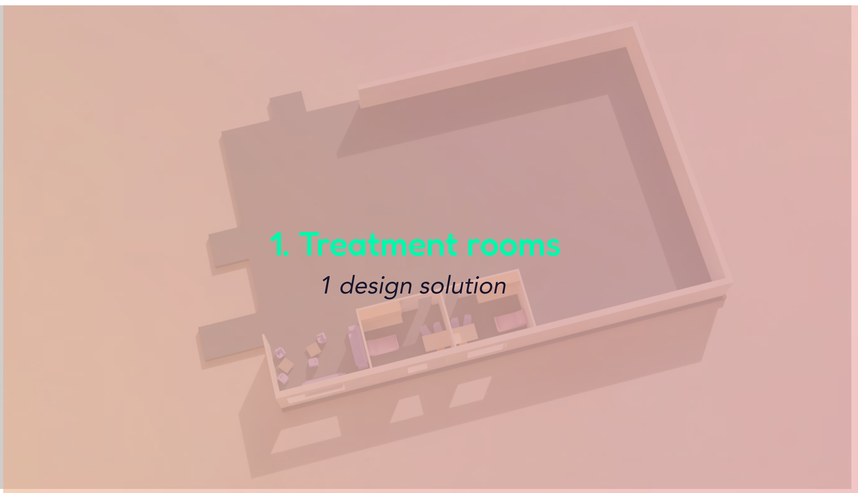
DEVELOP

SIMULATION

The floorplan on the left shows the final arrangement that is used as a starting point for the ideation on the individual area's. The design was discussed and approved by two managing staff members of the daycare, who declared the proposal "to have a logical layout". They did mention the break room and kitchen to be on the large side, which needed some alteration.

9 THIRD ITERATION

The next step of development revolves around the creation of different design solutions for each of the areas from the previous iteration. These variations can then be combined into concept proposals and used for simulation with the staff. Throughout the development, the colors indicate spaces for **staff**, **children**, and **parents**.

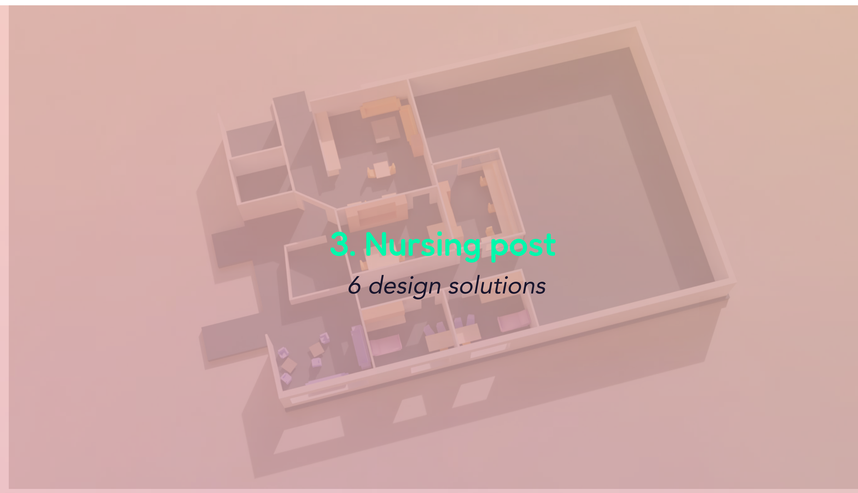


1. Treatment rooms

1 design solution

2. Staff area

4 design solutions



3. Nursing post

6 design solutions

4. Bedside area

4 design solutions

5. Normal area

6 design solutions

6. Silent area

5 design solutions

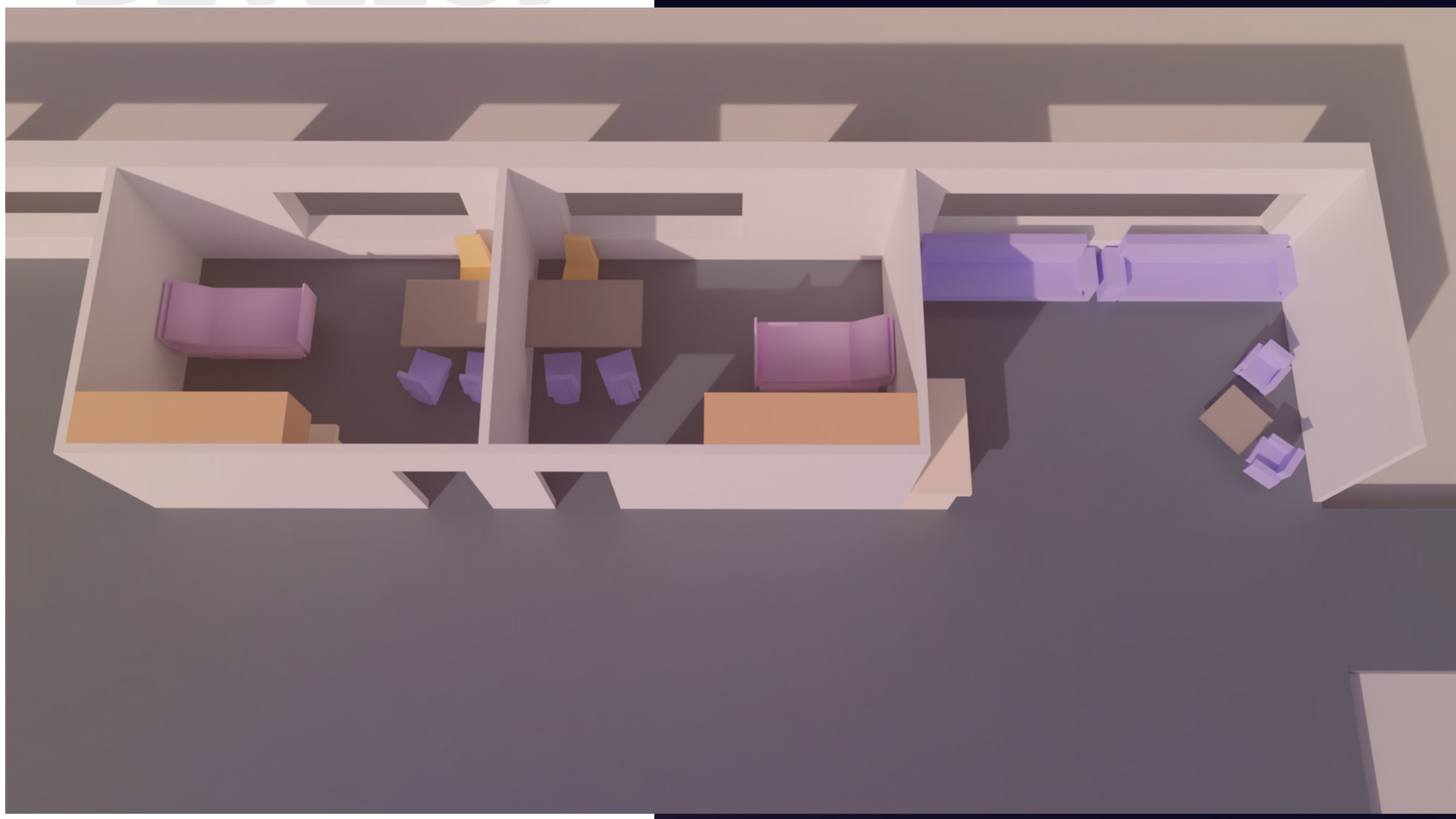
DEVELOP

1. Waiting- and treatment rooms

Contains the treatment rooms and the waiting area. Since the design of these is already quite optimized but it was considered small, there is only a single variation, with an increased size of the treatment rooms.

Private spot in the corner for the nursing post without traffic coming through.

Oversight in the old lab is limited but very well accessible.



DEVELOP

2. Staff area

Contains the Breakroom, Offices, Dressing room and Kitchen. The last two have low priority, hence only the breakroom and the offices contain furniture. The variations are made between openness of the design and size of the rooms. Some variations contain an extra hallway for access, but suffer in office- or breakroom space. All cases have the main entrance hall past the treatment rooms.

The space is balanced between the office and breakroom, separated from the dressing room and the kitchen by a hallway. It makes for the most equal distribution of space.

The breakroom merged with a cafetaria-syle kitchen makes for one large staff area, improving food service to the daycare.

DEVELOP

2. Staff area

A larger breakroom but smaller offices, with a separate kitchen and dressing room, focusses on the quality of breaktime.

A collection of smaller spaces for the office and breakroom, separated from eachother by an extra hallway for increased access.

3. Nursing post

The nursing post was separated from the staff area to increase design possibilities. Variations are made between the shape, the position of the door, and the openness towards the rest of the daycare. This created some interesting differences in traffic routes, accessibility and visibility.

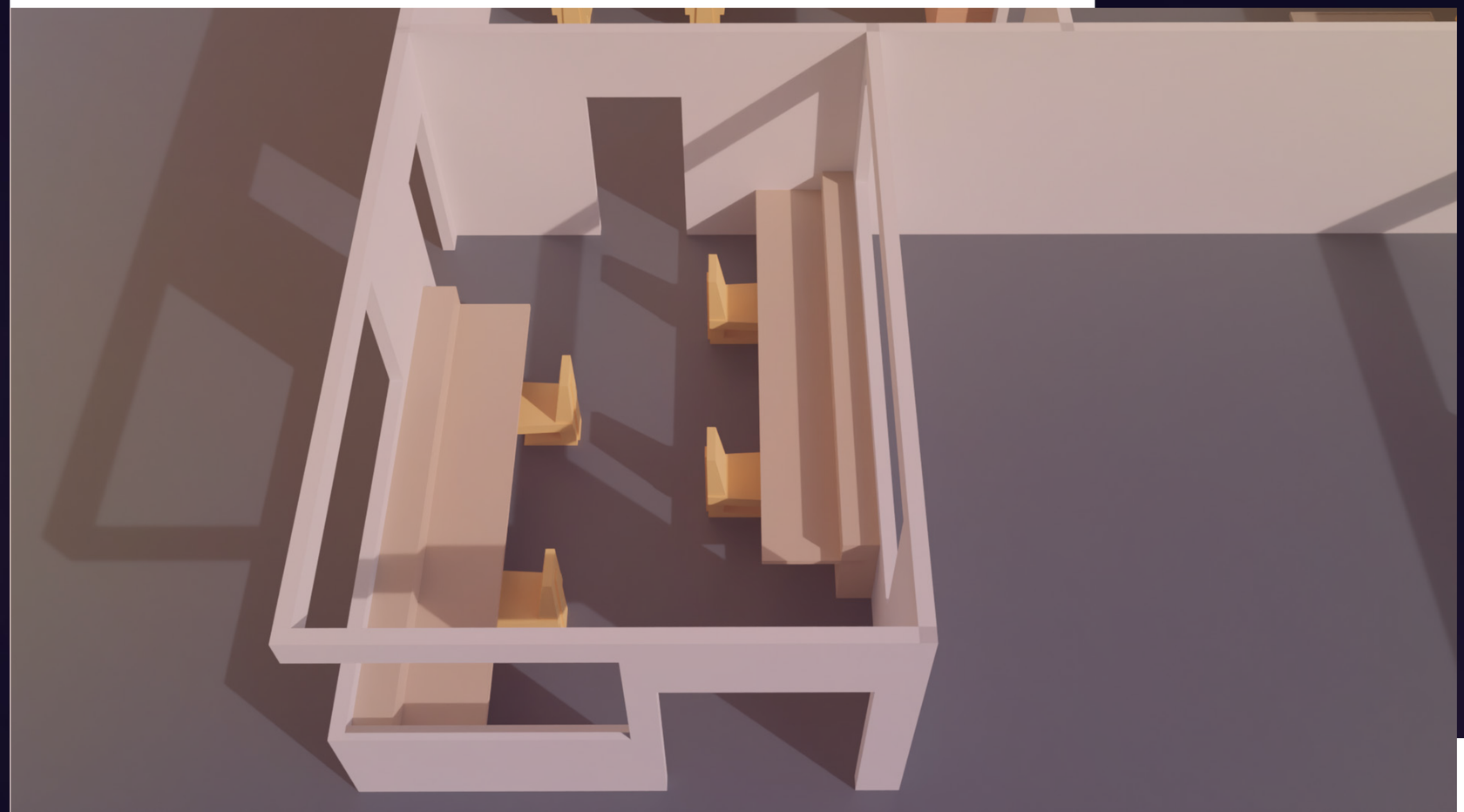
A wider nursing post with glass and doors to the side makes space for a large desk and a nice traffic route behind the desks.

A wider nursing post with glass and a door to the front makes for quick access to the daycare and more privacy for the beds.

DEVELOP

3. Nursing post

A longer nursing post with glass and doors to the side makes for high visibility on the daycare, but creates more dead space and eliminates the possibility of a workstation against the office wall



A longer nursing post with glass and a door to the front creates high accessibility and oversight, but has the risk of creating a traffic route in between the desks. There is also no space for a workstation against the office wall.

DEVELOP

3. Nursing post

A wider nursing post with glass and no doors will create high accesibility and takes up less space, but will be more noisy.

An extra wide nursing post with no glass will create the ultimate level of accessibility, but also loses huge on noisyness and privacy for the staff.

4. Bedside area

Contains the regular bed spaces and the isolation room. Variations are made between the position of the isolation room and the privacy level of the beds, which influenced traffic routes and sightlines. More privacy means less beds and vice versa.

Private beds with the isolation room in the back makes for low traffic between the nursing post and the beds, but takes up a lot of space and is hard to oversee.

With more beds, the hospital can host more patients, but everything will be packed closer together. Especially with the isolation room in the back, there is little space for windows to carry natural light inside.

DEVELOP

4. Bedside area

The isolation room in the front puts it closer to the nursing station and creates better oversight on the beds, though at the cost of slighty longer traffic routes to and from the nursing post.

The most patients can be hosted with the isolation room in the front and the rest of the beds in the back. It makes for high oversight and accessibility, but is more cramped and less private for the patients.

5. Normal area

This area contains several seating opportunities for the patients and parents, a play corner for young children and a console with a coffee machine, fridge, microwave and other kitchen facilities. Variations are made between different positions and options for seating.

A central play area for children close to the nursing post makes for high visibility, but could create chaos overlapping with one of the main traffic routes. It is also not very flexible to move around.

A large table in the middle can serve as a gathering spot for parents and children, without taking up too much space.

DEVELOP

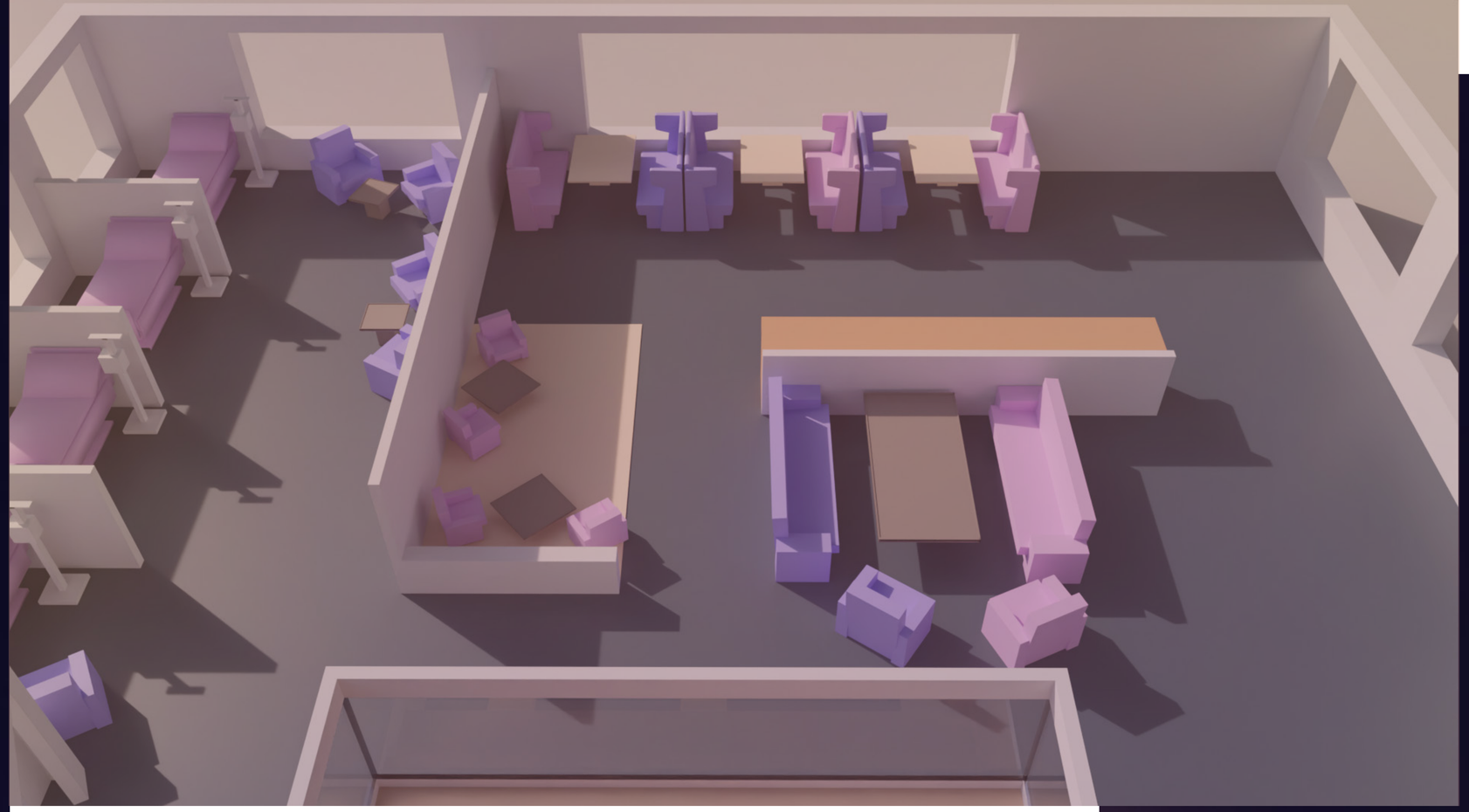
5. Normal area

A central 'lounge' contributes greatly to the elimination of the hospital feeling upon entering the daycare, while a playarea in the back might reduce the amount of noise coming from there.

A central coffeecounter might contribute to the removal of the hospital experience, but takes up a lot of visual space and limits access towards the back of the daycare.

DEVELOP

5. Normal area



Combining the lounge and coffeecounter in a central spot works great for eliminating the hospital feeling. The play area to the side keeps it out of major traffic, but so close to the beds it might invoke noise related issues.

A coffeecounter adjacent to the bedarea creates a lot of space on the daycare, and couches in the back are an optimal solution for a combination of high privacy for the patients and good oversight for the staff.

6. Silent area

This area includes the toilets, some desk spaces to work and a chill corner with couches for teenagers. The toilet area is also represented as an empty room - as are the kitchen and dressing room - because of low priority. Variations are made between the position of the toilet and the size/location of the desk- and chill areas.

The toilets in the corner, combined with a large desk along the side, create better oversight for the staff, but increase the overall traffic through the daycare and provides little privacy at the desks.

Toilets in the front are benificial for traffic, and the back-to-back configuration of the desks makes good use of the space, but creates less privacy.

DEVELOP

6. Silent area

Creating a larger lounge area in the back will take away some space from the desks, but will provide an optimal private chill corner for teenagers.

The toilet in the back will increase accessibility to the treatment spots, while the lounge in the front can function as waiting room for untreated patients.

A well balanced size for the toilet, lounge and desk make for good oversight and privacy, but the toilet in the back might be problematic for traffic.

10 CONCEPT CREATION

Different combinations of design solutions for each area were made to create four viable concepts, as is visualized by the morphological chart. These concepts served as the centerpoint of discussion during a simulation with the daycare staff. With the amount of design solutions in this project, there is a theoretical total of 2880 different variations.

1 *Open concept*

2 *Not a hospital*

3 *Easy to see*

4 *High privacy*

DEVELOP

Open concept

Not a hospital

The large amount of beds makes sure more patients can be hosted, at the cost of a little privacy. To compensate, the beds are barely visible from the rest of the daycare.

An extra hallway towards the bedarea will relieve traffic from the main entrance.

The central coffeecounter is a great gathering spot and looks inviting when entering the daycare. It is also a great vantage point for staff.

Easy to see

The positioning and open design of the nursing post maximizes visibility on the daycare, while the glass wall limits the noise as well.
A larger office space creates some room to have private conversations with parents or prepare medication.
The couches in the back are easily visible from the nursing post, yet when sitting in the couches, the view is quite limited.

Privacy focussed

DEVELOP

The fishbowl design of the nursing post creates good privacy for the staff, blocks noise, and keeps oversight. It also descreases the need for a bigger office, freeing up extra space for the breakroom.

The positioning of the coffeecounter creates a very clear route through the daycare and secludes the couches in the back nicely, while not imposing on visibility

The silent area is equipped with a cosy lounge, which can be easily observed from the nursing post, but not from other spots on the daycare.

DEVELOP

SIMULATION

This simulation was aimed to gain insights into the pros and cons of the four concepts and for the staff to use those insights to create one themselves. On the left we see two configurations made by staff members, which showed a number of interesting overlaps and differences

The daycare has a very logical arrangement with regards to traffic and oversight and limits sightlines to hospital related equipment.

The results and feedback from the simulations on the several iteration rounds can be summarized by 6 insights

DEVELOP

INSIGHTS

The staff area needs to contain the hallway for increased fire safety and accessibility to the bed area of the daycare. It was the clear favorite for all subjects, who stated they did not mind the smaller size of the breakroom.

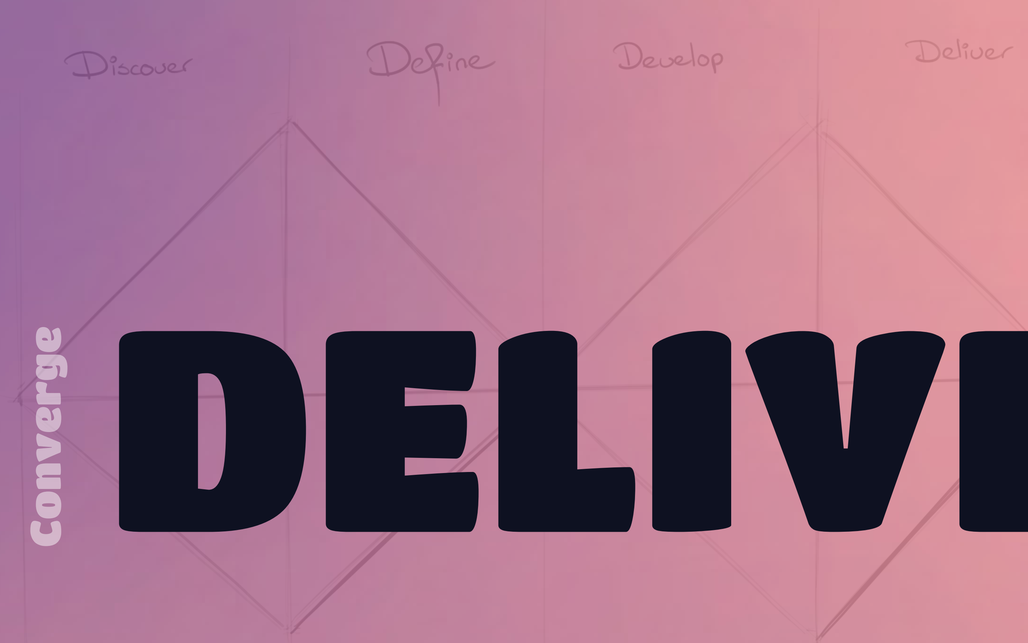
The amount of beds needed to be increased, so any private options that contained 4 beds were not considered a viable option. Both arrangements showed a **favor for the open design with 6 beds**, combined with one smaller private bedspace and the isolation in the front. The staff stated that flexibility and accessibility were the most important factors behind their choice.

The nursing post definitely needs glass to improve acoustics, but should remain open in order for parents to easily approach the staff. The glass is not considered to increase this approachability. The 'fishbowl design' and the open counter with glass are therefore considered the best options, the first has the better privacy, the latter has better accessibility.

Opinions on the normal area of the daycare are divided, mostly about the shape of the treatment spots. The staff indicated that **the current chairs are highly beneficial for accessibility and flexibility,** which should be considered in the design of new treatment spots as well. A combination of chairs and couches should be considered, as the silent area also already has some couches available.

The staff showed doubt related to a designated play area and fixed furniture, considering the consequences for tranquility, oversight and flexibility. Instead, **the central area should remain quite open and contain movable furniture** that can be switched out on a day-to-day basis. This also means the kitchen console is best placed along the side of the room. The paradox however is that a play area must requires some boundaries, otherwise it spreads amongst the whole daycare - so the area cannot be kept too open.

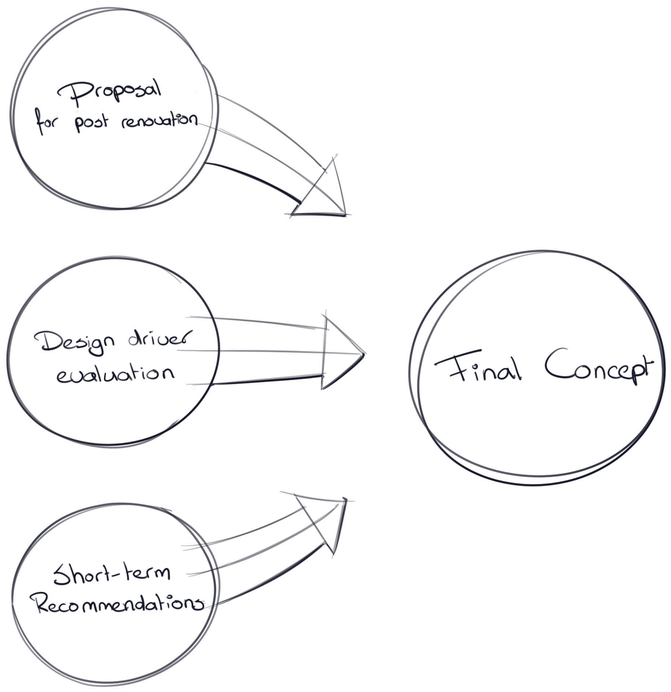
The silent area should have its **toilet in the front**, to decrease traffic and improve accessibility.



Converge

DELIVER

The delivery focuses on **communicating the final proposal** for the ‘ideal daycare’. Chapter 11 shows the final arrangement of the different spaces and their furniture and illustrates how the daycare would look from different viewpoints on eye-level perspective. Chapter 12 evaluates the quality of the proposal with regards to the three design drivers and concludes with recommendations for the near future.



What can be done after the renovation?

How well does the proposal match the use values and design drivers?

What can be done before the renovation?

11 DESIGN PROPOSAL

Now that the overall layout of the daycare was defined, we could focus more on the design of that layout. Based on the feedback and insights gained during development, a final design for the interior was made in Blender. This chapter walks us through a design proposal of an ideal daycare and touches upon several of its features.

DELIVER

Why the nature theme?

Sohpia wants the experience at the daycare to blend in with daily life as much as possible. One of the ways this is done, is by **bringing the outside world inside** - the celebration of holidays, birthdays, but also preparation of lunch and breakfast, or facilitation of workspaces. Why not take the statement more literal and bring the actual physical outside world inside? This is where the idea for the forest theme began, but there are several more reasons why it stuck.

The theme exudes serenity, the feeling of relaxing under a tree makes for a very calm and environment and it anchors the room, ensuring that the daycare doesn't turn into a playground as well.

The tree functions as a central gathering point with a large table, which is what a lot of parents and children were missing and what they valued at other hospitals. At the same time, it encloses a central area for little children that might want to play near the base of the tree. It is positioned to minimize the obstruction of sight from the nursing post.

The tree is **visible from the main entrance**, creating a attractive and inviting sight, while also making it abundantly clear where to go as visitor.

Large abstract shaped leafs can be placed around the daycare to unify the daycare and obscure the scary looking hospital-environment. Besides aestheticelly pleasing, the shapes are functional, as they are quite benificial for acoustics and block reverberance throughout the room.

WAITING ROOM

DELIVER

Staff
Visitors
YOUR SLOGAN HERE
Quite clear where to go..

TREATMENT ROOMS

Multifunctional
desk
Can be used
to measure
height...
...and
weight

DAYCARE CENTRAL

No beds visible upon entry
Screens only visible for visitors if they try really hard.
Large pillows under the tree for younger children to play at

Little beds are visible
Large central coffee counter

The table can rotate around the tree to create different configurations when needed.

Great for acoustics
and echo-disruption
A little more
"chill"
Diner booths
in the back
Desks in the corner
so no one falls behind
schedule...
Large central table
as gathering point

Couches can easily roll in and out for quick access

Great place to sit with family and.. eat!
Almost no line of sight to other patients, but a clear one to the nursing post

Enough storage for
any games, supplies

DAYCARE SILENT

Clear line of sight to the nursing post
This is a movable whiteboard
Almost no other patients visible

Clear line of sight

Minifridge!

DAYCARE BEDS

All glass dividers can be turned opaque at the push of a button.
Curtains can help with that extra bit of privacy.

A nice closed off bed area, while interior elements remain visible.

Secluded, yet accessible

NURSING POST

Big window to see into the isolation room.
Sound-proofness and transparancy can be adjusted at any time according to the need for privacy
Space to prepare medication

All areas remain quite
visible despite the tree.

Most beds are directly visible from behind the glass
Central coffeebar is a great vantage point outside of the nursing post

Quick access to the nursing post
Can also be a couch
6 desks

STAFF AREA

Simple but
effective design
Big comfy couch
like in the other breakroom

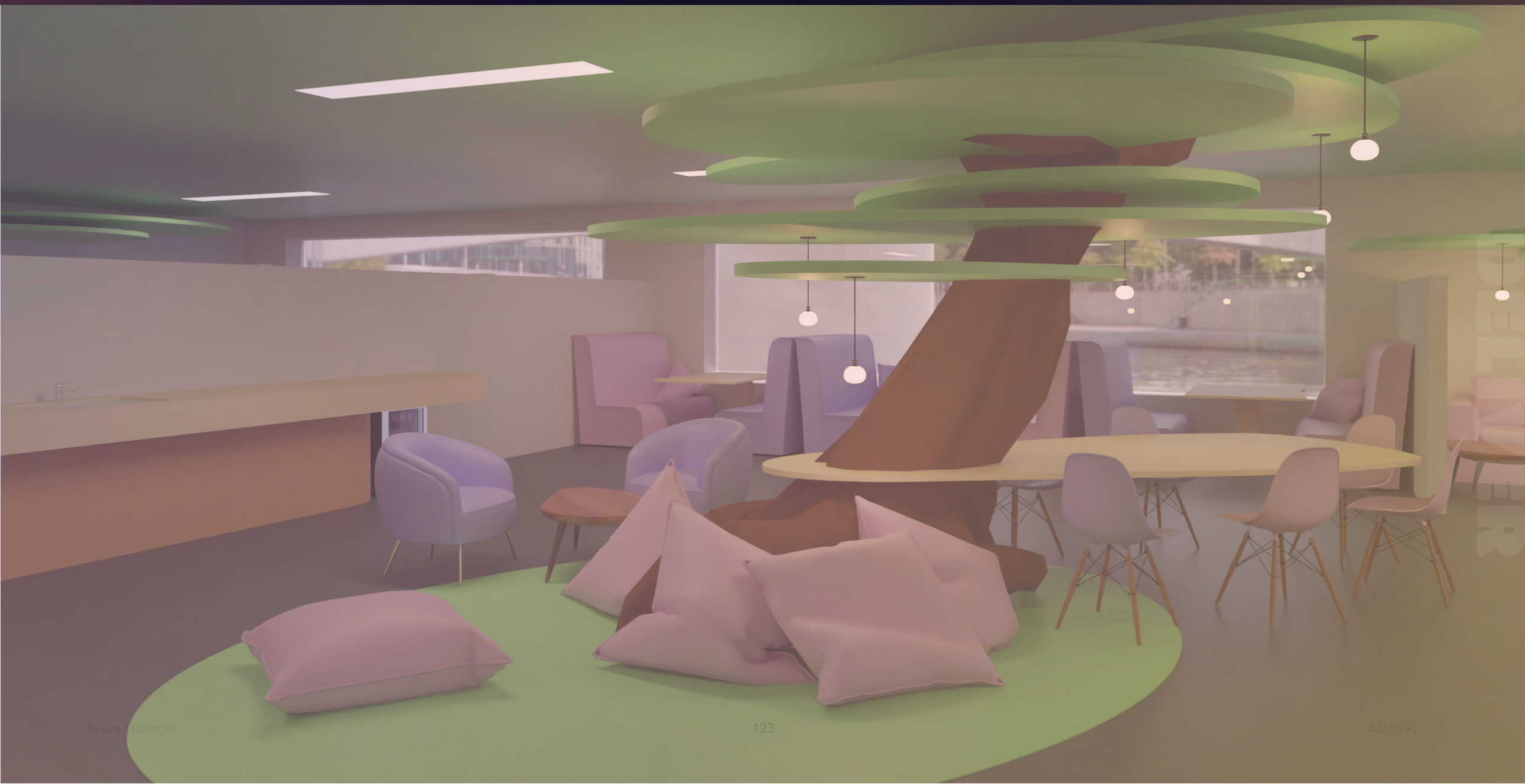
Can be made
transparent with
a switch

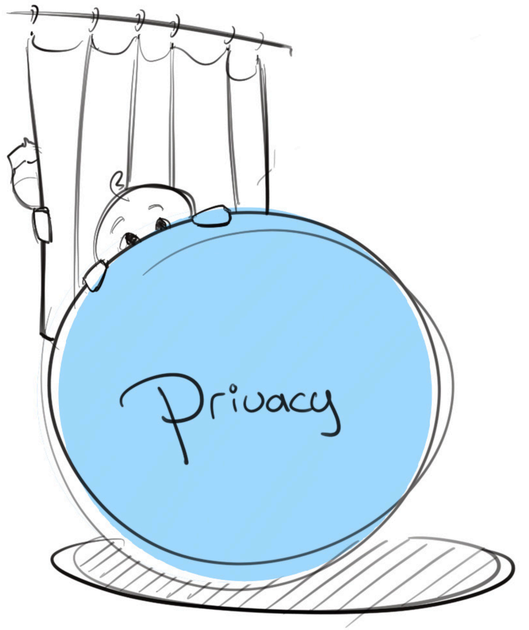
Open kitchen,
takeout style

Maybe hire a
barista...

12 DESIGN EVALUATION

The proposal for post-renovation is examined with regards to the three design drivers, in order to evaluate the validity of the concept and discover any recommendations for the short term.





Guidelines for the interior

- *The amount of places from where the patients can see the beds must be as small as possible.*
- *The amount of treatment spots that are directly visible from another treatment spot should be as small as possible.*
- *The amount of treatment spots that are directly visible from the nursing post should be as large as possible.*

Staff

The majority of treatment spots is directly visible from the nursing post, with the exception of two beds adjacent to the wall separating the beds from the central area. The addition of a central coffee counter in the middle of the two areas makes keeping oversight a lot easier. The nursing post is not in the way of any major traffic route, so there are no unwanted visitors peeking at computer screens. Noise is also greatly reduced by the fishbowl design, as the adjustable glass panels deal with the flexibility problems and also give the whole place a modern touch.

Children

The beds are only visible from a limited amount of places, as they are nicely secluded behind the long kitchen counter. It contributes greatly towards the elimination of the hospital environment, while on the other hand providing the much needed silence for the children that require some rest. The beds are further apart than in the current situation, with glass dividers as a modern way to adjust visual privacy levels and to block echoing sounds from around the daycare.

Parents

The new daycare has plenty of space available to discuss private information with the staff. If there is no spot available somewhere on the daycare, the nursing post can be closed off accordingly. The treatment spots are oriented in such a way that you don’t immediately see all the other patients, which is nice.

Guidelines for the interior

- *Beds must be placed closest to the nursing station and the staff should travel as little distance as possible between treatment spots.*
- *The patient's journey should be in chronological order: waiting room, measuring and weighing, treatment room, daycare, with as little distance traveled as possible*
- *The staff area should be clearly separated from the public area.*
- *There should be at least one comfy seat for the parents, per treatment spot for children. This includes bed and seats.*

Staff

The nursing post is located at the central of the three different areas of the daycare and routes towards them are as short as they can be without imposing on other traffic routes. With the office right behind the nursing post, the staff can conduct privacy sensitive administrative work out of sight. The addition of the kitchen counter also eliminates the problems of having to leave the daycare unattended while going for a coffee break. For larger breaks, the breakroom is perfectly sufficient and out of sight of patients, while still being close to the daycare in case of emergency.

Children

The idea is that the patients can choose their own spot when entering the daycare, There is something here for all ages: a play area under the tree with big pillows for the younger children, booths with tables for the creative middle schoolers and a more secluded chill corner with a couple of desks for the ones that want to socialize on their phone or do some homework. The kitchen in the staff area is equipped to serve quality fresh food for children that stay a significant amount of time, to counteract the boredom of waiting.

Parents

Upon entry, it is quite clear where they have to go or report and as the families progress through the building, so do they progress through the treatment. The treatment rooms at the entrance enable some parents to come by for a quick consult without having to enter the daycare. For the parents that do stay with their children, the kitchen facilities and nice comfy chairs are a huge improvement. The large table makes for a nice gathering point and the booths in the back make it possible to work or play games with their child.

Guidelines for the interior

- *The visibility and noise of medical equipment should be as little as possible*
- *The environment should represent calmth and tranquility while looking modern and playful.*
- *Give the users ample opportunities to consume good food and drinks while they are waiting or working.*

Staff

The nature theme of the environment stands as a metaphor for calmth and tranquility, which exuberates throughout the entire daycare. It is a quite timeless theme, assuming that nature will always be a relevant part of our lives. The big tree not only has aesthetic purposes, but also functions as an acoustic panel to block any reverberance in the room. It creates just enough obstruction to prevent children from running around, while still leaving enough space to adjust the interior according to their needs.

Children

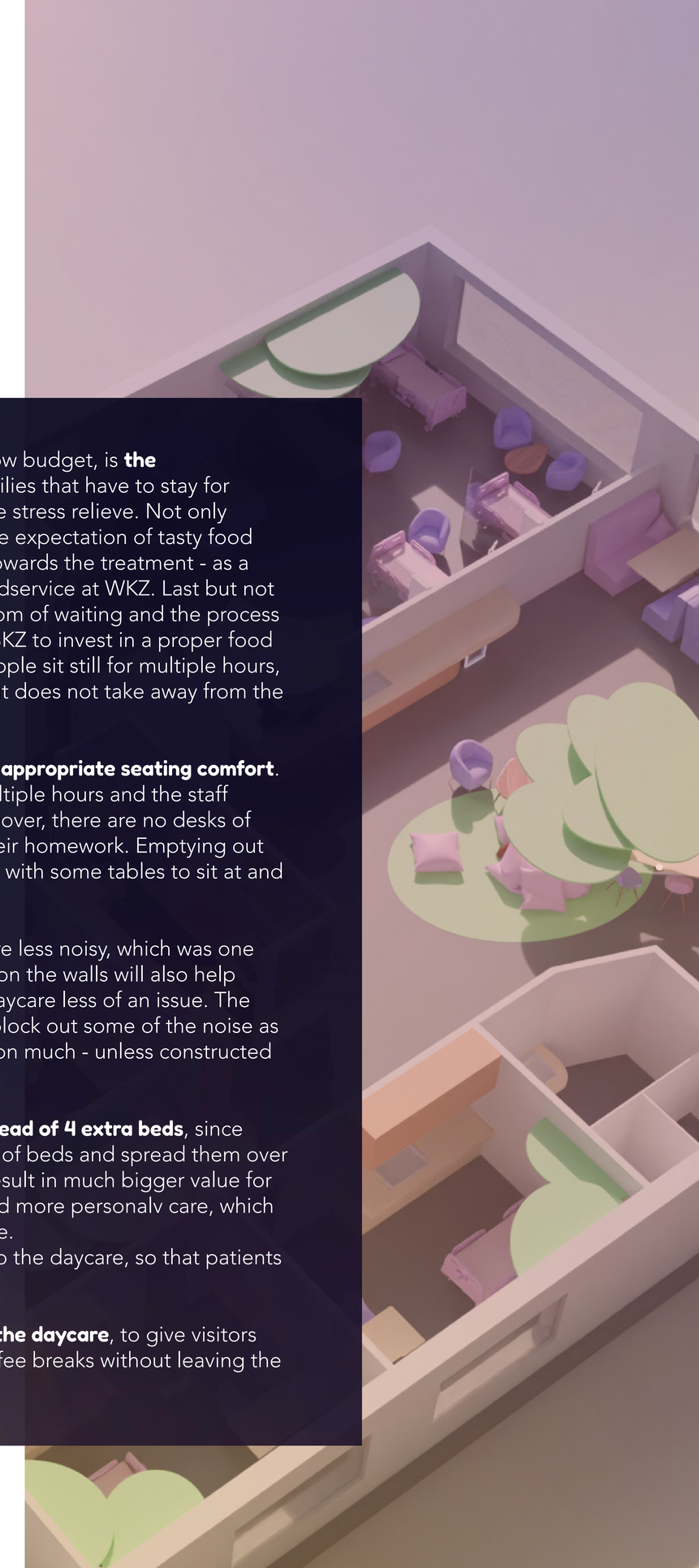
The entire daycare is made to not look like a hospital at all, except for the treatment rooms and the bedside area. The IV poles that patients have to walk around with cannot really be eliminated, but there are several other studies on a redesign of IV drips that are easier on the eyes. Furthermore, any necessary equipment can be hidden away in the back of couches, or even inside the tree. Combine the interior with a proper foodservice and the children might leave with some positive memories.

Parents

The proposal is much more parent-friendly than the current situation. There is sufficient space for parents to be able to rest, or continue their working life while accompanying their child. The remainder of the healing- and stress relieving experience is dependant on the interaction with the staff, who will most likely provide better care in an optimized work-environment like this.

Some of the recommendations are related to the interior, but the most important improvement with the biggest impact would be the incorporation of a proper foodservice.

What are the short-term improvents that Sophia can make with limited budget to optimize the situation until the renovation?



DELIVERY

RECOMMENDATIONS

The most important improvement that can be made with relatively low budget, is **the implementation of a food-service on the daycare**. Especially for families that have to stay for 6 hours, having lunch and/or breakfast taken care of would be a huge stress relieve. Not only because the parents do not have to worry about preparing meals, the expectation of tasty food is also a great way to create some positive anticipation in children towards the treatment - as a counteractor to the needleshots - which is also confirmed by the foodservice at WKZ. Last but not least, having a proper meal is a great way to distract from the boredom of waiting and the process requires little physical movement. For these reasons, it is crucial for SKZ to invest in a proper food service. If we think about it, a restaurant or diner is a place where people sit still for multiple hours, yet they are not bored. Granted that the latter is a voluntary activity, it does not take away from the entertainment value of food.

A cheap and easy fix with a relatively high payoff, is **better and more appropriate seating comfort**. Parents would like to sit on something else than plastic chairs for multiple hours and the staff requires better seats in the breakroom and at the nursing post. Moreover, there are no desks of any kind available for parents to do any work or for children to do their homework. Emptying out the old laboratory might clear up some space for a study/breakroom with some tables to sit at and maybe even host patients.

Acoustic ceiling panels could help towards making the whole daycare less noisy, which was one of the biggest privacy concerns of all stakeholders. Clothy materials on the walls will also help to absorb a lot of reverberance and make talking anywhere on the daycare less of an issue. The installment of a glass wall in front of the nursing post might help to block out some of the noise as well, but because of its central location it will not improve the situation much - unless constructed properly, which costs a lot of money and recourses.

The old laboratory is best refurbished into a proper breakroom instead of 4 extra beds, since hosting more patients is not simply solved by increasing the amount of beds and spread them over multiple rooms, as previously discovered. A proper breakroom will result in much bigger value for less resources, also considering a happier staff will provide better and more personalv care, which is what parents valued mostly from a good treatment in the first place.
An extra measuring and weighing location should be added closer to the daycare, so that patients do not have to walk past the waiting room after being treated.

An extra coffeemachine, water cooker or minifridge with drinks on the daycare, to give visitors more incentive to drink and make it possible for the staff to have coffee breaks without leaving the daycare unattended.

PROJECT EVALUATION

Looking back, how did the project go and what did you learn from the ups and downs?

The overall process was quite chaotic, but in the end, with the help of good feedback and extra focus on the development of a coherent story, the final design proposal is well argumented by proper research into users and benchmarks.

The pivot at the midterm was quite the disturbance in the planning, as it was discouraging that the existing corporate structure within the hospital makes it so hard to make the changes - to the interior - that need to be made, in order to improve the experience for the children that they claim to be at the center of this project in the first place. The situation later turned out to be a blessing in disguise, as it opened up a lot of design freedom and left opportunity to provide the hospital with simple things to improve the daycare on the short term as well. The hospital was highly delighted with the result and felt confident to continue with the plans for renovation. It made it clear to me that I want the projects that I do to have some actual impact, otherwise the motivation and progress will dissapate fairly quickly. I want to feel like the effort I put in, actually helps people with their problems and that I am not just there for 'spek en bonen', as they say in the Netherlands.

Initially, I took on the project because of personal interests in interior design and to use VR and AI in the process. VR turned out to be too complicated to develop the desired end-result within the allocated time. It was replaced by Blender - a CAD program well suitable for interior design - which I conveniently wanted to become more proficient with anyways. AI got completely lost in the process however, which is something I would like to have done differently. Another chapter on AI development of an interior based on initial design ideas, would have added greatly to the research value of this project. The AI could also have increased the solution output during development and created a larger quantity to work with for the delivery. Feng Shui was an interesting interior design method to learn about, but turned out to be more of an inspiration rather than a guiding factor in the design.

Planning could have gone better and is something that I still struggle with personally. Making a planning is no issue, sticking to the planning is the challenge. I dealt with several procrastination periods during the project, which caused the occasional lack of progress, followed by increased stress and workload later on. This also resulted into periods of radio silence, because I felt bad about not having anything new to show. I suspect the procrastination is rooted in the desire to do everything at once and therefore creating tasks or goals that are too big, which only works paralyzing. The key is to make tasks infinitely small and keep completing them consistently, it does not have to be perfect. Furthermore, lack of progress should never impede on proper communication. The most important part is that everyone involved in the project is up to date on what is happening and why.

A chaotic process with a good story and a well-based design proposal.

Former student Bruce Haantjes

What can be done to improve the study, should it be repeated or continued?

The amount of subjects to partake in the interviews can be increased to create a broader and more complete dataset.

Get confirmation from the board on the shape and size of the new wing allocated to Sophia after the renovation. The design could then be worked out on architectural standards to increase viability of the design.

More research can be done into a redesign for the IV drips, to increase the movement freedom of patients while they are receiving their treatment.

A proper logistic study into the influx of patients could shed a better light on excactly what is needed to host more patients.

A lighting design and/or color study could be conducted to optimise the serene yet playful atmosphere of the daycare. The lights in this project's model were chosen for display purposes, while the colors functioned as indicators for users.

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APPENDIX A

Graduation Project Brief

DESIGN FOR our future

6431

TU Delft

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

USE ADOBE ACROBAT READER TO OPEN, EDIT AND SAVE THIS DOCUMENT

Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy".
Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !

family name: Haantjes
initials: B W — given name: Bruce
student number: 4365992
street & no.: [redacted]
zipcode & city:
country:
phone:
email:

Your master programme (only select the options that apply to you):

IDE master(s): ★ IPD ○ DfI ○ SPD
2nd non-IDE master:
individual programme: - - (give date of approval)
honours programme: ○ Honours Programme Master
specialisation / annotation: ○ Medisign ○ Tech. in Sustainable Design ○ Entrepeneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair: [redacted] dept. / section: HICD
** mentor: dept. / section: DCC
2nd mentor:
organisation: Erasmus MC Sophia
city: Rotterdam country: The Netherlands
comments (optional)

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..

Second mentor only applies in case the assignment is hosted by an external organisation.

Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

Bruce Haantjes

Procedural Checks - IDE Master Graduation

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair [redacted] date 10 - 04 - 2023 signature

CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 27 EC
Of which, taking the conditional requirements into account, can be part of the exam programme 27 EC
List of electives obtained before the third semester without approval of the BoE

★ YES all 1st year master courses passed
○ NO missing 1st year master courses are:

name [redacted] date 19 - 04 - 2023 signature RdB

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **.
Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks ?
- Does the composition of the supervisory team comply with the regulations and fit the assignment ?

Content: V APPROVED ○ NOT APPROVED
Procedure: V APPROVED ○ NOT APPROVED
comments

name [redacted] date - KE 2/5/2023 signature MvM

Personal Project Brief - IDE Master Graduation

Designing the ideal daycare experience at Erasmus MC Sophia — project title

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

start date 15 - 03 - 2023 — 31 - 07 - 2023 end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

This project revolves around the development of a child centered interior design for the daycare of Erasmus MC Sophia. Their current space is quite outdated and not up to the more modernized standards of, for example WKZ in Utrecht. The whole experience there is much less hospital-like and more playful, which is something that Sophia aspires as well.
There are four rooms that will receive a renovation, on descending priority, these are: the Daycare, the old Lab and the two treatment rooms. (see next page for floorplan).

Sophia's hospital staff has already defined some areas that have to be improved upon. So is there no place for them to discuss private business with parents, prepare medication, nor to have some time and space for themselves. They are now using the old laboratory (see next page) for breaks, which is also used for storage at the same time.. This room must also facilitate 4 new treatment spaces after the renovation.

As mentioned, the daycare is currently way too 'hospital like'. Sophia wants to consider the viewpoint of a healthy child that comes in for a regular treatment. They do not always need to lay in a hospital bed, yet as of now, except for a chair, there are no nice alternatives. So how can we incorporate the values of the children (comfort, entertainment, privacy) into the experience and how does that translate into an interior? Furthermore, the daycare is being used by kids ranging from 0 to 18, all with different needs and personalities. On top of that, there is a different combination of children present each day. The environment has to be super flexible, with both room to play ánd to make homework, while keeping the amount of treatment spaces the same as now.

Not only the kids need a better place to stay, the parents need a spot to sit for coffee /work and preferably while able to watch their kids. A designated room to discuss matters with the doctors in private is also highly valued. These conversation are often very delicate, and not ideal to have next to other people in the daycare, which is what happens now; they just close the curtains around the bed. However this creates a false sense visual privacy, which causes everybody behind the curtain to speak even more loud that they would've without.

The opportunities here lie in translating the wishes of all different stakeholders into an interior design that fits (and maybe exceeds) every and all desires. Since the exterior walls of the building cannot change, the new ideal daycare experience has to fit within the existing space, and within the norms and rules applied by Erasmus MC. Now what does this ideal daycare look like?

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introduction (continued): space for images

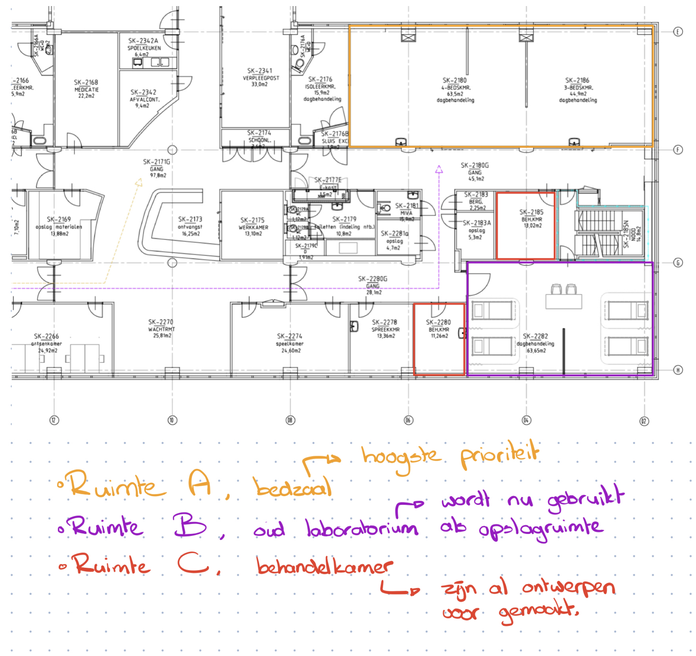


image / figure 1: Floor plan of the rooms.

TO PLACE YOUR IMAGE IN THIS AREA:
- **SAVE THIS DOCUMENT TO YOUR COMPUTER AND OPEN IT IN ADOBE READER**
- **CLICK AREA TO PLACE IMAGE / FIGURE**

PLEASE NOTE:
- **IMAGE WILL SCALE TO FIT AUTOMATICALLY**
- **NATIVE IMAGE RATIO IS 16:10**
- **IF YOU EXPERIENCE PROBLEMS IN UPLOADING, COVERT IMAGE TO PDF AND TRY AGAIN**

image / figure 2:

Personal Project Brief - IDE Master Graduation

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

The problem that this project revolves around is that the daycare is currently somewhat outdated and does not live up to the wishes and expectations of the kids, parents and hospital staff alike. The question is now: what would the ideal daycare look like ? The hospital staff has already defined some criteria of their own, and now want to visually communicate this properly to an architect.

The main issues to be addressed that limit the solution space:

- The healthy child: Most of the kids coming into the daycare are not só sick that they have to lay in a bed. It creates that 'hospital feeling', which scares them unnecessarily. This is something the hospital wants to avoid. Therefore, how do we remove this hospital feeling, while keeping the amount of treatment spots the same?

- Different ages of the children: The daycare is used by kids of all ages (0-18), all with unique preferences. Some might value a quiet place to study, others want to run around and play. How can we facilitate all the different needs simultaneously within the limited room available?

- Hospital: The hospital adheres a set of values which need to be integrated into the new design. It must also fit within the existing space, no outside walls can be moved.

- Staff and friends or family. The staff has no breakroom for themselves, nor a place to discuss private business with the parents. With only limited space, how can we create such a place without compromising the quality or quantity of the care.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

The goal is to create an interior design for each of the three rooms indicated in the introduction, (with Room A having the highest priority), which translate the needs and wishes of all different stakeholders into a visual concept proposal for the ideal Daycare of the Sophia Child hospital, that can be presented to an architect for further development.

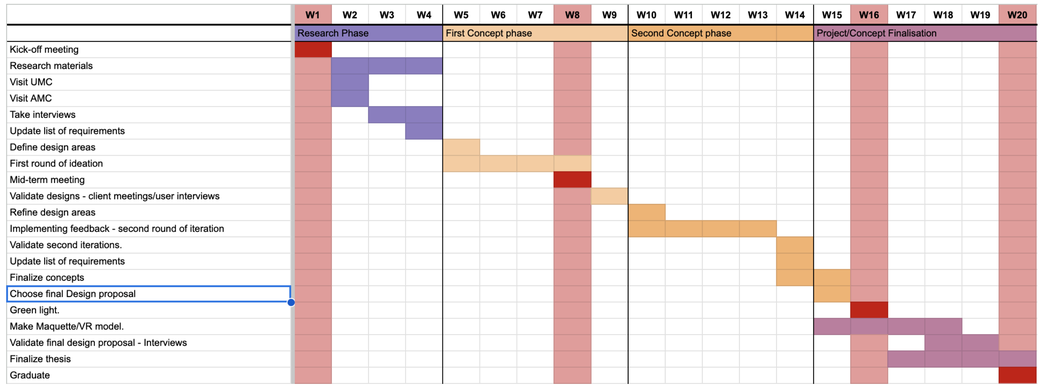
The assignment is to discover and present what the ideal daycare would look like, with a healthy child as its main focus point. Therefore I will research the needs, wishes and values of the children and parents, and add to the criteria that are already identified by the hospital staff. Gain inspiration for solutions from other child hospitals and other child centered establishments (recreation parks, toy stores, regular daycares). Combine the insights into an interior design proposal and deliver either a digital model or a Maquette as a final proposal for the architect to continue realization. In between iterations, I will validate the design through interviews with the stakeholders.

Personal Project Brief - IDE Master Graduation

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 15 - 3 - 2023 31 - 7 - 2023 end date



I want to lay more focus on the designing, the research phase can be quite short in this project. The fact that the hospital staff has already conducted some research of their own already adds to this. I start out with a 4 week research period, followed by a 10 week design phase. This phase contains two rounds of iterations with two rounds of validation in between. I have reserved 5 weeks to make the models and finalize the concept, overlapping with 4 weeks to write the thesis and graduate.

Personal Project Brief - IDE Master Graduation

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, ... Stick to no more than five ambitions.

I set up this project because I liked to challenge myself. I have some basic experience with interior design, but that is limited to a home environment. Designing an actual hospital room that could make the lives of sick kids just that little better, would be a great honor to me. The idea that I can contribute to their happiness is something I think is very beautiful. I am not just doing this for myself, I am also doing this for all the people that could possibly be using that room in the future.

I'm very visually oriented and I like designing by drawing and 3d modeling. These are some skills that I want to improve on, especially VR design. I worked with the technology on another project to design a supercar and I am very curious if the same technology could also be applied in an interior design project.

Next I acquired some management skills during my time in Formula Student. I want to further develop these, with respect to project planning, communication and time management.

Furthermore, the recent emerging and explosion of AI technology is something I think is very interesting for the future of design. It is one of the fastest emerging tech ever, and I'm curious if it could be of use during the ideation process. I have never worked with it before, so the discovery of good workflow is also part of the process

Last but not least I would like to prove my competences in leading and facilitating a design project. I aspire to make a proposal that not only looks pretty, but is also based on solid insights from research, ideation and validation.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Lets go!

APPENDIX B

Informed consent form

Toestemmingsformulier Interview

Project: Nieuwe dagbehandeling van Sophia Kinderziekenhuis
Onderzoeker: Bruce Haantjes
Organisatie: TU Delft

Hallo!
Ik ben erg benieuwd naar jouw ervaringen in het kinderziekenhuis en ik wil je graag uitnodigen voor een gesprekje! Ik ga snel uitleggen waar het onderzoek over gaat en wat er gaat gebeuren.

Waarom doe ik dit onderzoek?
Ik wil graag het ziekenhuis beter maken voor kinderen en jouw mening is daarvoor erg belangrijk. Het zou mij enorm helpen om te begrijpen hoe het is om als patiënt op de dagbehandeling te verblijven.

Wat gaan we doen?
Als je besloten hebt om mee te doen, zullen we een gezellig gesprek gaan houden. Ik ga je een aantal vragen stellen over jouw hobby's, jouw dagelijks leven en jouw ervaringen met het ziekenhuis. Ook gaan we samen fantaseren over een perfect ziekenhuis in de toekomst! Het gesprek zal maximaal 10 minuten duren.

Vrijwillige deelname
Je mag zelf beslissen of je wilt meedoen. Tijdens het gesprek mag je alles zeggen wat er in je opkomt, er is geen goed of fout antwoord. Ik ben enkel benieuwd naar jouw gedachten en ervaringen. Als je je op een bepaald moment tijdens het gesprek niet prettig voelt of het gesprek wilt stoppen, mag je dat altijd zeggen. De uitkomst van het gesprek zal geen invloed hebben op de zorg die je krijgt in het ziekenhuis.

Geheimhouding:
De resultaten van het gesprek worden alleen gebruikt voor dit onderzoek met als doel om de ervaring voor kinderen in het Sophia te verbeteren. We zullen geen namen gebruiken als we over het onderzoek praten en iedereen wordt anoniem gemaakt in het verslag.

Contactgegevens:

Als je vragen hebt over het onderzoek of als je meer wilt weten, kun je contact opnemen met mij via brucehaantjes@hotmail.com of bel 06-47545876.

Handtekening van de deelnemer (indien je oud genoeg bent):	**Handtekening ouder/verzorger:**
_____	_____
Datum:	**Datum:**
_____	_____

Dank je wel dat je dit hebt gelezen! Ik waardeer je tijd en dat je met mij wilt praten over jouw ervaringen in het kinderziekenhuis. Als je vragen hebt, stel ze dan gerust.

APPENDIX C

List of requirements

A comprehensive list of requirements, encompassing various criteria divided amongst the scope and the three design drivers, privacy, routine and atmosphere. Pugh's checklist in the Delft Design Guide was used to compose a complete, yet concise list of requirements and wishes, based upon the collection of insights gathered in the analysis.

Privacy

Requirements
The interior must include different areas for three groups of children, related to their tolerance for external input.
The interior must include a space that allows for static play and noise.
The interior must include a space with moderate external stimuli, for patients to chill or do their homework.
The interior must include a quiet place for patients that need to rest and can tolerate little to no external input.
The interior must facilitate a way to have private conversations with parents and patients, without bystanders being able to understand the conversation.
The privacy level of each treatment spot must be able to be adjusted at any time.
The interior needs to include at least one room where treatments can be conducted behind closed doors
The nursing post must be designed in such a way that the computer screens on it are not directly visible for patients and parents
The nursing post must be designed in such a way that it allows for private conversations between colleagues on normal volume, without bystanders being able to hear the conversation.
The beds must always be accessible from both sides
The interior should facilitate opportunities for static, low input entertainment that can be enjoyed while in bed.
The interior should facilitate opportunities for screen time on an Ipad or television.
The daycare should be able to be constantly monitored by at least one person.
All treatment spots should be accessible from anywhere in the room within 20 seconds.

Wishes
The amount of places from where the patients can see the beds must be as small as possible.
The amount of treatment spots that are directly visible from another treatment spot should be as small as possible.
The amount of treatment spots that are directly visible from the nursing post should be as large as possible.

Routine

Requirements
The interior must facilitate opportunities for static play that do not require much
The daycare should provide one tablet for each treatment spot.
Any form of entertainment should require less than 5 minutes of start-up time.
The daycare must include a coffee corner for both parents and staff.
Staff members inside the break room should be out of sight for patients.
The breakroom should be able to host at least 6 people at the same time
The chairs for the nursing post should be adjustable and have an ergonomic design.
The height of the desk should be adjustable to accommodate for the difference in height between staff members.
The beds must be able to be wheeled out of the room unobstructed.
The nursing post should not intersect with a major traffic route.
The waiting room should not intersect with a major traffic route.
The interior should include a designated area to prepare medication, which is not directly accessible to patients
The interior should include a place for parents to work online, in close proximity to their child.

Wishes
Beds must be placed as close to the nursing station as possible.
The patient's journey should be chronologically: waiting room, measuring and weighing, treatment room, daycare, with as little distance traveled as possible.
The staff should travel as little distance as possible

Atmosphere

Requirements
The bed area must be separated from the other treatment spots.
The interior must facilitate flexible options to isolate sound coming from various places and reduce overall noisiness

Wishes
The visibility and noise of medical equipment should be as little as possible
The environment should feel calm and tranquil
The windows should be visible from as many points in the space as possible.
The daycare should look modern and playful.

Scope

Requirements
The new daycare must fit within the existing exterior walls
The daycare must include at least 4 beds for patients
The daycare must include at least 9 other treatment spots for patients.
The daycare must include at least one treatment room where the patients can get their IV
The daycare must include at least one nursing post
The daycare must include a breakroom for the staff

Wishes
The amount of resources and money spent on the renovation has to be as little as possible.

APPENDIX D

Written persona’s

Persona 1: Ethan
Age: 4 years old
Condition: Feeling sick , is highly sensitive to stimuli

Goals and Motivations:
To maintain a sense of comfort and relaxation during his treatment, with as little external input as possible

Needs and Pain Points:
Requires a cozy and calming space that facilitates rest and sleep
May experience fatigue and physical discomfort that requires immediate attention
Greatly values the presence of his parents
Troubled by the lack of privacy on the daycare.

Behaviors and Preferences:
Sleeps most of the time
Enjoys quiet activities with little to no body movement, such as playing on a tablet or a phone
Prefers an environment with minimal noise and soft lighting that promotes relaxation
Values the direct presence and attention of close family or highly familiar caregivers

Emotional Factors:
Experiences a range of emotions, including courage, frustration, and occasional moments of vulnerability and a longing for normalcy
Feels frightened by needles and is often anxious when getting shot or seeing others get shot.

Scenarios and Use Cases:
Ethan's treatment lasts multiple hours, he often comes in at 10 in the morning and leaves at 3 in the afternoon
Ethan sometimes has to wait for his results to come back, resulting in longer boring waiting times in the waiting room
Since Ethan is in a wheelchair, he needs to be carried by his parents when being weighed, or during bathroom visits.
After getting his shot, Ethan often feels tired and tries to rest for a couple of hours.
Nearing the end of the treatment, Ethan feels less fatigued and likes to engage in games on the Ipad while lying in bed.

Persona 2: Olivia
Age: 10 years old
Condition: Feeling healthy, the regular dose of medication every few weeks makes her feel better.

Goals and Motivations:
To engage in creative play and exploration

Needs and Pain Points:
Needs age-appropriate forms of entertainment that distract her from the treatment
Sometimes feels limited in her movement by the IV pole attached to the needle in her arm.
Troubled by lack of privacy in the room

Behaviors and Preferences:
Often sets sail on creative endeavors such as drawing, practicing her guitar and solving puzzles
Enjoys participating in group activities, pretend play, and cooperative games
Prefers spending some time with her parents, but also will play by herself if they are occupied.

Emotional Factors:
Experiences mixed feelings, excitement to feel better, but nervous for the needle shot.
Has occasional moments of awkwardness when seeing other kids that are more sick then her.
Feels intimidated by visible medical equipment

Scenarios and Use Cases:
Olivia comes to the daycare every two weeks for approximately 2 hours total.
During her treatment, Olivia often likes to engage in games and drawing on her tablet.

Persona 3: Jackie
Age: 18 years old
Condition: Healthy, but has a moderate tolerance for stimuli

Goals and Motivations:
Maintain a sense of independence and control over her life despite her medical condition
Connect with peers and engage in social interactions with her friends during her time at the daycare
Use the downtime during treatment to get some school work done.

Needs and Pain Points:
Requires opportunities to do her homework while waiting for the treatment to end
Sometimes feels upset by the treatment interrupting her daily life.
Bothered by the lack of privacy and abundance of noises at Sophia.

Behaviors and Preferences:
Values short interactions with caregivers who respect her autonomy and aren't patronizing.
Prefers sitting by herself in a somewhat private area
Doesn't move around at all during her treatment, apart from the occasional bathroom visit.

Emotional Factors:
Being familiar with the treatment, she experiences feelings of indifference, resilience and independence.
May require a supportive and non-judgmental environment for the occasional feelings of frustration due to the interruption of daily life

Scenarios and Use Cases:
jackie arrives at the daycare independently, carrying her backpack with personal items and materials for homework.
jackie spends most of her time at the daycare on her phone, often engaged in deep video calls with her friends at school.
If the level of chaos on the daycare allows for it, jackie attempts to do her homework.

Persona 4: Julie
Age: 36 years old
Child: 4 year old girl, feeling sick

Goals and Motivations:
Ensure the well-being and happiness of their child
Provide constant care, support, and attention

Needs and Pain Points:
Requires a comfortable and quiet place to sit with her child during the long treatment.
May experience worry, anxiety, and stress related to their child's health
Requires a quiet environment that will not distract her from work unnecessarily

Behaviors and Preferences:
Actively engages in their child's treatment plan and follows medical recommendations
Desires detailed and private information about their child's condition and progress to be discussed in private.

Emotional Factors:
May feel overwhelmed or emotionally drained due to the constant caregiving responsibilities
Seeks reassurance and support from healthcare professionals and other parents facing similar challenges

Scenarios and Use Cases:
After getting lost, Julie arrives late together with her 4 year old
While waiting in the waiting room, Julie struggles to keep her son entertained and distracted from her treatment.
Julie stays by her sons side throughout the whole process, helping the caregivers wherever necessary.

Persona 5: Matthias
Age: 35 years old
Child: 16 year old girl, feeling somewhat healthy

Goals and Motivations:
Trust the expertise of the medical staff and feel confident in their child's treatment
Maintain a sense of normalcy and routine in their own life while supporting their child's journey

Needs and Pain Points:
Desires regular updates and communication about their child's progress and any changes in the treatment plan
Needs assurance that their child is in safe and capable hands during the daycare hours
May experience feelings of guilt or anxiety about not being physically present with their child during treatment

Behaviors and Preferences:
Values clear and concise communication from the daycare staff regarding the child's activities, progress, and any concerns
Values regular reassurance and updates about their child's well-being when not at the daycare
Appreciates a streamlined process for drop-off and pick-up to optimize efficiency

Emotional Factors:
Experiences occasional moments of guilt or helplessness when not present at the daycare during treatment
Acknowledges the expertise of the daycare staff enough to leave his child under their care.

Scenarios and Use Cases:
Alex drops off his child at the daycare and entrusts them to the capable hands of the medical staff.
Alex wants to receive regular updates on his child's wellbeing throughout the day
Before pick-up, Matthias likes to get an update on his son's progress
A staff shortage means she has to work more frequently and for more hours.

Persona 6: Sarah
Age: 29 years old
Job: Fulltime caretaker at Erasmus MC Sophia

Goals and Motivations:
Provide a safe and nurturing environment for the children under her care
Maintain a healthy level of work-life balance and get through the day without excessive amounts of stress.
Have all treatments of the day administered successfully.

Needs and Pain Points:
Requires a well-equipped workplace environment that maintains a good privacy-oversight balance.
Needs a designated area or space in close proximity to the daycare for breaks that offer relaxation and privacy
Craves a designated place to have private conversations with parents or a collegiate discussion.
There has to be at least one staff member present at the daycare at all times, making it hard to leave or work individually
Everyone at the daycare is not drinking enough fluids
A staff shortage means she has to work more frequently and for more hours.

Behaviors and Preferences:
Demonstrates patience, empathy, and a genuine love for working with children
Values open communication and collaboration with colleagues and parents
Whispers with her colleagues most of the time, due to the very noisy environment in the daycare
Prefers taking care of the children over administrative computer work

Emotional Factors:
Experiences joy and fulfillment from seeing the children's growth and progress
Upset with the absence of a proper breakroom.
Shows occasional moments of stress when it is busy or something went wrong with the treatment.
Shows signs of fatigue and tiredness at the end of the day
Goes through sporadic moments of frustration related to a bad work environment and lack of personnel, making it often impossible to leave the daycare.

Scenarios and Use Cases:
Sarah starts changing for her 8 hour shift at 8:30 in the morning, after which she grabs a coffee from the waiting room
One of the other caretakers is not coming in, causing Sarah to not have her buddy for the day.
Throughout the day, Sarah will provide medical support, measure and weigh the children, administer treatments, monitor the patients during treatment, attempt some administrative computer work, and make frequent trips to the coffee machine.
When approaching breaktime, Sarah engages in a quick discussion with her colleagues, to make sure the daycare is not left unattended. She agrees to have a break later, but finds herself annoyed waiting for her colleagues to return from theirs.
Sarah has to discuss a child's progress with one of the parents. Since she is alone and cannot leave the daycare, the conversation happens next to bed on very low volume.
During her preparation of medication for a patient, Sarah inattentively places the IV bag on the counter in the middle of the daycare, which happens to be right next to her colleague's ham-sandwich.
Sarah wants to discuss the status of the patients with her colleague before going on her break. She tries to keep a low volume, resulting in her having to repeat herself multiple times.
Sarah often has her break on the other side of the building with colleagues from the other daycare, since their own 'break room' has insufficient space and is technically a storage room.

APPENDIX E

Design driver breakdown

Stimuli Sensitivity
Stakeholder influence: children
The requirements for different levels of privacy originates within children largely from the varying sensitivity levels to external stimuli.

Insights
Every child has a different need or tolerance for external input depending on their condition, age, mood and personality. Despite this enormous variety, the patients can be divided into three groups based on this need: low input, average input and high input. The first group contains sick children that want to sleep during their treatment and need to lay in bed. The second group focuses on the healthy patients that can tolerate input, but prefer a calm environment to chill or do homework. The third group consists of the children that feel healthy and can tolerate high levels of external input. The new daycare needs to consider all three groups.
Children that do not have to sleep or lay in bed for their treatment, mostly spend time on their phone or tablet. This is partly due to the lack of other opportunities, partly because of the increased popularity of phones and tablets for entertainment.
Highschool children have a lower tolerance for external input, due to their age and need to chill or do homework.
The daycare is quite small and noisy, causing everybody to talk very quietly or say nothing at all, in an attempt to not disturb the ones who need rest and to limit unintended eavesdropping.

Accessibility
Stakeholder influence: children, staff
It is important to realize the paradox of privacy and oversight: more of one often means less of the other. The staff wants a solution that enables good oversight, while patients and their parents require a sense of privacy.

Insights
There always needs to be at least one staff member present at the daycare at all times, which is quite restricting in combination with a small staff. Increasing the number of separate rooms in the daycare will only aggravate this issue.
A bed must always be accessible from both sides and able to be easily transported outside of the daycare. It is important to consider not only the location of the beds, but also the route towards them.
All the treatment spots need to be in close proximity, or within sight of the nursing post, so that the complete daycare can always be monitored by one person. The beds have the highest priority and need to be closest and easily accessible at all times.
The daycare needs to facilitate a way to create a sense of privacy for the patients, without compromising easy access, or oversight in the room.
WKZ makes use of a half-length wall to separate the bed area from the rest of the daycare. This creates enough privacy, while not making the room look smaller or limiting oversight.
The interior should address the issue of wheelchair accessibility, by facilitating wide pathways and minimizing the overall traffic of a child visiting the daycare.

Privacy Sensitivity
Stakeholder influence: staff, parents
Staff members are more concerned with privacy related to sensitive information and personal conversations between colleagues.

Insights
Since the daycare is very small and tightly packed, private conversations with parents often happen next to the bed, for their kids and the rest of the room to hear. Sometimes a curtain gets raised, causing the campsite-effect; the visual privacy in combination with insufficient sound isolation makes the conversations behind the curtain even louder than without it. One of the biggest pain points of the staff is not having a designated area to discuss private business with parents.
The open nursing post in the middle of the room is very inconvenient. Due to its positioning, anyone who walks in, is able to look straight into the computer screens that potentially show confidential information.
Any conversations between the staff can clearly be heard anywhere in the room, unless they decide to whisper. Constantly having to manage your volume level can be quite obstructing for communication, not to mention unnecessarily exhausting.

Flexibility
Stakeholder influence: children
The collection of children coming to the daycare differs from day to day, and so does their set of requirements. It is important that the daycare can easily adapt to facilitate any needs the children might have, or adopt a design-for-all philosophy instead.

Insights
The daycare can be categorized in three areas, based on the childrens' need for activity. Low activity: a quiet area with beds close to the nursing station. Medium activity: a place with enough opportunity for teenagers to hang out or do homework. High activity: a spot where (younger) children can play, talk and sit with their parents, without worrying about making noise.
Elements of entertainment like the tv's above the bed are rarely used because of their size and noise. Their money is best invested otherwise.
Facilities for entertainment like a playstation or a drivable toy car are stored in the old laboratory for when someone wants to use them. This rarely happens however, due to the limited time and space with opportunities to do so. Even though there is flexible entertainment like this available, the effort-reward ratio of installing and using them is too low compared to fast and easy screen time on a phone or tablet. This shows the need for easily accessible entertainment that does not require much physical movement from the patients.

Traffic flows
Stakeholder influence: children, staff, parents
In order to optimize workflow efficiency, it is crucial to consider both the intensity and direction of human traffic within the space. Destinations should be allocated accordingly, so that users can follow a logical path through the daycare without unnecessary explorative journeys.

Insights
Weighing and measuring is done in a small room far away from the daycare, which creates an unnecessarily long traffic route going past the waiting room. This results in treated patients having to walk past unexpecting people in the waiting room, which is not ideal for both parties.
High traffic flows between the nursing post and the treatment spots will not become less, thus it is beneficial for these locations to stay in close proximity to one another.
The coffee machine located in the waiting room causes extra traffic flows coming from the daycare and the old laboratory/break room.

Creating two separate rooms with treatment spots will increase traffic in a hallway that is already overloaded, plus it amplifies the issues imposed by the shortness of staff and the need to maintain a constant oversight of all the patients.
Children do not move around a lot during their treatment, mostly caused by the fact that they are attached to an IV. Also considering that traffic in the daycare is already quite busy and the area is small, it would be chaos if there were also patients running around. Highly active play is therefore not very common and actually discouraged by the hospital staff.
Access to both the treatment room and weighing room is very limited and creates obstructions. There are ample spaces available for parents to sit, and only one family member is allowed in the daycare with regards to crowdedness. The remaining company takes place outside at the end of the hallway. It would be beneficial for the experience of the parents to improve seating possibilities and opportunities to work online.

Work and break routine
Stakeholder influence: staff, children, parents
While traffic flows are important to determine the optimal location of different spaces relative to each other, user routines are more influential on the absolute location and size of the spaces. The visitors should follow a logical route through the building, while the staff needs a proper office space and a breakroom, separated from the daycare.

Insights
There always has to be 1 caretaker present on the daycare to maintain oversight, which tends to limit freedom a lot and complicate things for small toilet or coffee breaks. This problem is aggravated by the shortness of staff, making it sometimes impossible to get away from the daycare without leaving it unattended.

The current breakroom is mostly used for small breaks away from the daycare. Larger lunch breaks are held at the other side of the building, together with the other team. This suggests a lower priority for a large break room, while still emphasizing the need for a small break area away from the view of the children and the parents.
Since there is a high intensity of administrative desk work to be done, the staff states a significant importance of an ergonomic workspace, mostly concerning their desks and chairs.

Hygiene
Stakeholder influence: staff
Hygiene is one of the most important factors that determine the quality of a hospital. The interior should facilitate a healthy and clean environment that ensures safety in the workflow.
Insights
Since there is no dedicated spot to prepare medication, this is usually done out in the open behind the nursing post. It is not uncommon for medical supplies like needles or medication to lay around for everybody to grab, even right next to food or drinks sometimes.
Most treatments are conducted in the designated treatment room because of hygiëne, convenience and scare factor for the other kids. Since there is only one available, this leads to delays and the occasional extra waiting time for patients, which is not ideal.

Visuals and sightlines
Stakeholder influence: children, staff, parents

Insights
During treatment, it is not always nice to be seen by the entire daycare. One of the most popular spots in the daycare was the bed right in front of the nursing post, because it was cozy and secluded, yet closeby the staff in case of emergency. The interior at WKZ confirmed this, its bed area was visually closed off from most points in the rest of the room. It is therefore important to consider the orientation and location of the beds, to make sure they are in some way visually separated from the rest of the daycare.
The location of windows and the light coming through them is important to consider when dealing with orientation and placement of working stations, beds and inside walls. The daycare has a lot of natural light coming in, which should be utilized.
The daycare is already quite small, and the extra treatment room is going to be even smaller. It illuminates the importance of taking the lack of space into account when allocating different areas.

Acoustics
Stakeholder influence: children, staff, parents

Insights
The daycare is extremely noisy, which is one of the biggest overlapping pain points of all the stakeholders. The ideal daycare should take this into account and have some kind of sound isolation or design structure that limits reverberation..
Renovation
Stakeholder influence: Board, Staff

Insights
The amount of treatment spots in the new interior cannot be less than the current situation. This makes 4 beds and 5 chairs in the daycare. The idea is to facilitate 4 more spots in the old laboratorium, in order to host more patients. However, this imposes several complications on the workflow and workload of the daycare staff and removes their one and only breakroom. The new interior should properly consider the actual need for extra beds, since these are not the only thing required to host more patients. An extra treatment room is also necessary in order to handle a larger incoming flow by treating two patients simultaneously. This will inevitably show the need for extra personnel in order to handle the extra workload.
There is a budget of 200.000 euros available to be invested into the renovation of the daycare.

THE IDEAL DAYCARE