A SERVICE DESIGN TOOLKIT FOR
A MORE INCLUSIVE ENERGY TRANSITION

Master thesis by Eva van Eck

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PREFACE

When I started my Master of Design for Interaction, I hoped to gain new perspectives on how put the human needs at the centre of the design process. I consciously chose this direction, because I feel that the users are often overlooked in innovating systems and the emphasis lies instead on technology or business. My interest in sustainability enabled me to follow several projects in this area during my master's. Examples of such projects are the creation of a future scenario in which people take over the role of insects to combat food shortages, and the design of a circular and sustainable product-service system for Indonesian laundry facilities.

For my graduation assignment, I searched for a project in which both components, the social and the sustainable, come together. At Zeewaardig I was given the opportunity to gain design experience as a student designer, after which I was given the opportunity to pursue a graduation project in which I can elaborate on my passion. During this project, I experienced what it can be like to do research and work in this field. This graduation project presented the opportunity for me to concern myself in-depth with designing for both a societal and sustainable impact.

With this project, I also hope to inspire others to take up the challenge to tackling the challenges of social innovation through design.

Enjoy the read,

Eva

ACKNOWLEDGEMENTS

I want to thank my wonderful supervisory team, Ingrid and Abby. Thank you for the guidance I received from you. Thank you for all the knowledge I have been able to learn from you and especially thanks for the moments when you trusted me when I lost this confidence. Thank you for your motivating pep talks when I needed this. I hope to see you in real life soon!

I want to especially thank Marlou, she has been instrumental in setting up this thesis. Supporting me when ever I needed, with matters concerning my thesis but also beyond. Marlou, I admire your style and would like to work towards reflecting that in my further career.

Thanks to the team of Zeewaardig, Jip and Boukje for involving me in Project Reyeroord Aardgasvrij. Thank you for your involvement in this graduation project. In particular, I want to thank Bjørn, for giving me the opportunity to do an internship at Zeewaardig. This internship has taught me so much and showed me how much fun it is to be working on societal challenges.

Thanks to all students, friends and participants that volunteered to take part in my prototypes, tests and creative sessions. Thank you for sharing your valuable thoughts and insights with me. Collaborating, co-creating, and hearing your input were for me the favourite moments of the assignment. This project would not have succeeded without your input.

Thanks to my dear family and friends for the endless support during the graduation journey and the COVID-19 period. In particular Toni, Maria, Chiara, Ben, Michelle and Lindsey thanks for your friendship and the necessary distractions. To Martijn, I am grateful for your motivations, patience and your listening ear. Thank you for always being there for me.

EXECUTIVE SUMMARY

In project Reyeroord Aardgasvij Service designers work together with the municipality and other stakeholders to stimulate the energy transition in the neighbourhood Reyeroord in Rotterdam. Their goal is to develop interventions in the form of neighbourhood meetings, campaigns, and other activities that aim to activate the residents of Reyeroord in the discontinuation of natural gas in their homes. This thesis project set out to explore how the service designers can be supported in adopting a new approach to design more inclusively in this context.

It seems that currently the interventions by the designers attract only a select group of "early adopters", but ultimately the energy transition takes place throughout the entire neighbourhood and thus influences all residents. Therefore, every resident needs to be aware of the changes to come and make choices about the changes that likely impact their home environment. It is a wish of the municipality is to include as many residents as possible in the transition.

In this thesis an adapted design process is proposed for the service designers to contribute to a broader and more diverse participation in the neighbourhood. A three diamond approach is used to identify the problem, research possible solutions, and iteratively develop a solution.

The design goal of this thesis is formulated as: 'To design a toolkit that enables service designers to practise a more inclusive design process when designing interventions in Reyeroord for a fairer energy transition.'

From the literature research, it is concluded that an inclusive design approach looks different depending on the applied context. The complex context of the energy transition shows points for improvement and challenges that can be solved with an inclusive approach. A shared understanding is drawn up, in which an inclusive energy transition aims to include and integrate all people and groups in the activity of shifting residential homes from natural gas to a residual heating system while promoting the reduction of energy use and insulation in homes, especially those people who are disadvantaged.

During the idea finding phase, additional and relevant research supports the brainstorm for ideas. This explorative study focuses on the users of the toolkit and the essential elements for an inclusive approach. The design activities then lead to opportunities regarding the designers' process, insights about building a toolkit and various components. The exploration leads to the discovery of eight solution spaces, which forms the basis of the final toolkit

1 Understand the principles of inclusion
2 Enable a discussion with other stakeholders
3 Informing the designers about excluded groups
4 Providing the opportunity to empathise
5 Approaching residents in Reyeroord
6 Introducing the topic energy transition
7 Being reminded to the inclusive design methodology
8 Enabling to evaluate the inclusivity of an intervention

Finally, this study looks at what solution could enable the designers to implement a more inclusive design process. In an iterative design approach, various ideas are then tested with students and designers of Zeewaardig leading to the proposed inclusion toolkit. The final toolkit supports the designers with four different tools that can be used during the design of interventions. Lastly, the toolkit is evaluated through a validation test which proves that the toolkit has multiple valuable additions to the current design process. Furthermore it provides relevant insights for future improvement.

To conclude, this thesis dives into the role of inclusion in the energy transition and what service designers can do to create a broader and more diverse participation in the energy transition as a whole. The final deliverable to the designers is a toolkit to reach this goal.

GLOSSARY

The thesis includes literature and internal research, in which technical and design jargon is used. To avoid misunderstanding, the definition of the jargon terms are clarified below.

The design team
The design team are the designers working on the project Reyeroord aardgasvrij. They are a collaboration of designers from Zeewaardig, Noorderwind, one architect and various interns from Zeewaardig.

User
In this report, the term user is used for the users for the toolkit. The users of the toolkit are the service designers of Zeewaardig working on the energy transition in the neighbourhood Reyeroord.

Unusual suspects
'Unusual suspects' is a term used by the municipality and design team to indicate the people who are not yet reached, while we are open to it. Apparently, the municipality is unable to reach or involve these groups. By calling all these people unusual suspects, it is impossible to differentiate between them. Therefore in this thesis, these groups are identified as separate excluded groups.

Target group(s)
The target groups are groups that are currently excluded in the 'Project Reyeroord Aardgasvrij'. The target groups are people that are excluded due to a lack of knowledge, abilities or willingness, as explored in chapter 2.4.

Energy transition
In this report, the energy transition means the activity of shifting residential homes from natural gas to a residual heating system, while promoting the reduction of energy use and insulation in homes.

Discontinuation of gas (Aardgasvrij)
The discontinuation of gas refers solely to the shift from natural gas to a residual heating system. Other factors (like insulation, or other sustainable solutions) are not included.

Project Reyeroord Aardgasvrij
The municipality of Rotterdam assigned five neighbourhoods to work as testing grounds for discontinuation of the gas. Reyeroord is one of these neighbourhoods. This key project is known as 'project aanpak Reyeroord Aardgasvrij', referred to as Project Reyeroord Aardgasvrij. This includes the core team from the municipality and the design team.

Interventions
Interventions are activities related to the discontinuation of gas in Reyeroord designed by the design team. The interventions distinguish four activation aspects, which are: opening up to the topic, understanding the topic, being able to contribute or the willingness to contribute. Examples of possible interventions are including neighbourhood meetings, a campaign, activities in schools and at other communities in the neighbourhood.

Practically educated and theoretically educated
The terms high and low educated refer to a hierarchy in which higher education is favoured. This perpetuates inequality in society and is therefore not inclusive language use. For this reason, this research refers to practically / theoretically educated people.

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01 INTRODUCTION

This chapter introduces the project context and describes the approach for the conducted research.

1.1 PROJECT OVERVIEW

In this section, the context of the graduation project, the stakeholders and the challenges of a fair energy transition are described.

1.1.1 PROJECT CONTEXT
Energy transition
The Netherlands is aiming for a 49% reduction of carbon emissions by the year 2030. Compared to 1990, the emissions should be reduced by 95% by 2050 (Borgman, 2019, 1). Looking at the current state of Dutch carbon footprint, it is clear that there is still a long way to go to reach the emission reduction targets of most sectors.

The housing sector has a vital role in the Dutch climate agreements. It needs to reduce overall emissions by 3.4 Mton by 2030 in relation to the business-as-usual scenario (Het Ministerie van Binnenlandse Zaken, 2019). One of the main goals for this sector is to disconnect 7 million homes and 1 million buildings from natural gas by 2050. This means that the homes must be insulated and shift to renewable energy sources for their energy requirements. In the current climate agreement, municipalities play a central role in this transition for the housing sector. Together with residents, municipalities determine the best solutions for each district in the 'Regionale Energie Strategie' (Blokker, 2020).

Gas free neighbourhoods
The 'Programma Aardgasvrije Wijken' (PAW, n.d.-b) collaborates with the Ministry of the Interior and Kingdom Relations, the Ministry of Economic Affairs and Climate, the Interprovincial Consultation, the Union of Water Boards and the Association of Dutch Municipalities. PAW supports municipalities with the starting of so-called testing ground neighbourhoods where cities can experiment with the transition towards natural-gas free residential areas. The goal of these testing grounds is to learn more about the challenges of the transition, how the transition can be governed and how it can be scaled up to include more of the residential areas that are part of the municipality (PAW, n.d.-a).

figure 2:
The location of Reyeroord within the city of Rotterdam.

As part of this approach, the municipality of Rotterdam assigned five neighbourhoods to work as testing grounds; Reyeroord is one of these neighbourhoods. This key project is known as 'project aanpak Reyeroord Aardgasvrij' (Duurzaam 010, 2021), from hereon referred to as Project Reyeroord Aardgasvrij.

Reyeroord
Reyeroord is a neighbourhood in Rotterdam in the region of Groot IJsselmonde, located between Lombardijen and Beverwaard, shown in figure 2. The area was built in the late 1950s and early 1960s as an independent city district, but nowadays, it is completely absorbed by the growing city of Rotterdam (Wikipedia-bijdragers, 2018) The neighbourhood's image is characterised by its wide roads and the many flower beds and parks that offer the district much green space. Unfortunately, despite the abundance of greenery, the district still looks like a dull grey mass since apartment blocks close off the views (Shah, 2020). There are a limited number of public areas in the neighbourhood, such as a local supermarket, a playground, multiple churches, some shops, and a few schools. In addition, there are not many activities or facilities in the neighbourhood. Residents would have to go to the nearby mall Keizerswaard for their shopping or entertainment.

The residents of Reyeroord are very diverse, concerning age, cultural background, income, and many other identifying traits. Compared to the average of Rotterdam, there are relatively more children and elderly; respectively, 17% and 20% of the residents (Gemeente Rotterdam, 2020). The neighbourhood has a diversity of different cultures. Besides Dutch, there are residents with a migration background from eastern European countries and Surinamese or Antillean background or Turkish or Moroccan background. Homeowners and tenants live mixed in the neighbourhood because there are only a few housing associations. Most homes are rented out privately. The average income in Reyeroord is around € 30,000 per year, which is slightly below the Dutch average (Gemeente Rotterdam, 2020a).

1.1.2 STAKEHOLDERS

The transition towards natural gas free residential areas requires interaction between stakeholders with individual power over the project, expertise, and needs. The main stakeholders at the core of the gas discontinuation project in Reyeroord are the service design agency Zeewaardig, the municipality of Rotterdam, and the residents of Reyeroord. Their roles are explained below.

Service Design studio Zeewaardig

Zeewaardig is a service design agency located in Rotterdam. According to Zeewaardig, they 'design methods to creatively solve complex issues together' (2020). Zeewaardig focuses on societal issues and topics in the public sector, education or area development. Currently, Zeewaardig is involved in the Project Reyeroord Aardgasvrij, with a collaboration of creatives.

The design team in the Project Reyeroord Aardgasvrij goes beyond only Zeewaardig and consists of a group of designers, architects and student designers, all with different expertise and focus. The design team collaboration stretches across three design agencies: Zeewaardig, Noorderwind and Personal Architecture.

The design team's goal is to develop and execute interventions for the neighbourhood Reyeroord to activate its residents in the energy transition. Interventions are activities related to the discontinuation in Reyeroord designed by the design team. The interventions distinguish four activation aspects (Zeewaardig, 2020), which are: opening up to the topic, understanding the subject, contributing or the willingness to contribute. Examples of possible interventions include neighbourhood meetings, a campaign, and activities in schools and other communities in the neighbourhood. While the design team is designing and implementing interventions in the neighbourhood, the impact of these interventions is measured, resulting in an intervention matrix that shows which intervention had an impact and could be used in other scenarios.

The municipality of Rotterdam

The municipality is the client of the design team. At the same time, the municipality is managing the project from a higher level. Among other tasks, they are responsible for the communication and information line to the residents, like sending newsletters with the progress and dealing with and connecting to other relevant stakeholders.

Residents of Reyeroord

Municipalities can not independently adapt the homes of the residents to discontinue the gas supply. It is part of the municipality's vision on the energy transition to let residents make their own decisions. Currently, the municipality is in its first phase, which causes many residents not to be aware of the municipality's plans yet. Therefore the residents need to be treated as important stakeholders. The diversity of the residents will be discussed in more detail in chapter 2.4

Other stakeholders

The design team and municipality often collaborate with external parties, like Vattenfall (contractor), Frontlijn (social research department of the municipality), or VVE010 (overarching owners association of Rotterdam).

figure 3: Stakeholders Project Reyeroord Aardgasvrij

THE FOCUS

The design team is the core focus of this thesis project. The figure 3, explains how the different stakeholders are covered in this project. At the core is the design team's focus, mainly the designers at Zeewaardig, a designer at Noorderwind and an architect from Personal Architecture. The stakeholders that fall outside the direct focus but are still crucial to the project are the municipality of Rotterdam, specifically the department of Project Reyeroord Aardgasvrij, and the residents of Reyeroord. The parties that fall outside of the scope are all the other parties involved in Project Reyeroord Aardgasvrij, such as Vattenfall, Frontlijn, VVE010 and others. The reason for excluding these parties is that in every intervention, the parties involved are different and play different roles.

The design team is the direct user of the solution designed in this research. But there are also other important users, such as the residents of Reyeroord. The residents are the users of the solutions that the design team creates, and therefore indirect users of the solution created in this research. The figure 3 shows how these different stakeholders are connected to each other, explaining different meta-levels of design and research (Stappers & Sleeswijk Visser, 2014)
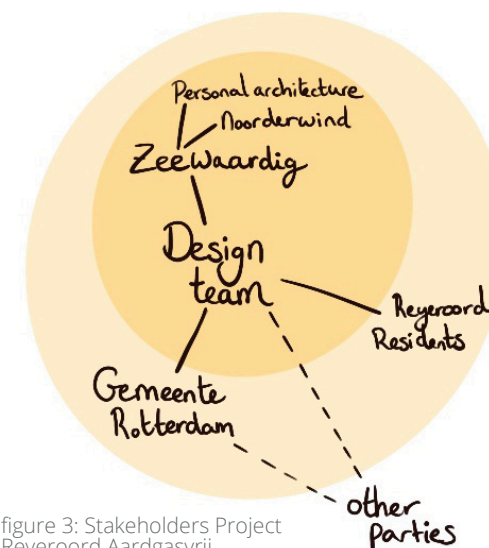
For this thesis project, the tool is the result, while the design team will use the tool to improve their interventions, and the residents will use the interventions to move towards a natural gas-free neighbourhood. PJ Stappers and F Sleeswijk Visser (2014) describe this distinction clearly in the 'connecting triangle' between designer, product and user. For the designers the interventions in the product (an end), while for the residents it is the tool (a means), to reach a further goal.

The same principle applies to the municipality, which is the client of the design team. This stakeholder is also indirectly linked to the solution. One thing to keep in mind during this project is to keep an eye on who is the user of which product. In this project, the design team is the direct user, while the residents of Reyeroord, as well as the municipality, are indirect users.

Considering that the solution for this project is at a higher meta-level than a product or service, a solution is sought at this corresponding level. The solution offered to the design team will therefore be a toolkit for the design team as illustrated in figure 4.
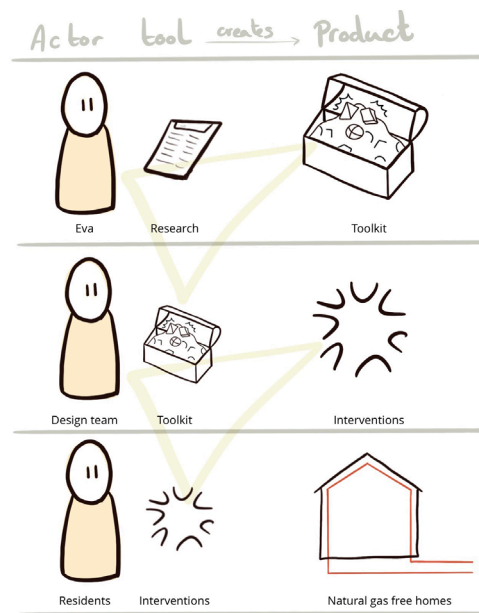

figure 4: Meta levels of design and research (Stappers & Sleeswijk-Visser 2014)

1.1.3 THE PROJECT MOTIVATION

The municipality aims to activate as many residents as possible in the energy transition in the neighbourhood Reyeroord. This is necessary for realising the natural gas-free ambitions and the municipality's desire to perform the transition with the residents. This desire is extended to the design team, who are asked to include all residents in their work and interventions. Both the municipality and the design team are aware that involving all residents is a significant challenge.

The importance of participation

By having a larger reach in the Project Reyeroord Aardgasvrij, there will also be a more extensive support base for the changes to come. The underlying principle is that the more people are aware of the municipality's plans, the more will eventually be likely to consider making an effort needed for the transition. Besides, when people are aware of the goal of the transition, it is expected that this topic will become the subject of a lively discussion in the neighbourhood, which leads to more involvement of the residents in the transition. Therefore, the initial larger reach is thought to be the first step towards more significant participation.

At the moment it seems that only a select group of 'early adopters' are involved in the activities and interventions related to the transition towards natural gas-free houses (Simon & van Os, 2020). In contrast, the eventual transition takes place throughout the entire neighbourhood and thus influences all residents. Therefore, every resident needs to be aware of the changes to come and be allowed to make choices about the changes that likely impact their home environment.

A more inclusive design process could contribute to broader and more diverse participation in the neighbourhood and ensures a fairer energy transition. This requires mapping out the challenges of the design team and investigating how an inclusive design process can contribute to more diverse participation. More research is required to answer these questions. Therefore, chapter 2 focuses on exploring and identifying this problem.

1.2 PROJECT APPROACH

This section describes the project aim, research questions, the approach to the project, and lastly the methodology used to reach the goal.

1.2.1 PROJECT AIM

As illustrated in the previous section, there is a need to establish a fairer and more inclusive energy transition in Reyeroord; this starts with designing more inclusive interventions as this is ultimately the first step of the total transition. The design team is responsible for the design of the interventions, and therefore the design team will be at the focus of this project. The question is:

How can service designers be supported in adopting a new process to design more inclusively?

Besides this main question, it is important to look into the concept of inclusivity in this context. This goes beyond assessing which available design tools cause more inclusivity by taking a deeper look at which methods and vantage points can lead to making inclusivity a part of the design process of the design team.

1.2.1 RESEARCH QUESTIONS

There are research questions that need to be answered first to answer the above-mentioned question.

Research question 1: What does inclusion mean in the context of the project?
Before looking for possible solutions, it is important to deeply understand the problem. The subject of inclusion can have different implications in different contexts. In addition, it is important to be aware of the inclusive design principles and the current state of inclusion in Reyeroord. The meaning of inclusion is explored in Chapter 2.

Research question 2: How to ensure that the design team will adopt the new approach in their routines?
To make a positive impact, it is important that the users indeed start using the toolkit. Therefore it is relevant to discover how to ensure that the solution is desirable and explore how the toolkit could fit into the designers' design process? By answering this question, possible ideas are discovered.

Research question 3: What components are essential for an inclusive toolkit?
Firstly, to be able to construct a toolkit, it is relevant to ask which components are important when creating a toolkit. What makes a toolkit a toolkit? And what are

frameworks or components that should be integrated into a design toolkit? Besides understanding the components of a toolkit and the behaviour of the stakeholders, it is equally important to understand what ingredients make 'an approach' more inclusive. To be able to do so, it is essential to look at the inclusive design methodology from a higher level to discover overarching ingredients that can be used to create tools for an inclusive approach.

Research question 2 and 3 are investigated in Chapter 3.

Research question 4: Can the inclusion toolkit facilitate the design team to practise a more inclusive approach?
At last, the gained knowledge needs to be translated into a toolkit that the design team can use to practise a more inclusive approach. During this design process, the toolkit concept is developed while asking how the principles of inclusion can be translated into a tangible toolkit. This solution finding process is described in Chapter 4.

1.2.2 PROJECT APPROACH
Three diamonds approach

To find answers to the questions described above, the three diamonds approach has been applied, illustrated in figure 5. This approach is described in Road Map for Creative Problem Solving Techniques (Heijne & Meer, 2019). The problem is reformulated in the first creative diamond. In the second diamond, options are generated and selected. In the third diamond, a translation is made, in which promising options are implemented.

Heijne and Meer introduce the creative diamond 2.0, shown in figure 6. Where each diamond starts with a task appraisal, followed by the traditional diverging. The new phase called Reverging is introduced, in which the designer 'revisits and rearranges their options, in order to reveal and refine the problem' (Heijne & Meer, 2019, p.9). Followed by the converging stage and finalised in the reflecting phase.

In this project, the Three diamonds approach and the creative diamond 2.0 are followed. Below, the project approach is elaborated per diamond and illustrated in figure 7.
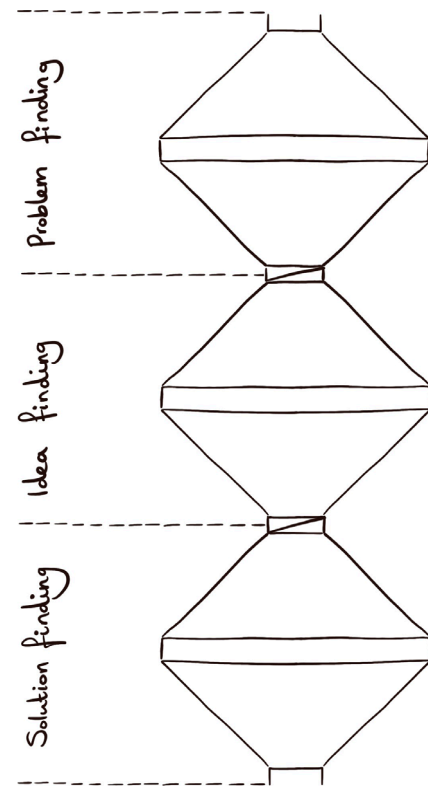

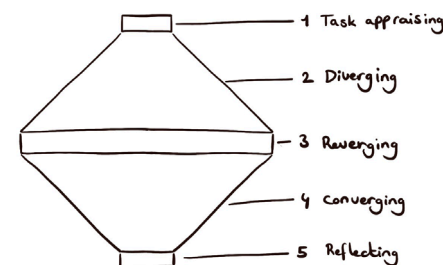figure 5: Three diamond approach (Heijne & Meer, 2019).

figure 6: Creative diamond 2.0 (Heijne & Meer, 2019)

Problem finding

In the first diamond, the problem is investigated. The goal is to understand what inclusive design means in the context of this project and in which areas inclusivity plays a role in the energy transition and the Reyeroord district. The phase of the project is called the fuzzy front end, as illustrated in figure 7. A lot of information is gathered to put the problem into context. Several opportunities are explored and taken to the next phase. Research question 1 is answered at the end of the first diamond through the project brief.

Idea finding

The second diamond focuses on finding ideas through an explorative study. By tackling research questions 2 and 3, it becomes clear what the most important elements are for the toolkit. Through reverging and converging all information is gathered into an overview. This is summarised in the eight solution spaces at the end of this chapter. The solution spaces create an overview of all ideas that could be integrated into the final solution.

Solution finding

The eight solution spaces are the starting point of the third diamond, solution-finding. In this diamond, the solution spaces are developed into tangible tools through an iterative design approach. Finally, the developed toolkit is presented as a solution

for the design team.
The diamond completes with a validation of the developed toolkit to discover to what extent the toolkit is desirable, viable and feasible. This diamond thus answers the fourth research question.
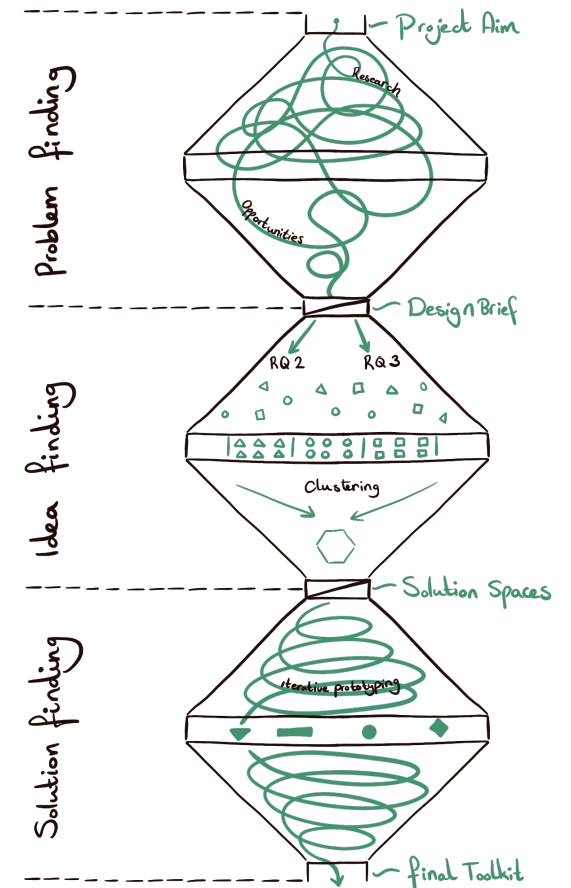

figure 7: The project's three diamonds approach.

1.2.4 METHODOLOGY

The exploration is done through participatory design research. This means that not only are the users studied, but they play a role as a partner in the development of the solution. This approach is often called co-designing as explained by Sanders & Stappers (2008). Involving the users throughout the entire process ensured that the solution is meeting their needs. To ensure a participatory approach, users have been involved at every phase of the process and have influenced the outcome of the project.

Throughout the project, various methods and design activities were carried out. This section provides an overview presenting the main activities.

Literature review
A literature review was conducted to gain an understanding of the topic of inclusion. Since inclusion is a complex topic, the review was an essential part of the project, providing insights into the current state of inclusive design and inclusivity in relevant areas of the context.

Document analysis
Through Zeewaardig and the Municipality of Rotterdam, I gained access to internal documents about the Project Reyeroord Aardgasvrij, information about the demographics of Reyeroord and Evaluation documents from other related gas discontinuation projects.

Semi-structured interviews
At the start of the project, two semi-structured interviews with the Municipality of Rotterdam were conducted through ZOOM. The interviews lasted approximately one hour per interview. During these interviews, I got more information about Project Reyeroord Aardgasvrij and what role inclusivity plays in this project from the perspective of the municipality.

Previous semi-structured interviews were conducted during the internship. During this interview, several residents of Reyeroord were asked about their attitude towards the energy transition. These interviews helped me to better understand the concerns and needs of residents regarding the energy transition and gas discontinuation in particular.

Observation during Design team meetings
Meetings with the design team are held every other week. Attending these meetings helped to discover the challenges the designers had as well as understanding the process used to develop the interventions.

Input sessions
During input sessions, the design team was asked to share their opinions about a diversity of related topics to this project. The input sessions were carried out during some of the bi-weekly meetings in MURAL. During the input sessions, the opinions of the designers were shared. This enabled me to take these into consideration for the toolkit.

Toolkit analysis
The toolkit analysis is a comparative analysis where various online inclusion toolkits are analysed and compared. Eight toolkits were carefully reviewed, after which a standardised list of questions was answered. The answers are placed next to each other to find similarities and differences between the toolkits.

Creative session
During a creative session with graduation design students, insights were gathered about the components of a toolkit by exploring what is relevant for a tool or method and sharing personal stories about what inspires people to change their current behaviour. The creative session was conducted through ZOOM, and insights were gathered in MURAL. The session lasted two hours.

Brainstorming
At the start of the third diamond, a brainstorming session took place. During this brainstorm, ideas for prototypes and tests were created, which lead to the first iterations of the toolkit. The brainstorm is collected on a MURAL board.

Iterative prototyping and testing
In the last creative diamond, an iterative design process has been applied. The quick iterations ensure that a lot can be learned in a short time. Through this process a lot of small adjustments can be made during the development, adjusting the final solution to fit its users. The iterative process starts with simple ideas, questions or assumptions. A research question is formulated, and an appropriate test or experiment is developed and tested. After the experiment, the research questions can be answered, and the drawn conclusions can be taken to the next iteration.
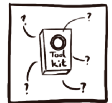
Validation testing
After the final toolkit is developed, a final validation test is executed with the designers of Zeewaardig. During this test, the desirability, feasibility and viability of the toolkit are examined.

All elements explained above are summarized in figure 8. The three diamonds show the different phases. The specific methods used per phase are listed under each diamond. Each diamond is covered in one chapter. Chapter 2, the first diamond, examines the problem. This chapter finds an answer to the first research question. Chapter 3, the second diamond, consists of explorative research. Both research questions 2 and 3 are answered to collect ideas for the toolkit and third diamond: Chapter 4. Here, the process of finding a solution is described in detail. In the end, research question 4 is answered through a validation test. The design brief, approved by the IDE board of examiners, can be found in Appendix 1.

Problem finding

Idea finding

Solution finding

Literature review | Document analysis | Toolkit analysis | Input sessions | Brainstorming | Iterative proto-typing

Semi-structured interview | Creative session | Observations | Validation

Online survey | Literature review

Chapter 2

Chapter 3

Chapter 4

Research question 1:
What does inclusion mean in the context of the project?

Research question 2:
How to ensure that the design team will adapt the new approach in their routines?

Research question 4:
How can a toolkit facilitate the design team to practise a more inclusive approach?

Research question 3:
Which ingredients are essential for an inclusive approach?

figure 8: An overview of the project's process, divided into three diamonds.

02 UNDERSTANDING INCLUSION

In this chapter, the problem is examined. For this, the main concept of inclusion will be discovered. The theory of inclusive design is described as well as what an inclusive transition in the project's context implies. The challenges of the design team are identified, and a design brief reformulates the findings into a design goal.
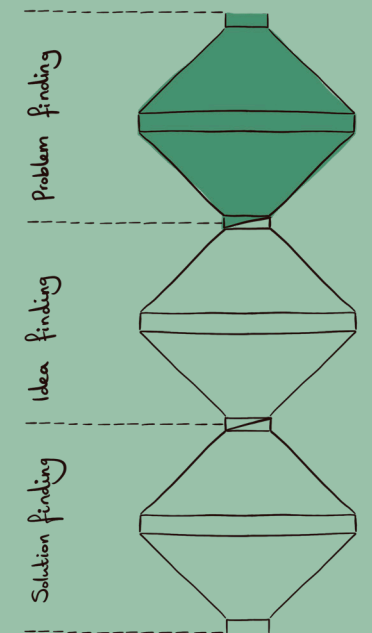
figure 10: The three diamonds approach: Problem finding.

2.1 A DEFINITION FOR INCLUSION IN THE ENERGY TRANSITION

In this section, the necessary terminology around inclusivity will be defined. This helps to better understand what inclusion will mean in the context. Before a solution for a more inclusive transition can be sought, it is important to set a common meaning and purpose for an inclusive energy transition. Foremost it is essential to have a shared understanding of the goal of inclusivity. Since most people would agree that 'an inclusive approach' is to be aimed for, while the meaning is still debatable. By making it very clear what is meant with the words 'inclusion in the energy transition', there is no possibility for various interpretations. With a shared definition, all stakeholders involved in the project can work toward a common goal. For this reason, there is a need to set a definition of inclusion in the context of the energy transition in Reyeroord. To do so, there is a need to establish an understanding of the basic terminology first.

BASIC TERMINOLOGY

In literature, inclusion, diversity, equity and belonging are often used combined. They influence each other, while their definitions also partly overlap. According to Kryss Burnette (2019), 'each element represents a different piece of the full human experience.' For this reason, each term is defined below. The diagram of Burnette is illustrated in figure 11.
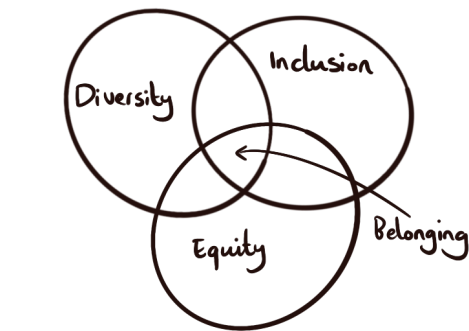
figure 11: Diversity, inclusion, equity and belonging (Burnette, 2019).

Belonging

Belonging is a universal human goal, representing our desire to be part of a social group (Desmet et al., 2017). 'Belonging means that everyone is treated and feels like a full member of the larger community and can thrive' (Harvard, 2020). When speaking of belonging, everyone in the group feels that they can be themselves without adapting to their environment to match the norm. A feeling of belonging happens when Diversity, Inclusion and Equity are met (Burnette, 2019), as illustrated in figure 11.
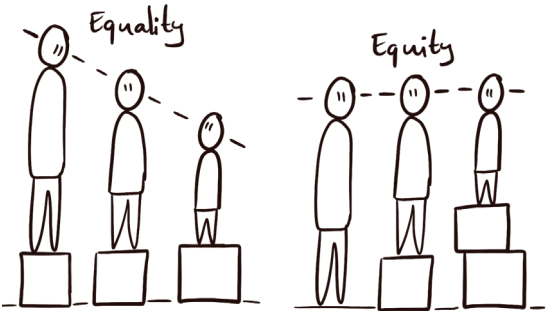
figure 12: The difference between equality and equity illustrated.

Equity vs Equality

Equity means 'a fair treatment for all while striving to identify and eliminate inequities and barriers (Harvard, 2020). Equality, however, strives for equal treatment, which does not always produce equitable results (Merriam-Webster, 2020), as illustrated in figure 12.

Diversity

Diversity is 'the condition of being different or having differences' (Harvard, 2020). These differences can emerge in various human differences such as gender, age, education level, ethnicity, to name a few. To be able to say something about diversity, there has to be a boundary to the system looked at (Simpson, 1949), such as within a society or an organisation. In the context of the energy transition, diversity can be looked at within the closed system of the municipality, the neighbourhood, or certain movements.

Inclusion

'Inclusion means that everyone is included, visible, heard and considered' (Harvard, 2020). Moreover, inclusivity relates to the level of participation that everyone has within the closed system. When speaking of inclusivity, everyone should have the same rights of participation, despite the differences that these people have. How diversity and inclusion are linked is illustrated in figure 13.
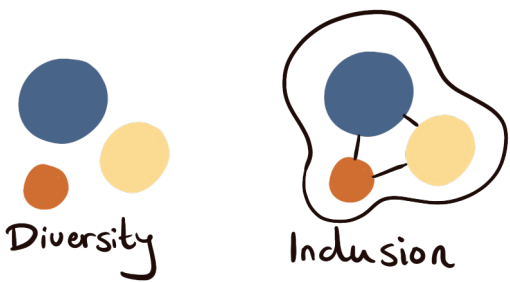
figure 13: Diversity ais about differences, while inclusion is about how these differences are treated within the system.

The ultimate goal of inclusion can be described as follows:

'Aiming to include and integrate all people and groups in activities, organisations, political processes etc. Especially those who are disadvantaged, have suffered discrimination or are living with disabilities' (Dictionary, 2020).

Identifying the term inclusion is still half the solution. It is also essential to specifically emphasise what the energy transition entails in this context.

The Energy transition is perhaps best defined as:

'a shift from a system dominated by finite (mostly fossil-based) energy towards a system using a majority of renewable energy sources, also maximising the opportunities available from increased energy efficiency and better management of energy demand.' (UIA, 2020).

In the context of the project Reyeroord Aardgasvrij, the energy transition solely focuses on the shift of finite energy towards a system using a majority of renewable energy sources. Reyeroord is specifically defined as shifting residential homes from natural gas to a residual heating system (Gemeente Rotterdam, 2020). Other segments have a specific focus in the project:

- The discontinuation of gas in Reyeroord is focused on residential homes only. Industry and business premises are not included in the project (Gemeente Rotterdam, 2020). For this reason, the notice about the management of energy demand can be excluded from the definition.

- The municipality gives the option to residents in Reyeroord to join the residual heating system of the Rotterdam harbour. To be able to have a comfortable home connected to the residual heating system, good insulation in the home is a requirement (Energievergelijk, 2020). Therefore the municipality should stimulate residents to insulate their homes as a first step towards the discontinuation of gas.

- People living with disabilities are not necessarily disadvantaged in the context of the energy transition. For

example, people that are blind do not immediately have an obstacle in the energy transition. For this reason, the special notice of 'people living with disabled' is left out of the definition.

With all these aspects considered, the definition of an inclusive energy transition in Reyeroord becomes:

Inclusive energy transition in Reyeroord: Aiming to include and integrate all people and groups in the activity of shifting residential homes from natural gas to a residual heating system while promoting the reduction of energy use and insulation in homes, especially those people who are disadvantaged.

THE NORTH STAR
For this project, the definition of an inclusive energy transition mentioned above is The North Star (Chang, 2019, pp. 23-27) to work towards. This is the higher goal of the project that will lead to a fairer energy transition in the future. The municipality and the design team can use The North Star as a mirror to evaluate their results from interventions.

The North Star is not necessarily the main goal that is to be achieved in this project, but a higher goal on the horizon. In this thesis, the results are working towards this future, illustrated in figure 14.

figure 14: The North star helps to set a clear vision among different stakeholders.

CONCLUSION
This section explained the terminology often used in combination with inclusion; belonging, diversity, equality and equity. These terms overlap and are difficult to separate. A common goal for an inclusive energy transition has been drawn up. By defining this goal from the terminology, different stakeholders can envision and collaborate to this common goal.

2.2 THE BASICS OF INCLUSIVE DESIGN

Now that there is a shared definition and 'North Star' for an inclusive energy transition in Reyeroord, it is possible to investigate how this goal can be achieved. This means that the designers will have to adopt an inclusive design process. A designers methodology for this is Inclusive design described by Kat Holmes in her book Mismatch (2018). This design methodology builts on 'the full range of human diversity' (Shum et al., 2016). This human-centred design approach consists of three principles (Holmes & Maeda, 2018), which will be explained in the section below.

Principles of inclusive design:
  Recognise exclusion
  Learn from diversity
  Solve for one, extend to many

These principles, as illustrated in figure 15, originated from early projects in which inclusion played an important role in the collaboration between Holmes' team at Microsoft and inclusive design leaders and innovators in the field (Holmes & Maeda, 2018). To understand the basics of inclusive design, it is essential to understand these three principles. These principles are explored below.

Recognise exclusion
'Exclusion happens when we solve problems using our own biases', says Kat Holmes (2018). We speak of exclusion if the user is hindered in using a product or achieving its goal in the given context. Microsoft speaks of a 'mismatch between individuals and their environments, situations and society as a whole ' (Shum et al., 2016). People with a physical disability or personal health condition experience obstacles more often, but exclusion occurs whenever there is a mismatch in human interactions.

People can be left out consciously or unconsciously. To illustrate, it can be a conscious choice of the designer to serve a particular target group only. For example, the senior telephone deliberately has limited functions not to serve everyone but focuses on the elderly only. This target group does not understand technology well and often have reduced eyesight.

Although sometimes people are deliberately excluded, often groups of people are unconsciously excluded by designers because the designer was unaware of the users or barriers for the users of the product.

In the energy transition, it can be a conscious choice to exclude tenants and focus on house owners for a neighbourhood meeting about home renovation. While unconsciously another group can be excluded. For example, the elderly could be unconsciously hindered because they don't have the technological knowledge to attend a digital meeting.

Not the same groups are always disadvantaged. Precisely who is disadvantaged depends on the context. When thinking of exclusion, people often quickly think of physical health issues such as people who are deaf or blind or people in a wheelchair. For example, the inclusive design methodology refers in almost all examples to accessibility and physical disabilities. While depending on the context, the disadvantaged groups will differ. People with a physical disability are not always hindered in all contexts, and there are many other groups and people who are restrained in different situations. For example, someone in a wheelchair is not limited when ordering food in a restaurant, while an international student may have great difficulty understanding the Dutch menu. In the context of the energy transition, people with physical disabilities are often not disadvantaged. Their impairment is not the reason why they might be excluded in the energy transition. In section 2.3, the groups that are excluded in the energy transition are defined and discussed.

figure 15: The principles of the inclusive design methodology illustrated.

Learn from diversity

When a product does not serve its users, the people using this product adapt to it and interact with it. 'Human beings are the real experts in adapting to diversity,' according to Kat Holmes (2018). It is up to designers to discover these adaptations and create better experiences by digging deeper into the users' underlying emotions, wants, and needs. Empathy is a valuable skill for designers to look beyond the barriers of people experiencing barriers in interactions. Empathy enables us to recognise motivations that all people have in common. By observing and researching with excluded groups and people, designers can learn how to improve products and services.

Solve for one, extend to many

By focusing on underlying universal human needs, solutions can be used more broadly than for the person or associated group that this person fits into. 'By focusing on what is universally important to all humans', says Holmes, 'we can improve solutions for a much broader audience' (2018).

For example, a solution that helps someone who is deaf also works for people in noisy environments. By designing for people with permanent obstacles, people with temporary obstacles also benefit. This is best explained with the tool Persona Spectrum, illustrated in figure 16 (K. Holmes, 2018). The example below explains the Persona spectrum.
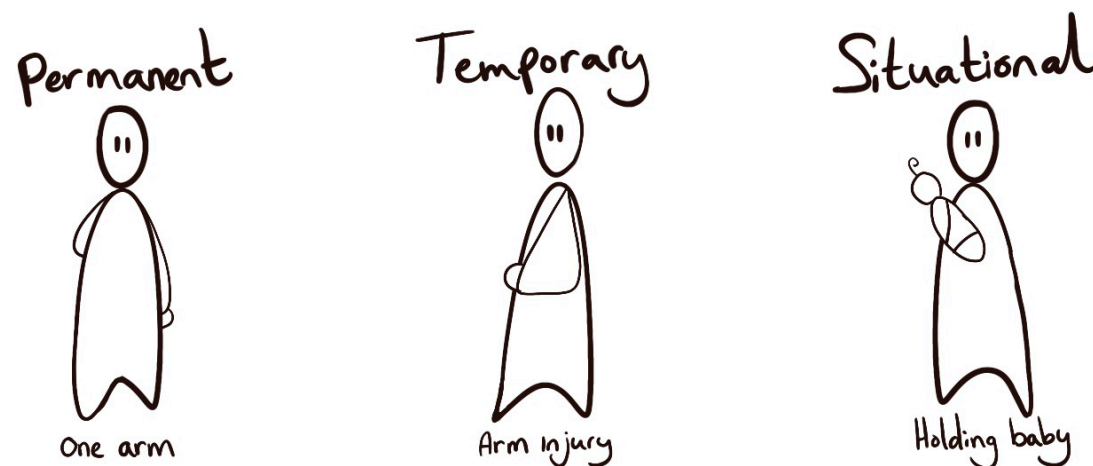
By finding a solution for someone who is deaf, designers indirectly involve a much larger group because the solution helps even people who temporarily have an ear infection. Even people who situationally wear headphones with loud music or people in a noisy environment such as in public locations or at a bar will be able to use the product better thanks to the solution. This example shows that coming up with a solution for one person or a group can be extended to many.

The principle of the Persona Spectrum (figure 16) can be applied to examples in the energy transition in Reyeroord as well. For example simplifying and illustrating the explanation about the discontinuation of natural gas, will enable low literate people to understand the process. At the same time this solution helps people in stressful situations, that temporarily have less brain capacities. In specific situations, this communication also enables to have short conversations on the street, where people do not have much time.

Another example, by showing a diverse group of people as examples in the energy transition, people who are currently feeling unrepresented can see role models taking their opinions into account. At the same time, during a neighborhood meeting where a Turkish-Dutch person happens to be in a group of white female designers, this

solution can make the difference between whether this person feels like he belongs, or doesn't come back to the future meetings.

CONCLUSION

The inclusive design methodology follows three principles; recognise exclusion, learn from diversity, and solve for one, extend to many. K Holmes described in her book Mismatch how exclusion could be discovered. For the context of this graduation project, the energy transition in Reyeroord, there are many different aspects that need to be investigated to understand its context. The current state is therefore elaborated in the next section.

figure 16: An example of the persona spectrum

2.3 THE CURRENT STATE OF INCLUSIVITY

As mentioned above, the context depends on who is excluded. These contextual aspects and trends are explored in the upcoming section to understand better what inclusivity practically entails for this graduation project. Mapping the current state of inclusivity in the energy transition will help to understand what the problems are that need to be tackled. Firstly, the national influence is briefly covered to see what is happening at a national level in developing the energy transition. Subsequently, the level of the municipality of Rotterdam is analysed through an interview with the municipality and inspection of the evaluation documents of the gas discontinuation projects in Heindijk, another testing neighbourhood for Aardgasvrij. Conclusions can be drawn that influence inclusiveness in Reyeroord as well. After this, there will be a focus on the neighbourhood Reyeroord. The insights come from observations in the neighbourhood, supported by background information. Finally, the problems that the design team is experiencing in the project in Reyeroord are looked into. The underlying information for this was retrieved during online input sessions with the design team. The set-up and transcript of the input sessions can be found in Appendix 4 A-C.

Energy transition on a national scale
The energy transition in The Netherlands is currently not inclusive as a result of the unconscious increase of inequality (Leerling & Markus, 2020). Pearsall & Anguelovski even argue that sustainability planning as a whole leads to environmental gentrification, exclusion and marginalisation (2016). As an example, proposals for sustainability mainly end up with people with higher incomes. As there are various options for subsidies for solar panels to stimulate renewable energy. People with higher incomes can invest in subsidised panels, which results in a lower monthly energy bill and more comfortable home. People with a lower income can not use the same privileges. People living in rental homes do not enjoy the same benefits since rent usually increases when a landlord decides to invest in solar panels.

Another disadvantaged group consists of people that experience energy poverty, who are primarily homeowners. Energy poverty is defined as: 'the phenomenon in which households have an energy bill that is too high for their income. About 10% of the Dutch have to deal with energy poverty. Because this form of poverty is proportional to expenses and income, it occurs in all social layers of society.' according to Vollgraff (2019). For these people, a lower energy bill could be the solution to solving their problems, but despite the subsidy, investment in solar panels is often not an option for them since they can not afford it to begin with.

Increasing inequality and exclusion is by no doubt not the intention of the energy transition, but yet this effect is observed. The example above clarifies how the energy transition can negatively affect certain groups despite the best intentions. It is essential to be aware of this and to reflect on inclusion regularly. By involving a diversity of people in the energy transition, designers can count on solutions that will appeal to a broader audience.

Energy transition on the level of the municipality of Rotterdam
One observation during meetings between the municipality and the design team is that there is no focus on the tenants yet (Interview municipality, Nov 2020). The full interview transcript can be found in appendix 2. The main argument in this is that tenants can not decide to discontinue the gas themselves. This makes it difficult to focus on them since the municipality does not want to give false hope. On the other hand, an insight from the evaluation document of Heindijk (van Elburg, 2020), shows that tenants feel left out in the entire process of discontinuation of gas. According to Elburg 'Residents who rent a house through a housing association regretted that the offer from the municipality did not apply to them, but only to owner-occupiers.' Some tenants might want to take action, but the current arrangements simply do not apply to them (Kleiwegt et al., 2020).

Another criticism towards municipalities is about communication, according to van Kleiwegt (2020). Numerous letters are being sent, and multiple meetings are held for the residents, but the attendance is low, and many groups of people are not reached altogether. There is a need for equal communication. Elburg (2020) mentions that 'it is important that all target groups - tenants, landlords and owners - receive sufficient attention and are informed. For example, by paying attention to all groups in the neighborhood in newsletters.' Reaching more people starts with better and more communication. Information should be spread via multiple platforms instead of only being mentioned in one neighbourhood meeting. This way, a broader audience can be reached.

Residents also commented that there is a need for communication in multiple languages. Currently, only Dutch is used as a communication language. This leads to the exclusion of people who speak Dutch as a second language or do not speak Dutch. (van Elburg et al., 2020). Introducing multiple languages is not easy for the municipality, because the municipality is a complex organ with strict rules about its communication strategies and little flexibility to cope with these challenges (Interview municipality, Nov 2020).

Energy transition on a neighbourhood level

The neighbourhood Reyeroord is a diverse neighbourhood concerning age, cultural background, income, and many other identifying traits (Gemeente Rotterdam, 2020b). The diversity of people in this neighbourhood creates a sense of detachment within the neighbourhood instead of a collaborative multicultural community. There are countless different bubbles of groups of people, building strong communal feelings within the boundaries of these bubbles. This is a problem for inclusion because people tend to stay within the limits of their bubbles, making it more difficult for the outreach of the municipality to reach these groups or go from one group to the other, according to Jesal Shah researching social contagion in the context of Reyeroord (2020).

The average income in Reyeroord is slightly below the average (Gemeente Rotterdam, 2020a). There is a relatively large amount of energy poverty in the district. On the national scale, around 10% experiences energy poverty (Straver et al., 2017). In the neighbourhood Reyeroord, this would be an estimated guess of approximately 17%, assuming an equal relationship between the poverty threshold and energy poverty. This is an obvious challenge for the energy transition in this neighbourhood because often, residential sustainability measures

cost more than they yield over a few years.

Due to the COVID-19 pandemic, it is not possible to organise physical neighbourhood meetings and other activities. As a result, people in the neighbourhood are even more distanced (Overlegorgaan Fysieke Leefomgeving, 2020). The municipality and Zeewaardig have also noticed that this affects the target group they can reach. Observations showed that online meetings attract a younger target audience to the meetings. this is also acknowledged by (Overlegorgaan Fysieke Leefomgeving, 2020) Evaluations showed that most of these people already have access and opportunities to take in information found online and also have more affiliation with sustainability topics. Other groups that were harder to reach are now becoming increasingly difficult to reach, including older residents, low-literate, 'computer illiterates' (digibeten). This increases the inequality in the accessibility of information about the energy transition in the neighbourhood.

Energy transition on the level of the design team

During one of the online input sessions (Appendix 4B), the design team was asked about their opinion about problems they see on inclusivity in their project. In a brief reflection on their own team composition, the design team mentioned that the team

itself is not diverse and mainly consists of highly educated and mostly white designers. The lack of diversity within the team could cause the team to miss out on opportunities to highlight inclusivity in their designing activities.

In general, it appeared that the current focus is not yet on disadvantaged or excluded target groups, often called 'unusual suspects'. The designers are mainly preoccupied with the larger and more easily identifiable target groups. This is caused by the difficulty of reaching these disadvantaged groups, which is a problem encountered by the design team and the municipality. The designers pointed to the general lack of participation in the neighbourhood, which leads to a lack of 'leads' for the designers to include more people.

Another reason for the lack of participation is thought to be caused by the complexity of the subject. People that already experience problems with the communication they receive from the municipality of the interventions then experience the additional problem of complexity.
People who already have difficulty

with regular communication from the municipality can become confused due to the complexity of the subject. For example, the municipality does not yet know exactly what the costs will be and what the timeline for the renovations will look like. Expectations are communicated but might change over time. For people who have trouble understanding this complex subject, information like this can leave them confused.

CONCLUSION

The analysis of the current state of inclusivity shows that there are still many areas where residents are excluded, disadvantaged or hindered. This seems to occur on the various levels in the energy transition: the national level, the municipal level, the neighbourhood level, and the design team level. To continue with the first step of more inclusive design, the next section will elaborate on the exclusion in Reyeroord specifically. This is a necessary step for understanding the current lack of inclusivity in the interventions developed by the design team.

2.4 EXCLUDED GROUPS IN REYEROORD

As mentioned before, a large group is currently being named 'unusual suspects', by the municipality and the design team. This is a problem because this large group is impossible to identify. By dividing this large ambiguous group into several smaller groups, the designers can then start identifying the individual needs and motivations of these groups. This also corresponds to the first principle of inclusive design: recognise exclusion.

Therefore, in the following section, the excluded and disadvantaged groups in the energy transition are mapped. After these groups have been identified, patterns are explored to create three categories. These categories will be discussed in section 2.3.2.

2.4.1 IDENTIFYING EXCLUDED OR DISADVANTAGED GROUPS

During the internship at Zeewaardig, before this thesis project and during the first months of this project, interviews and meetings with the design team, the municipality, stakeholders from Reyeroord (such as the Neighbourhood networker) and residents. From all these experiences, insights have been gathered into the nature of exclusion in Reyeroord.

The analysis led to the identification of many groups and people that have characteristics that lead to exclusion. More desk research into the excluded groups provided information about the group size (see figure 17) in Reyeroord and motivations for the exclusion. The largest groups are briefly introduced below. A more elaborate identification of the excluded groups can be found in Appendix 3.

Elderly: Elderly are a big group in Reyeroord. Around 20% is older than 65 (Gemeente Rotterdam, 2019). This is high, compared to the Dutch average of 18% (CBS, 2020). A significant portion of the elderly does not see how the discontinuation applies to them since they are uncertain about the benefits due to their relatively high age (J. Vos-ter Wolbeek, interview, Nov 2020). The elderly are more often hindered because they are often less mobile, may have health problems and are more likely to be digitally disabled (Gebruiker Centraal, n.d.). This combination may mean that the elderly are less aware of the plans in the neighbourhood. Their age also plays a role in the choices they make for their home (Gebruiker Centraal, n.d.). Designers can look for underlying needs to reach the elderly, for example, by responding to better comfort, living at home longer or health care.

People who are sceptical towards authority: Some people are uncertain about the municipality and government. These people might question the political decisions in certain areas and resist these political decisions either simply as resistance towards authority or because of a lack of trust (Harambam, 2017). Others might believe in conspiracies and can not simply be persuaded by providing them with more information. There are many different degrees of scepticism (Harambam, 2017). An example is the current support and scepticism for the COVID measures: Up to 16% of the Dutch believe COVID is a biological weapon manufactured in a laboratory (van der Laan et al., 2021). The same principle can also be seen in sustainability issues, although no estimations are currently available about the number of people who believe in conspiracy theories related to the climate debate

Climate sceptics: This group is filled with people on a spectrum, from climate deniers on the one end and people sceptical about the current climate measures on the other end (van Vliet, 2019).
Some people don't believe in climate change. 16% of the Dutch do not think sustainability is a good idea (Ministerie van Economische Zaken en Klimaat, 2019). In 2019, an opinion panel research from a Dutch news show which included 27.000

Dutch respondents showed that 31% of the correspondents were sceptical of the role of humankind in the climate crisis (van Vliet, 2019) Similar numbers are shown in other countries like America, Belgium, and the UK (Lubbe, 2018). There is no reason to believe that these numbers are any different in Reyeroord. On the contrary, due to the already present sceptical attitude, the numbers are likely higher.

These people are currently not included in the energy transition because they deviate from the desired opinion. Their critical attitude means that they are often quickly skipped in meetings, instead of challenged to look for common ground. While for designers it is important to emphasise their neutral role. In this way, they can search for other topics and motivations that are important to this group, for example, comfort at home or improvement of public space.

People with other concerns: All people can temporarily end up in the circumstances in their lives that they experience as stressful, for example, a dismissal, marriage, debt problems or the stress of having and raising a child as a single parent (Gebruikercentraal, n.d.). At times like this, people can experience things that normally go off easily as very difficult because their thinking- or doing ability is occupied at that moment (Bovens & Keizer,
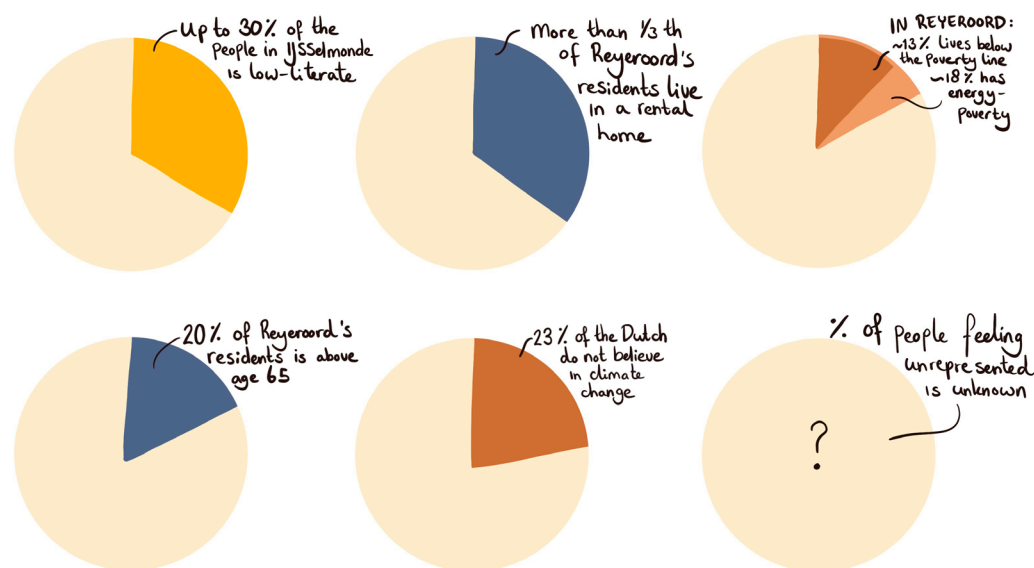
Up to 30% of the people in IJsselmonde is low-literate

More than 1/3th of Reyeroord's residents live in a rental home

IN REYEROORD: ~13% lives below the poverty line ~18% has energy-poverty

20% of Reyeroord's residents is above age 65

23% of the Dutch do not believe in climate change

% of people feeling unrepresented is unknown

?

figure 17: Group size diagrams of excluded groups in Reyeroord.

2020). If these concerns become too much, people can suffer from mental illnesses such as burn-outs or depression. 7 million people in the Netherlands develop one or more mental illnesses at a given time in their lives (Gebruikercentraal, n.d.). When people are combatting a mental illness, they will have less mental space to engage with topics such as the energy transition in their neighbourhood.

People living in a rental home: In Reyeroord around one-third of the homes are rented out by a housing association and a large portion of the homes are private rentals (Gemeente Rotterdam, 2019). People living in rental homes have less say in sustainability in their homes. It seems that tenants are a less important target group because they have no influence on what happens to their homes. Nevertheless, it is important to include this large group in the actions in the district, in order to bring the sustainability topic alive among the residents of Reyeroord. This group can easily be included in more general sustainability interventions, by looking a little further than natural gas-free. All interventions on sustainability are both interesting for homeowners and tenants and help to increase knowledge about sustainability in the neighbourhood as a whole.

People who have difficulties reading and writing: Low literacy is the term used for people that have great difficulties in reading and writing. 18% of the population is low literate (Stichting Lezen en Schrijven, 2018). Of this 18%, 2 million people speak Dutch as their first language, while 1.1 million speak Dutch as a second language (Stichting Lezen en Schrijven, 2018). Illiteracy is the term used for people who can not read or write at all. In the Dutch population, around 1.5 % is illiterate (Stichting Lezen en Schrijven, 2018). In Rotterdam, the numbers for low literacy are even higher than the national average. In Rotterdam, around 21% to 30% of the people are low literate in the neighbourhood (CINOP Advies et al., 2015). This is problematic in this context because people who cannot read and write (well), miss a lot of information on a daily basis. Low literacy is about three times more likely to have insufficient digital skills (Stichting Lezen en Schrijven, 2018). Processing information is difficult for people with low literacy because all information must be remembered from speech. Supporting images makes it easier for low literates to remember the content.

People with a low income, below the poverty line or living with energy poverty: 18.7% of the households in Rotterdam, have a low income. In Reyeroord 13% live below the poverty line (Gemeente Rotterdam, 2019). This is high compared to the national average of 7.9% (NIBUD, 2020).

In the Netherlands, 10% of households experience energy poverty (Straver et al., 2017). An estimated guess would be that 18% of the households in Reyeroord experience energy poverty. People with a low or no income more often live in poverty and often cannot take advantage of privileges that richer people can. For these people, a lower energy bill could be the solution to their problems, but despite the subsidy, investing in solar panels or other alternatives is often not an option for them, because they cannot afford it.

People who do not feel represented: There are many people in the Netherlands who do not feel represented in the energy transition, climate actions and the movement towards natural gas-free. They have no people in their environment or role models who are active in this field. In the Netherlands, the climate movement is mainly led by white, theoretically educated people. People who do not feel represented need not always be aware of this. They do not see any examples of representative figures involved in sustainability in their environment. In the Netherlands, people of colour are underrepresented in the climate movement. This can unconsciously affect people because they do not see examples for themselves.

2.4.2 EXCLUSION BY CATEGORY

TYPES

This large number of excluded groups makes it difficult to envision an approach that is aimed at including them. So, it makes sense to reduce the number of groups by categorising them into larger categories. While identifying the various excluded groups, it was noticeable that all groups have different needs. Therefore be approached differently and uniquely by designers.

RESULTS

Some of the excluded groups could be clustered into one of the three categories; A lack of knowledge, lack of abilities or, lack of willingness. The research agency Citisens (2020) recognizes these categories. They cite the most important factors as whether people are willing and able. In addition, they distinguish between knowledge, attitude and behaviour (Simon & van Os, 2020, p. 6). figure 18 illustrates the various categories that are explained below.

A lack of willingness means that the current motivations and arguments of the municipality and the design team do not match the necessities of these people. The options that the municipality currently offers do not overlap with the wishes of these residents. This group includes, among others, sceptics, the elderly and

people with other more urgent concerns. Currently, these people are often excluded because the needs of these residents are not listened to. For example, people with a sceptical attitude often experience that they are not listened to properly. This can make them feel disappointed and left out. This worsens communication because it is becoming increasingly difficult to involve and approach these people.

A lack of ability means that these groups of people have very limited options and possibilities within the energy transition, regardless of their motivations and opinions. As discussed earlier, renters often feel left out, since there are limited opportunities for them. They have the feeling that they are not being supported in sustainability. Households with mixed families or people with financial problems often have no options within the transition. It can feel like this transition was not intended for people like them. By actively involving these people, the subject can become much more alive in the neighbourhood. There are also many possibilities for sustainability besides the gas discontinuation, that have huge effects on the CO2 emissions. Currently, these opportunities are often missed because these groups feel excluded from the transition.
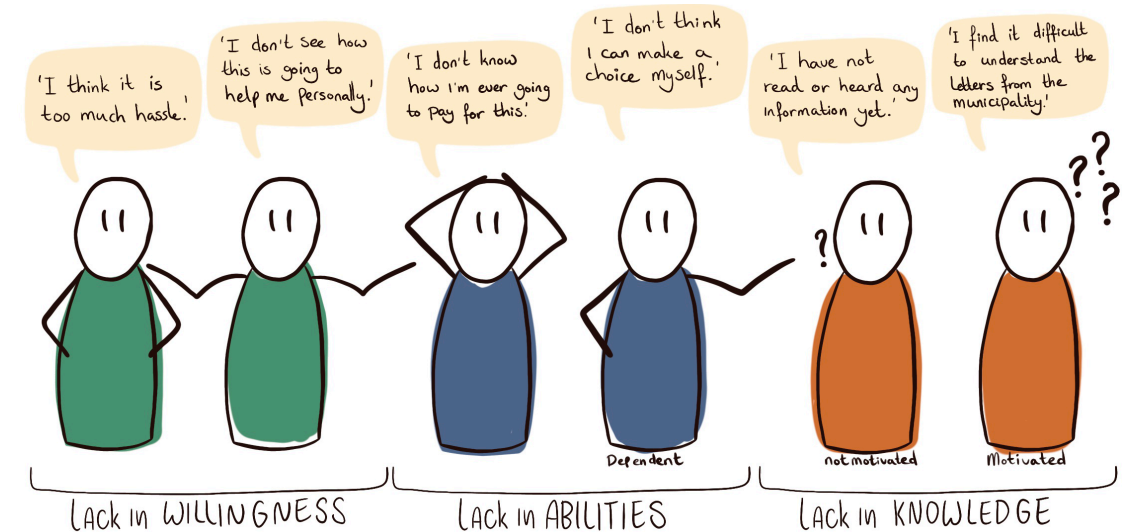

figure 18: The excluded and disadvantaged groups in three categories

A lack of knowledge relates to all groups and people that have difficulty accessing the knowledge about the transition. There are many different reasons why people miss out on information. The most obvious reasons are because people have limitations that make it harder for them to absorb information. For example, people that are low literate, practically educated or do not speak the language. But this group is broader than just these people; there is also a large group of people who have other concerns or are currently have no interest in the subject. Also, people who have not yet been approached by the municipality lack the necessary information.

CONCLUSION

By identifying different excluded or disadvantaged groups, the unusual suspects are mapped out. The identified groups have clear characteristics and can therefore be distinguished from each other. Designers can use generative methods to investigate the underlying needs and motivations of people within these groups. Three underlying lacks have been identified: a lack of knowledge, lack of abilities and a lack of willingness. It seems that people who are not willing to participate in the energy transition can be stimulated in at least one of these areas. This can help Project Reyeroord Aardgasvrij to apply a more targeted strategy to the groups and people they have not yet involved in the topic of the energy transition.

2.5 THE CHALLENGES OF A FAIR TRANSITION

In this chapter, the problem and its challenges were further identified, by examining in detail what an inclusive energy transition means. A common goal has been set up that all parties can work towards. In addition to this definition, the methodology of inclusive design has been investigated in order to be able to suggest a path to this goal. It has been discovered which issues arise in the energy transition in the field of inclusiveness, at different levels, and the excluded or disadvantaged groups in Reyeroord have been identified and described. During this research, various challenges of the design team were identified. These different challenges are explored and explained in the section below.

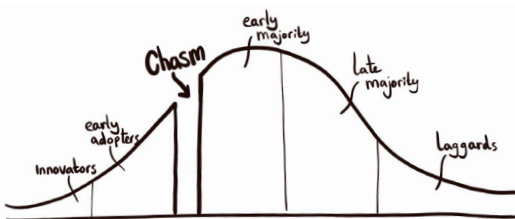### Challenge 1: A limited reach of residents

figure 19: The diffusion of innovation curve. Crossing the chasm.

The first identified challenge is that currently, the reach of the design team is limited. The amount of people reached by the interventions is still low. The aim is to reach enough people to take this topic beyond the so-called 'Chasm' on the

innovation curve (Moore, 1991). With the current approach, only the people on the left side of the chasm are reached; the innovators and the early adopters who are already open to sustainability. A focus on these people alone will not be enough to move beyond the chasm. By focusing on a wider group of people with other motives, the chasm can be overcome. Only then will the Project Reyeroord Aardgasvrij reach enough people to initiate change in the neighbourhood.

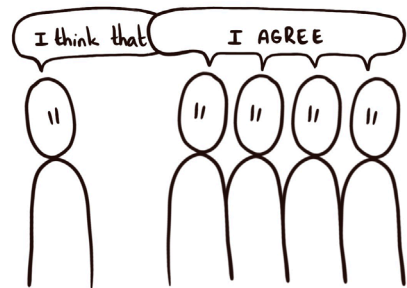### Challenge 2: Little diversity in involvement

figure 20: Lack of diversity leading to limited solutions.

To realise a fair energy transition, a diverse group of people will have to share their perspectives and develop solutions to the transition problem (Pearsall & Anguelovski, 2016). Currently, only a specific group of people attend the meetings organised by the municipality and the design team (Personal communication, 2020). This group often consists of like-minded people from similar cultural groups who feel affiliated with the energy transition. Therefore, these

meetings are not at all diverse in the various human differences and do not come close to representing the diversity of the neighbourhood.

Representation is crucial for building a more diverse participation among residents. If people do not feel represented in society, they are less likely to join it (Cheuk, 2019). As observed in previous meetings, the subculture is mostly theoretically educated and mostly white Dutch citizens. This could lead to a disassociation for people from other cultures who do not recognise themselves as the initiators of climate movements, which then lead to less involvement in the topic or even resistance against devised solutions.

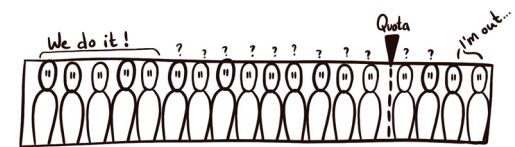### Challenge 3: A pressure to reach the quota

figure 21: Due to the quota pressure, it seems ineffective to reach out to smaller groups.

The municipality wants to reach a high quota of involved residents who want to transition towards residual heat. Only if this quota is reached, the construction activities will start, and the neighbourhood will start its sustainability transition. Of course, this will also lead to positive publicity, proving to other communities the value of a collective

vision and a transition where everyone does what is possible for them. The pressure to achieve this quota makes it difficult to develop interventions for the needs of smaller and marginalised groups. Because it always plays a role that ultimately a large number of residents must be taken along. Although this obstacle is challenging for the designers, this is not a problem that can be solved through this thesis research. The pressure to reach the quota is a given fact that the designers have to work with, within the scope of their assignment. This quota is determined in advance by the municipality and other involved parties. Therefore, this challenge is not a priority in this research.

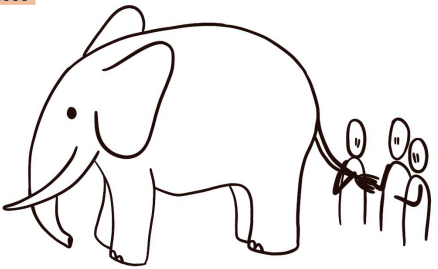### Challenge 4: No diversity within the team

figure 22: The team is only aware of solutions within its discipline.

The group of people involved in the project Reyeroord Aardgasvrij is not a diverse group of experts in terms of discipline, education level and cultural background. The lack of diversity can be considered a problem because it is believed that the best and most practical solutions to challenges

arise through diversity and the following interactions.

It is also beyond the influence of a design student to adjust the diversity of the design team, except appointing its restriction. There are limited resources and a fixed group of people are working within the Project Reyeroord Aardgasvrij.
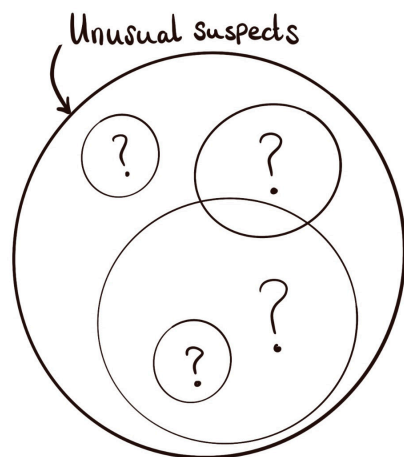
Challenge 5: 'Unusual suspects' are unclear

figure 23: The unusual suspects are multiple unidentified target groups

As mentioned before, it is difficult for the municipality and the design team to achieve broader participation. Part of this is that the municipality currently calls the unreachable people 'unusual suspects'. This means 'the people who are not yet reached, while we are open to it' (Bleijenberg, 2019). For some reason, the municipality is unable to reach and involve this big group.

The problem lies in naming this group 'unusual suspects'. Since this group is called unusual suspects, instead of dividing it into other smaller target groups, it is impossible to locate them. By dividing this large group into smaller groups, the needs and struggles of these different groups can be mapped, so that they are suddenly no longer intangible and so-called 'unusual'.

As discussed in section 2.3, the 'unusual suspects' have been mapped out. This shows that exclusion is not the problem of too many 'unusual suspects', but that it is difficult to involve these groups, keep them involved in the subject and thereby grow in reach and participation.
For this research, therefore the challenge is not who these people are, but how the designers approach and involve these groups.

Challenge 6: The definition and responsibilities for inclusion are not clear

figure 24: The responsibility of inclusion is not defined.

There is a lack of a joint definition between the design team and the municipality for inclusiveness in the energy transition. The municipality envisions that the discontinuation of gas is a process 'everyone can participate in.' (Ontwerpaanpak Reyeroord 2-D-04947-20) and expects that an inclusive transition can be achieved through a design process in collaboration with the design agency Zeewaardig. The service designers use a design process to develop interventions, but this is not necessarily an inclusive process. It seems that the different parties do not have the same vocabulary or meaning for both the energy transition and inclusivity.

From conversations with the municipality and the design team, it stands out that both parties think inclusivity is of high importance to the project, while neither talk about who is responsible for which parts of inclusivity. The municipality points at the design team, saying that 'Designers ensure a human-centred approach.' On the other side of the table, the design team points at the municipality 'surely the municipality will keep an overview of who is reached with the interventions'.

Challenge 7: Inclusion is no urgent task to act upon

It is important to note that although both stakeholders think inclusivity is essential, it is not considered an 'urgent task'. Urgent tasks include everyday tasks that employees
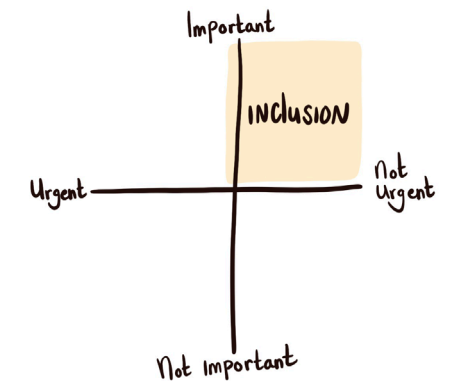
figure 25: Adding inclusion into the project is an important, but not urgent task.

have to do to get their work done. For example, answering emails or delivering deadlines. Non-urgent tasks are tasks like planning a 'teamborrel' or focussing on larger themes that do not directly affect the work, such as inclusivity. Especially the 'important but not urgent' tasks should receive specific and conscious moments. Adding inclusion to the to-do list can be classified as an important, but not urgent tasks, in the Eisenhower matrix as illustrated in figure 25 (Covey, 1994). If these kinds of tasks are left aside for a while, nothing will immediately go wrong. Once these activities are postponed for a longer period of time, there will be no improvements in the long term. Other important but not urgent tasks are, for example, thinking about strategies or improving work processes. By consciously planning time for important, but not urgent tasks, it is possible to create an impact (Pastoor, 2019, p.35).

2.6 DESIGN BRIEF

In section 2.5 the challenges of the design team are discovered. Some challenges are beyond the scope of this research, and as explained in the section above. These challenges will not be part of the solutions to be discussed in this thesis. The below-mentioned challenges I expect to be able to contribute to by this research:

Challenge 1: A limited reach of residents
Challenge 2: Little diversity in involvement
Challenge 5: Approaching excluded and disadvantaged groups
Challenge 6: The definition and responsibilities for inclusion are not clear
Challenge 7: Inclusion is no urgent task to act upon

Problem statement
The challenges can be summarised in the following problem statement:

There is a need to establish a fairer energy transition by enabling designers to create interventions that are more inclusive.

Creating a design goal
The solution direction envisioned for this thesis project is the development of a service design toolkit for the designers of Zeewaardig. Such a toolkit can then help the designers to adopt a more inclusive design process. In design, it's common to use methods and tools that help the designer overcome the complexity of the projects they engage with. For example, designers at IDE in Delft use methods, approaches and methodologies, like the Delft Design Guide, Convivial Toolbox, or IDEO human-centred design toolkit. It is undeniable that toolkits are useful and can help designers to structure their approach in design projects. Inclusivity adds to the complexity of a design project and one can imagine that it would be useful to have some sort of tangible guidance for inclusivity, in the same way as the books and tools mentioned above. By making a toolkit that stimulates inclusivity in the design process, the design team can create more inclusive interventions for Reyeroord.

This leads to the following design goal:

'To design a toolkit that enables service designers to practise a more inclusive design process when designing interventions in Reyeroord for a fairer energy transition.'

Although there is a problem statement and a design goal, the problem cannot be solved immediately. More research is needed to create good ideas for possible solutions. In chapter 3 the problem is divided into several research questions to get a better understanding of the users, toolkits and inclusion.

03 EXPLORATIVE STUDY

Now that the problem has been identified, it is time to investigate how improvements can be made. This chapter explores possible ideas for the problem. To do this, research questions 2 and 3 are answered: How to ensure that the design team will adopt the new approach in their routines? in chapter 3.1 and Which ingredients are essential for an inclusive approach? in chapter 3.2. From these sections it shows that empathy is a recurring component. This topic is further explored in chapter 3.3. Finally, the information is clustered into usable solution spaces in 3.4.
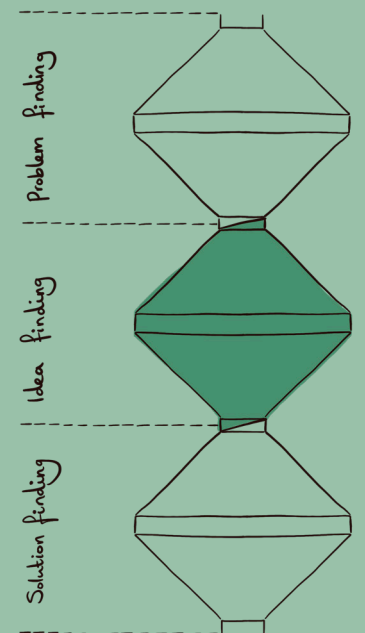
figure 26: The three diamonds approach: Idea finding.

3.1 USER RESEARCH

This section investigates the users of the toolkit, the design team. Examining the design team's working methods is useful because it provides insights into how the toolkit could be used by the team and at what moments. In addition, the designers are given the opportunity to share their needs during the various input sessions. Here the designers have the opportunity to co-design and develop the toolkit, assuring participatory design research.

3.1.1 DESIGN TEAM'S USER JOURNEY

To analyse the working method of the design team, a user journey is made. According to E. Schroeter 'A user journey is a visual representation of the path that users take to reach a specific goal' (2019). Often user journeys are used to review the journey that customers go through when using a specific product or service (Schroeter, 2019). In this case, the user journey of the design team was used to get a better understanding of the design process the designers go through and to see which opportunities, touchpoints or moments there are during this process where the toolkit can intervene.

APPROACH

With the knowledge gained during the internship and observations of the development of future interventions, the design process of the design team could

be analysed. During the analysis, the main question was; What is the design routine of the design team?
To create the user journey, first a timeline was created and the different phases were identified. Then specific tasks (and touchpoints) are identified and which stakeholders are included during the various tasks. Finally, possible opportunities are placed on the timeline.

RESULTS

As mentioned before, the design team is a multidisciplinary team of designers; service designers, interaction designers, innovation designers, an architect and interns, each with other responsibilities and skills and therefore each with a slightly different designing routine.

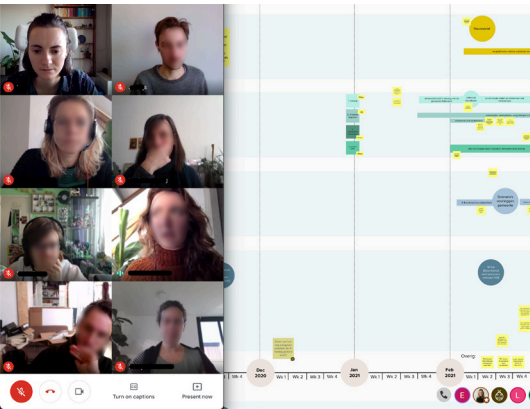The design team's most important tasks are developing interventions in Reyeroord

figure 27: Bi-weekly meeting with the design team of Project Reyeroord Aardgasvrij

that focus on activating the residents in the energy transition. Each intervention is different, focusing on different target groups, areas in the neighbourhood, or different activation aspects. In some parts of the neighbourhood, people do not have to take any action yet, but they only need to be informed about the upcoming changes. In other neighbourhood areas, the residents will soon have to decide if they switch to district heating. Since all these interventions look different, the designers have to adjust the design process for each intervention.

The design team's process can be placed in the double diamond process following the corresponding phases; Discover, define, develop, deliver (Design Council, 2015). The two diamonds represent divergent and convergent thinking in four consecutive phases; Discover, Define, Develop and Deliver, illustrated in the figure 28. Although depicted as a linear process, the process should be seen as a continuous circle, where the end of a Deliver phase often results in a new Discover phase. Specific design activities differ per designer within these phases, but in general terms, there are overlapping activities in each intervention. The results are gathered in figure 29.

The design phases are placed below each other in the image right. At the start of a new design cycle for an intervention,
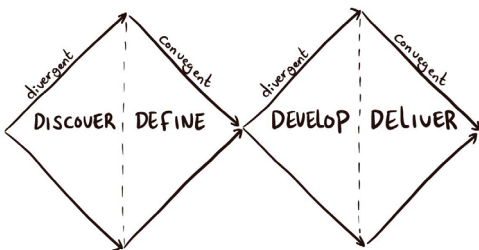
figure 28: Double diamond (Design Council, 2015)

the designers start with discovering the topic, illustrated at the top of the image. A diversity of activities happen before the intervention is completed. These activities are broadly summarised under "Activity". In the first diamond, the activities are different for each intervention. The design team is mainly concerned with researching the new topic and brainstorming about the intervention.
The image shows that the second diamond has a higher frequency of activities. Because the intervention is executed in the Deliver phase, a lot still needs to be done before the deadline. The designers are also responsible for implementing and evaluating the intervention, which makes this the busiest moment in the design cycle.

The coloured figures show which stakeholders are involved in the different activities throughout the process. The design team is involved in all design activities. In contrast, the residents are mainly present at the start and during the execution of the intervention. The

Phase	Residents	Other stakeh.	Municipality	Design team	Activity

Discover
- Discover new topic
- First meeting with stakeholders
- Defining goals

Define
- Define intervention
- Propose intervention to other stakeholders
- Process feedback and suggestions

Develop
- Develop intervention
- Intervention formats
- Feedback stakeholders
- Final version of intervention
- Plan pilot test or prototype

Deliver
- Execute the intervention with stakeholders & residents
- Ask participants for evaluation
- Measure interventions impact
- Analyse results
- Evaluate and discuss results with stakeholder

figure 29: The developed user journey of the designers in project Reyeroord Aardgasvrij.

municipality is always involved in the decision making, but the executive usually remains the design team.

CONCLUSION

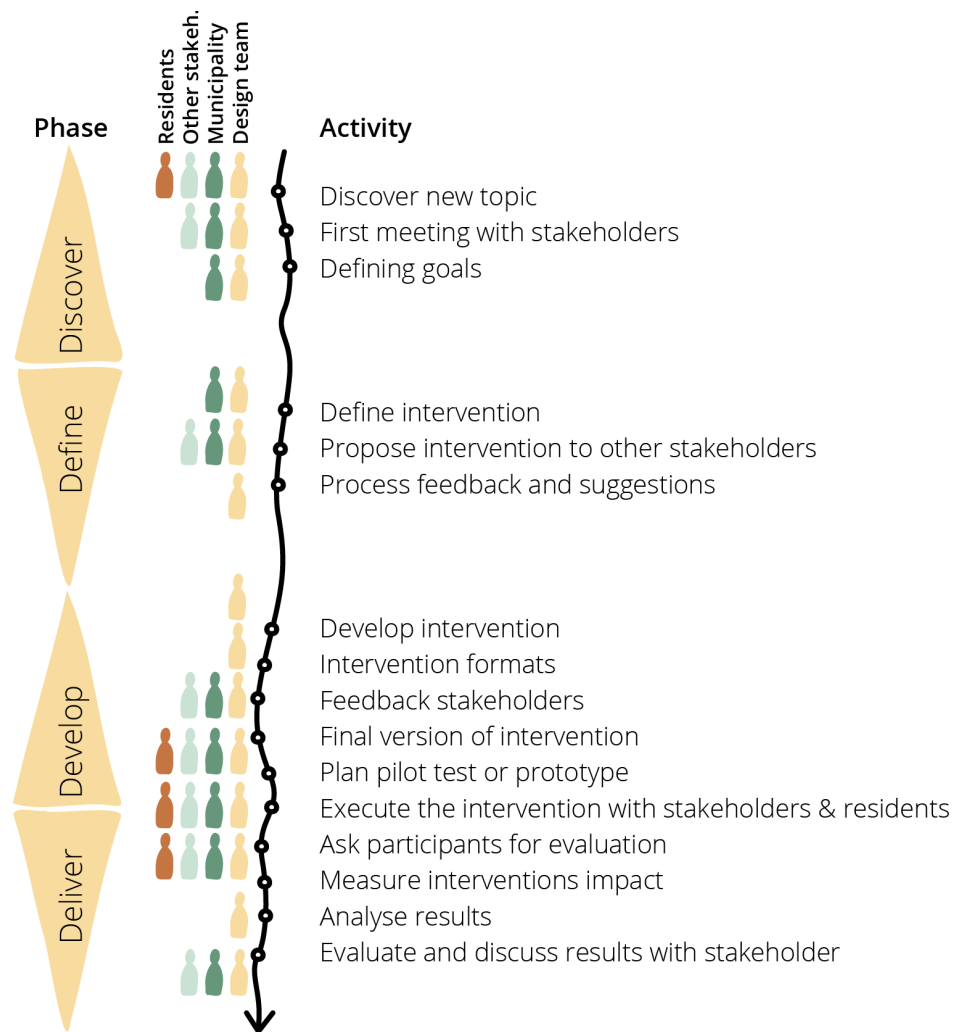The user journey, as illustrated in figure 29, shows that the designers have a large variety in tasks in designing the interventions. The different touchpoints and opportunities are good moments where the toolkit can intervene in different ways. The

different moments at which stakeholders play a role can also be taken into account.

This research provides insight into the behaviour of the design team throughout their process, but it doesn't provide any information about the needs and opinions of the team. This can be solved by involving the team and asking them about the challenges they see. In the next section this is explored.

3.1.2 CO-CREATING WITH THE DESIGN TEAM

In order to investigate how the designers would apply a new approach, it is essential to hear from them what motivations they have to change things and what problems they see in the district. Moreover, it is interesting to establish what the designers expect from a toolkit that helps them with a more inclusive approach. To find answers to this, a participatory approach is applied. In this way, the problems and ideas are conceived in collaboration.

APPROACH

To find answers to the above-mentioned questions, three input sessions were prepared. These sessions took place during the biweekly meeting of the team, where the progress of the project was discussed

among all involved designers. In an input session, the goal was to gain insights from the designers about their opinions, needs or expectations.

In each input session, a topic was first introduced. The designers were asked to share their views on the topic by adding post-its on a MURAL board, shown in image below. Then insights were shared from the research on inclusivity. Each input session lasted about 15 minutes. figure 30 illustrates how the opinions of the design team were collected during an input session. The following questions were asked in the input sessions:
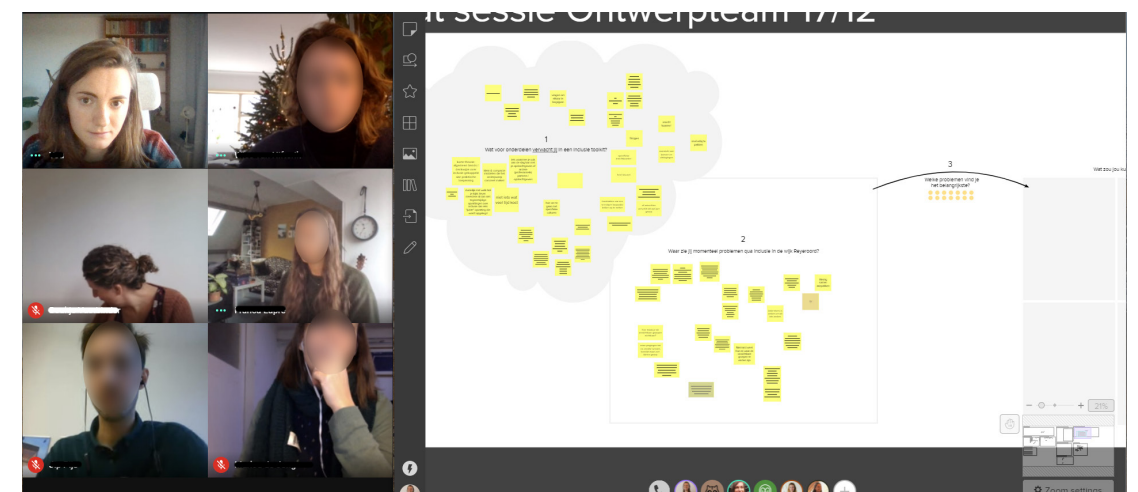

figure 30: The design team sharing their opinion during an input session.

Input session 1
What does an inclusive energy transition mean to you?
Why is inclusion important for you personally?

Input session 2
What do you expect in a toolkit for inclusion?
What problem do you currently see in Reyeroord?

Input session 3
Which excluded groups do you recognise in Reyeroord?
Which groups do you think are most important?

ANALYSIS
The questions asked during the input sessions resulted in many post-its. Afterwards, a process of clustering resulted in various categories. To guarantee a degree of reliability from the results (Sanders & Stappers, 2012), the clustering process was repeated twice on different days, and the outcome was discussed with an outsider. In this way, the clusters resulted in new insights.

RESULTS
Several insights have been obtained from the various clusters. These are explained on the next page.

Requirements for a toolkit
Various ideas referred to the usability of the toolkit; it should not take too much time, visual support and applicable in different situations. The toolkit should be easy to use for designers and supporting their current design process.

There is a need for background information behind the tools. Where do the tools come from, what theories are the tools based on and, for example, an explanation of how to use the toolkit itself.

Getting in contact with residents
There were many ideas about how residents can be approached, such as through games or conversation starters. The designers indicate that it is currently a problem that no one knows where invisible groups are located. Because of COVID, the designers miss out on contact, and it is even more challenging to involve certain groups. As a result, residents' participation is seen as a one-sided information provision instead of a collaboration between different parties.

Diversity in participation
In addition to the challenge of contacting residents, it is also a challenge to address a diverse group. Only a small group of people is reached during the co-creations, and the design team does not currently focus on smaller or vulnerable groups. The diversity within the design team is also limited. Almost everyone is theoretically educated and female.
The design team wants to improve its diversity by offering different options to various groups and learning to deal with other language and culture differences.

niet iets wat veel tijd kost

Heel visueel

korte theorie: algemeen trends / denkwijze over inclusie gekoppeld aan praktische toepassing

Niemand weet hoe en waar de onzichtbare groepen te vinden zijn

weinig bewonersparticipatie / is eenzijdig informerend of gericht op de usual suspects. Corona maakt dat veel moeilijker.

Spel vorm zodat je laagdrempelig gesprekken kan starten

Mogelijke interventies, passend bij verschillende mensen

onze pogingen tot co-creatie sessies bereikt maar een kleine groep

Definition of inclusion between stakeholders
An idea was proposed to develop a tool to involve other stakeholders or the client in the process. This ties in with the problem mentioned above that there is no common understanding of what is meant by inclusion. The municipality has no measurable goals, and therefore inclusion remains abstract.

Enabling empathy
Many suggested ideas can help to empathise with the residents. For example, several empathy tools are mentioned, such as the different thinking hats (De Bono, 2017) or scenario playing. Other ideas suggest getting more insights into the lives, lifestyles and cultures of the residents. A question is raised on how the designers can take all these different groups into account.

CONCLUSION
Together with the designers, several problems were identified. Some of these problems correspond to the previously encountered issues elaborated in chapter 2. One of the biggest issues in the neighbourhood is the participation rate. It is difficult to motivate people to actively be involved. In addition, the designers already provide many useful solutions for some of these problems. The next chapter examines how these elements can become part of a toolkit. The main insights of this chapter are listed on the next page.

Er is geen gezamenlijke opvatting over wat we onder inclusie verstaan.

gemeente noemt het in al haar documenten en de uitvraag van deze opdracht maar niemand stelt doelen / meetbare KPI's Dus het blijft abstract

iets waarmee je ook aan de slag kan met je opdrachtgevers of andere (professionele) partners / opdrachtgevers

eigenlijk zijn er zo veel groepen om rekening mee te houden. Hoe doen we dat zonder tijd & efficiency te verliezen?

verschillende scenario's die je kunt delen, om elkaar te begrijpen

hoe om te gaan met specifieke culturen

MAIN INSIGHTS OF SECTION 3.1

This section explored the needs and motivations of the design team. This information is relevant to take into account to ensure that the toolkit fits the designers design process. The main insights of this section are listed below.

- The roles of each designer are different. The toolkit must take into account that the tools should be usable for all designers.

- The toolkit must take into account that each intervention has a different goal and set-up. The tools must be specific enough to support, but also broad enough to be applicable for different types of interventions.

- The residents are often not included in the design process compared to other stakeholders. The design team would like to involve the residents more, but this is very difficult due to various circumstances, such as COVID-lockdown and difficulty finding residents that are interested in co-design.

- The topic of inclusivity can be discussed with all stakeholders involved to come to a shared understanding and action points. Also the residents can be involved in this process.

- During brainstorming sessions, the design team could focus on smaller groups and consider them the specific target group for one intervention, while other interventions are focussing on other groups.

- Inclusion can be integrated with the entire design process.

- Evaluating inclusivity can become part of the regular evaluations. All stakeholders and residents could be involved in this.

3.2 COMPONENTS FOR AN INCLUSIVE TOOLKIT

Chapter 3.1 has provided insights into the user's needs. But this has yet to be translated into a toolkit. This chapter examines which components are important to create a toolkit that promotes an inclusive approach.

As a designer at IDE, I am trained in coming up with solutions for the direct user; the solution solves the users' problem. In this project it is different, as mentioned earlier in chapter 1.1.2 (meta-levels of design and research). The solution I offer the designers will help them practice a more inclusive approach. That means that I am currently not the product designer, but a tool developer. Before the solution can be found, I must be well aware of this distinct role.

For this reason, firstly it is investigated what a toolkit actually is. What are important parts of a toolkit? The next section focuses on inclusion toolkits, in order to answer the question which components are essential for an inclusive approach.

3.2.1 UNCOVERING THE DESIGN TOOLKIT

Before investigating which parts are relevant for an inclusion toolkit, it is crucial to have a good understanding of what a toolkit means for designers. During a creative session with design students, the various building blocks of a design toolkit are explored. The session intends to gain insights about relevant components of tools and toolkits and to learn about what inspires and motivates people to change their current design process.

APPROACH
Seven graduation students joined the online creative session through ZOOM, using MURAL as a digital whiteboard. Before starting the session, all participants were asked to prepare some initial questions, asking them about recent inspiration or motivations and methods they like to use (figure 31). During the session, these answers were used as input for discussions
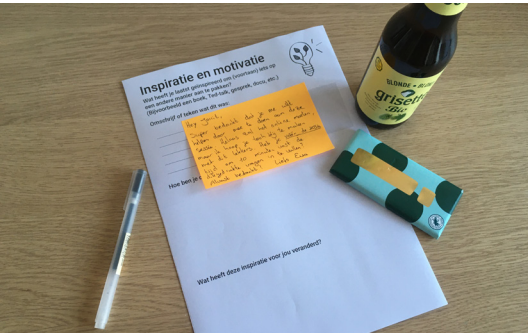

figure 31: Preparation package for creative session participants: Some questions, instructions and something to enjoy.
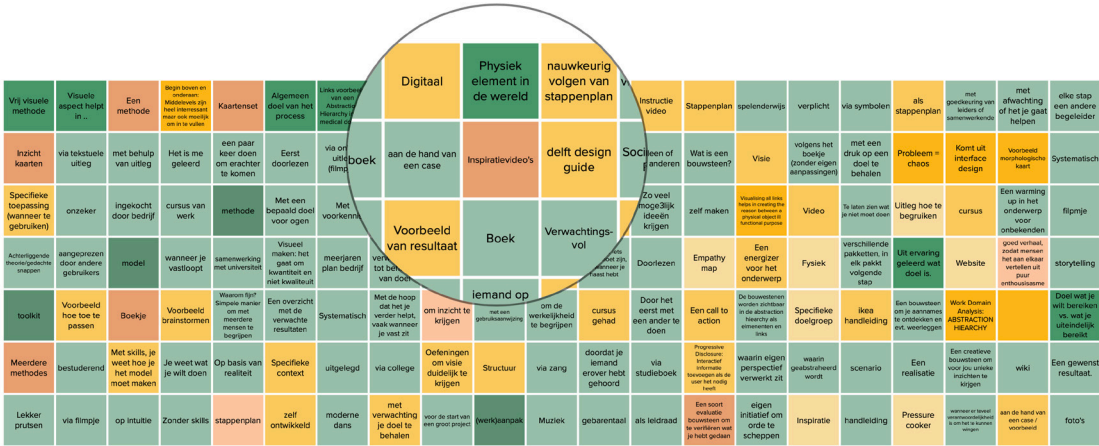

figure 32: Collection of all ideas during creative session, before clustering

between the groups. After that, various parts and questions were used for brainstorming: What is a tool, methods, or approach? What are important elements for a tool developer? How to create a clear understanding of the goal of a method? What are some of the building blocks of an approach? The set up of the creative session can be found in appendix 5.

RESULTS
The session concluded with an abundance of ideas that help create the right components for the toolkit, shown in figure 32. From all ideas, the most promising ideas were selected. Below, some of the ideas are elaborated on.

First time use
The first time use of a tool or method is important, because it makes a first impression. If people don't understand how or why to use it, then they probably won't use it again anytime soon. During the session various ways for a first time use

were shared; through a guided workshop, with a pressure cooker event or example case, by support through videos, and useful tips on how to apply it better in the future.

Digital versus physical tools
During the session, it was found that some participants only used digital tools, while others also liked to have tools that they could apply in a physical way. People interacted differently with both media. For the toolkit it is important to take into account how it is used, for example whether it will be a website or a physical attribute.

Sharing the 'Why'
Several participants felt that some tools or methods they frequently used felt useless. During their college they had been taught methods or tools, but they still don't know why these methods are necessary to do in this specific way. These kinds of tools often feel useless. This can be prevented by explaining why a certain step or method is important.

Being inspired

During the session all participants shared a new method they recently discovered and why this method worked so well for them. After analysing the different motivations and inspirations the participants shared, five principles for inspiration could be abstracted.

- Physical reminders for desired behaviour. For example, a basket in the supermarket selling items with a big discount, so it doesn't get wasted. Reminding people to not waste food.

- Doing activities that seem unrelated. For example, chatting with a friend, and finding solutions that you didn't see before.

- Learning a new skill. For example, learning how to code with Python, and discovering entire new ways of solving problems that can be applied to design as well.

- Seeing a new perspective clearly. For example, listening to a podcast about racism or reading personal stories about racism that provide insights that you didn't see before.

- Experiencing that given advice really works. By taking the advice and really doing something with it, showing you that it really works for you. It is like finally deciding to walk through an open door, that you knew of all that time. For example, finally taking a friend's advice to go to the weekly market, because it is fun and wil save money.

figure 33: Quick drawings of the different ways identified to be inspired.

CONCLUSION

There are different elements to a toolkit, and the tools themselves are only a part of the whole picture. The manual for example, plays an important role because it can help its user to understand the purpose and mindsets behind the tools. Another aspect that should be taken into account is the first use of the toolkit by the user, since a good first experience is essential for future use.

From the user's perspective there are additional needs, since the user wants to know why they are using the tool. Its purpose and mindset should be communicated. The user must be motivated to use the tools. As explored, there are several ways in which people can be inspired to adapt their approach.

3.2.2 INCLUSIVE DESIGN KIT

COMPONENTS

When searching online, there are already a handful of inclusion toolkits to be found. Most of the toolkits are websites, all concerning inclusion in different contexts. In this search, no inclusion toolkits were found in the context of the energy transition, discontinuation of gas in the neighbourhoods or other relevant social issues. Besides inclusion toolkits, various individual inclusion tools were also explored. These individual tools are considered as inspiration but not taken into account in the comparison. Looking at the differences and similarities, relevant elements can be explored to the contexts of this project.

The purpose of this research is to map out what kind of toolkits are already there, how they work, and what is effective and what is not. These insights can then be used to see which elements should be in the inclusion toolkit for the design team.

APPROACH

The toolkits are explored and analysed one-by-one. The global structure and logic of the toolkits are reviewed and the content of the tools, language use and overall appearance. Before starting the analysis, a set of questions is composed, listed below. In total, eight different toolkits have been

reviewed. After each individual review the toolkits are compared in a comparative analysis. In this analysis the similarities and differences are explored. As well as their unique points.

Research questions

- How is the toolkit structured?
- What is the primary purpose of the toolkit?
- For whom is the toolkit developed?
- How does the toolkit provide help to its user?
- Pros and cons about the toolkit?

The toolkits

The toolkits are briefly explained on the next page.
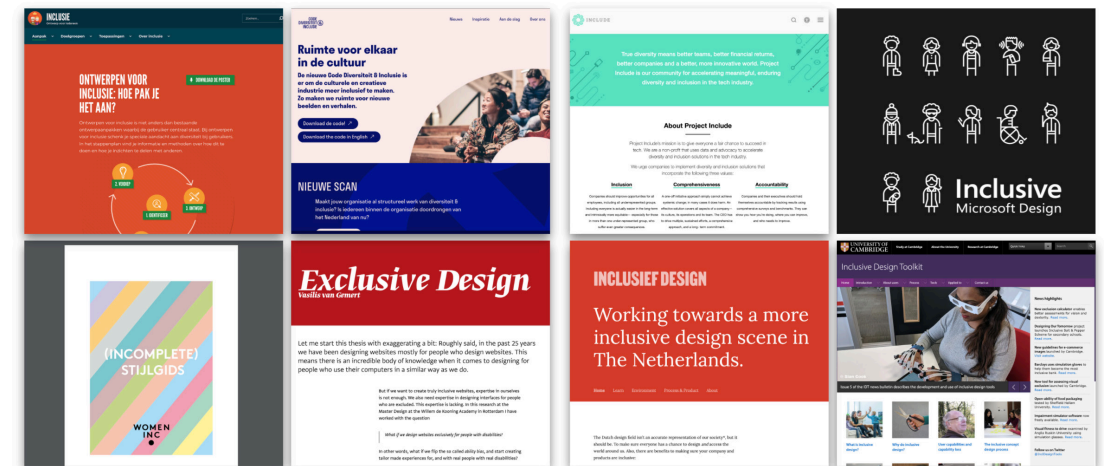
Gebruikercentraal

Target group: all parties that play a role in the development of digital government services.

Purpose: increase awareness about the importance of inclusive design, provide practical support to designers and other stakeholders in inclusive design and stimulate the sharing of experiences with inclusive design (Gebruikercentraal, 2019).

Women Inc. Stijlgids

Target group: for everyone who works at WOMEN Inc. and for everyone who wants to be inclusive in image and writing.

Purpose: to give an example of how gender-equal and inclusive (visual) language can be developed (Women INC, 2019).

Project Include

Target group: The tech industry

Purpose: is to give everyone a fair chance to succeed in tech and to make the workplace more inclusive (Project Include, n.d.).

Inclusief.design

Target group: The Dutch design field

Purpose: Sharing resources from marginalized communities, to read, listen and become more aware (F. Jansen, 2020).

Codedi

Target group: makers, producers or the audience of the cultural sector.

Purpose: to promote diversity and inclusion within the cultural sector. A strong sector that reflects society by telling different stories (Code Diversiteit & Inclusie, 2020).

Exclusive Design

Target group: Website developers

Purpose: the goal is to create websites exclusively for people with a disability (van Gemert, 2019).

Microsoft Inclusive Design Toolkit

Target group: Designers and students

Purpose: improve the design process on inclusion (Shum et al., 2016).

Cambridge Inclusive Design Toolkit

Target group: Students

Purpose: to improve the design process on inclusion (Engineering Design Centre, 2017).

RESULTS

In this section the most relevant similarities between the toolkits are shared. Then unique elements are highlighted. The information is supported by external sources from the toolkits.

Toolkits structures

The first thing that strikes about the online toolkits is that it often consists of an incredible amount of information and text—making it often difficult not to lose yourself in the different steps of the toolkit. Many toolkits have external links to other information sources, this is interesting if readers are looking for more information, but it often makes the structure of the toolkits unclear.

What also emerges from the comparison is that the toolkits often have consecutive steps as a step-by-step plan through which the user is guided. The specific steps are different per toolkit, although several steps are similar in the toolkits. It is striking that Codedi (Code Diversiteit & Inclusie, 2020) and Gebruikercentraal (2019) both more or less follow the steps of a design process, only with an added focus on inclusivity. Women Inc. (2019) is one of the only toolkits without a step-by-step plan. This "style guide" provides practical tips, do's and don'ts about inclusive images and language use.

Mapping exclusion

Four toolkits start with a similar first step, which is examining who are currently excluded in the context. These steps are approached slightly differently but achieve the same goal. These first stages are called "Know where you stand" (Code Diversiteit & Inclusie, 2020), "Recognise exclusion" (Shum et al., 2016), "Identify" (Gebruikercentraal, 2019) and "Study situation" (van Gemert, 2019). This corresponds to the first principle of the inclusive design methodology (Holmes, 2018); "Recognise exclusion". Only after identifying the excluded groups and people for the invested context, can the problem be accepted. By accepting the problem as such, people can start acting on it and move towards more inclusion.

Evaluate

In three toolkits, some kind of evaluation is taken into account (Code Diversiteit & Inclusie, 2020), (Engineering Design Centre, 2017), (Gebruikercentraal, 2019). Codedi and Cambridge propose evaluation meetings with employees or other relevant stakeholders to evaluate internally. Gebruikercentraal has a different approach in which they evaluate with the users, to record findings and recommendations for improvement.

Both approaches to evaluating are impactful to more inclusion. By evaluating and reflecting on the current process,

people within the team can learn from mistakes that were made and find ways to improve. The other approach looks at the process from a distance in order to learn in and possibly adjust the course of future developments. Looking at who is currently involved and for whom adjustments still need to be made. During an evaluation moment, people can look at which groups have currently been reached. And on the other hand which groups are important to involve in the short term or which groups are not yet involved at all. In this way, a solution is slowly being built in which everyone is included.

Prejudices

In two toolkits, discovering prejudices and stereotypes is emphasised (Code Diversiteit & Inclusie, 2020), (Shum et al., 2016). Codedi's toolkit refers to two online tests, the implicit association test by Harvard (Nosek et al., n.d.) and the similar Dutch version 'Onderhuids' (Critical Mass, n.d.). This test shows someone's personal prejudices about the subject's skin color and origin. This by means of various tests and videos. The Microsoft toolkit has several tools that ensure that designers take a step back to 'evolve their assumptions'.

While people like to believe that they are not prone to prejudice and stereotypes, this is the way human brains work; we make associates and generalizations (D. Jansen,

2021). It's important to remember that implicit bias works almost entirely on an unconscious level. While explicit biases are intentional and verifiable, implicit biases are less so.

We cannot become aware of our implicit biases through introspection. But there are two things we can take into account. First of all, we can make it negotiable. Before working together, one can discuss that we are all influenced by unconscious prejudices and agree on how they can address this openly. It is important to emphasise that no one is guilty of making prejudices, it is simply how people work. Secondly, information can be obtained from the outside. By learning more about the situation of the prejudiced person, one can look better from the perspective of another. (F. Jansen, 2021)

Empathy

Empathising is a theme that is regularly featured in the toolkits. In two toolkits, empathy is a specific step in the process (Engineering Design Centre, 2017), (Code Diversiteit & Inclusie, 2020), while in three other toolkits empathy is woven into various parts of the toolkits (Shum et al., 2016), (van Gemert, 2019), (Project Include, n.d.). In the Project Include toolkit, empathising is even accentuated in three different segments.

Empathising and understanding others behaviours and needs is often referred to in the toolkits as well as by the design team. Apparently this is an important part of a more inclusive approach.Many different tools for designers are already available, all of which aim to empower designers with the user. I wonder why this part is so important and how empathy can best be used for a more inclusive approach. To do this, more research will first have to be done into the subject. The insights found are shared in the next section.

Some toolkits have unique aspects. They may provide an advantage over the other toolkits.

Create support
Creating commitment and support is a specific step in the Codedi toolkit. Creating support means "involving the entire organisation in the reflection, the vision, the action plan and the change process"(Code Diversiteit & Inclusie, 2020). Codedi proposes that the subject inclusion should become an item on the agenda during regular meetings.

As mentioned in Chapter 1.1.3, Inclusion is a non urgent, but important task (Covey, 1994). Codedi's toolkit proposes a solution to make people aware of the issues and forces different stakeholders and colleagues to discuss the topic of inclusion on a regular basis. Since Project Reyeroord Aardgasvrij often experiences disagreements on the responsibilities, the ultimate goal or the expectations of the intervention, regularly discussing those topics can help to get a shared vision for more impact.

Start somewhere and make mistakes
Women Inc. gives the readers a valuable tip: 'Don't be afraid to make mistakes: it is better to learn from your mistakes than never to try' (Women INC, 2019). This encouragement is emphasised several times throughout their guide.

Inclusivity is something people should propagate and act on. Inclusivity can be seen as a skill, something people can train in (Holmes, 2018) Once people start training a skill, it is unavoidable that there will be some occasional mistakes. Making mistakes is part of a learning process. The same is true for practising a more inclusive approach. Currently, the first reaction to inclusion is often that people are afraid to say the wrong thing, and therefore stay away from it. According to Holmes, that is not the right approach. (Holmes, 2018) For that reason it is important to practice regularly with challenges or assignments focused on inclusion and to regularly evaluate and reflect on the results.

Educate yourself
The Inclusief.design toolkit is different from the other toolkits, since it doesn't provide a clear structure or roadmap. It is a database with information about inclusion in the broadest sense. "Educate yourself" is an important starting point for this toolkit. The website provides information from different points of view and gives a voice to the marginalized communities. It does so by collecting information and stories created by these groups, since 'it can be hard to find relevant resources' (F. Jansen, 2021).

Giving marginalized groups a voice can be hard, since these groups are smaller and therefore less visible. While for designers hearing other perspectives and opinions can stimulate other ideas and a broader solution scope.

CONCLUSION
The analysis of various toolkits shows the variety of inclusion toolkits available on the internet. By comparing the toolkits, an overview has been created with commonalities and therefore prove important for a more inclusive approach. A number of unique aspects are particularly noticeable because they are recognisable for the challenges of the design team.

Although there is a lot of practical information to be found, no toolkit is directly usable by the design team. First of all, because the toolkits are mainly focused on physical products or digital services. The design team is not creating physical products, but rather focuses on service design solutions and interventions. In addition, the contexts of the toolkits are all different, but cannot be scaled to the context of Reyeroord and the energy transition. Most toolkits also contain a lot of information. As designers, there is not enough time to sift through all this information and external links searching for the useful information. Finally, many of the examples given are about skin colour, ancestry or physical limitations such as people who are blind or people in a wheelchair. For the context of the designers, it seems less important to focus on these specific groups, because these people are not immediately hindered in the energy transition in Reyeroord. Rather, the previously identified excluded groups are interesting for the design team to dive into. The next section concludes the most relevant insights from chapter 3.2

MAIN INSIGHTS OF SECTION 3.2

This chapter examined which components are important, when creating a toolkit that promotes an inclusive approach. Research has been carried out into which parts are important in a toolkit. In addition, different inclusion toolkits were compared to collect key elements for the toolkit in the context of the energy transition. The main insights of this section are listed below.

- In the toolkit, next to explaining the tool's step-by-step approach, the purpose and the mindset are important to communicate as well.

- The first time use of the tools needs careful attention since this experience is essential for future use.

- By inspiring users, they will easily be intrinsically motivated to change their behaviour or design processes.

- Often toolkits contain too much information, which can create a feeling of being lost. By carefully selecting which information can be useful for the users at which time, this can be prevented.

- A step-by-step planning is a good way to structure the toolkit. This is useful to keep an overview as a user of the toolkit.

- Mapping exclusion is the most common part in all toolkits. The excluded groups in the context of this project have already been identified, it is important to communicate this to the design team in an understandable way.

- It is important to schedule time for evaluation. Evaluation provides the opportunity to learn from mistakes, to reflect and to continuously improve the inclusive approach.

- Empathy is also useful for the designers because it brings them closer to the target groups. This subject will be explored in the next section.

- The research appears to explicitly mention that making mistakes is an important part of the inclusive process, because the design process in principle consists largely of making mistakes and improving them, the same goes for inclusion.

- Inclusion is different in every context, the toolkit should fit the context of the energy transition in Reyeroord.

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3.3 DEEP DIVE INTO EMPATHY

Through the insights from the previous sections, it became clear that empathy plays a great role in a more inclusive approach. In this section, research about empathy is presented. By researching the basics of empathy, examining how to use it in the design process and understanding its challenges, empathy can be incorporated in the inclusion toolkit in an efficient way.

3.3.1 TYPES OF EMPATHY
Empathy is the ability to recognise and understand someone else's situation and thoughts and share similar emotions (Merriam-Webster, n.d.). Having empathy helps people understand another's point of view and keep these opinions in mind when making decisions or taking actions.

There are three different types of empathy; emotional, cognitive and compassionate empathy (Shamay-Tsoory et al., 2009). We can start feeling the other's emotion, which is called Emotional Empathy. This happens when people reflect on others emotions as if they were their own emotions. Cognitive empathy is what people do when they are putting themselves in someone else's shoes. This kind of empathy is by thought rather than by feeling and helps to understand someone's personal situation. Once we understand someone's emotions and situation, people might feel 'Compassionate' Empathy. This happens if we feel someone's pain, by understanding the situation and emotions, and try to take action to help.

Designers can ideate good solutions for others problems, by being empathetic. If they open up to be both emotionally and cognitively empathetic, they can then apply Compassionate Empathy to improve the situation for particular groups and people. This last step, showing compassionate empathy, is a valuable skill for designers because it will motivate them to find fitting solutions for human centred challenges.

3.3.2 VARIOUS EXISTING TOOLS AND METHODS
In the toolkit it is useful if the empathic capacity of the designers is stimulated by the tools. It is therefore interesting to investigate what methods and tools already exist. There are various tools from design or psychology backgrounds that enable and stimulate empathy. A selection of these methods are described below. Various tools and methods relate to the different types of empathy. Some have more effect on the emotional part while other methods stimulate cognitive empathy. The insights that someone gets from the different tools and methods can be compared with each other in order to determine which method may be suitable for the toolkit. At the end of this chapter, the tools are sorted in the Say,

Do, Make chart (Sleeswijk Visser et al, 2005) as illustrated in figure 34.

Novel reading: People that read fiction novels are practising their empathy. Fiction is a good way to connect others that people don't meet in their normal life. It provides insight into others' thoughts and feelings in different contexts (Vedantam, 2020).

Watching personal videos of people: Short videos in which people share their personal experiences and feelings, have a similar effect to reading books. Such as the video's of Humans of New York, in which people answer intimate questions while looking straight into the camera. By watching videos, we get to know people we would never have met otherwise. In addition, a video helps you empathize because you can literally read the other person's emotions from their face.

Acting and role-playing: Actors are good at empathizing with others, because they literally put themselves in the shoes of someone else (Vedantam, 2020). Even as a non-professional actor, role-playing can help to understand another person's opinion. For this reason, role-playing is also regularly used in creative sessions.

The Empathy Map is a tool that helps to understand the user's needs while developing a deeper understanding of the

person that is being designed for (Dam & Siang, 2020). The empathy map helps to answer four areas related to the thoughts, feelings, actions and statements from the target group or person.

Conducting interviews can be useful for understanding the users perceptions, opinions, motivations and behaviour concerning the context or product (Boeijen et al., 2014, p.47). This method can help to understand explicit knowledge from the users, while tacit and latent knowledge requires a generative approach.

Probes for Storytelling are tools that help designers to gather deeper information. According to Boeijen and Zijlstra, 'the deeper meaning relating to what users think and believe is elicited through triangulation, in which a certain phenomenon is studied in different ways'. (2020, p.117) For gathering these stories, certain triggers, called probes, are used to support people to tell a story supported by visual and tangible elements. These storytelling probes can take different forms like workbooks, photo's, cards, prototypes or games.

Context mapping is a systematic method in which designers collect rich data through qualitative research from the intended end-users (B.-N. Sanders & Stappers, 2014). Supported by generative tools and a step-by-step approach, the participants share

latent knowledge. This method consists of several steps that take about two weeks up to 6 months.

CONCLUSION
In the figure 34 an expected level of knowledge per tool and method is presented. The results are an interpretation of the analysed methods and tools. In addition, the time invested in each tool also varies.

Ideally, a tool would create a deep level of knowledge (latent) while also not demanding too much time from the user of the tool. It seems that the tools and methods that take more time can also discover a deeper level of knowledge. Despite the fact that this deep knowledge is favourable, it seems that the level of Tacit knowledge can give the designers enough

knowledge of local residents. A tool can therefore be developed in the toolkit that responds to this level of knowledge.

3.3.3 EMPATHY PITFALLS
Although empathy is an excellent way to empathise with others, there are also several pitfalls that should be taken into account.

The short-term pitfall
When we feel empathy towards others and seek solutions. These solutions are often short term solutions that might not benefit the bigger society or longer term. For example, if a kid is crying, we want to make it happy and maybe give them some candy, but this will not be beneficial in the long run. This shows the limits of human capacity, explains Paul Bloom. He says empathy is also the reason we do so little about climate
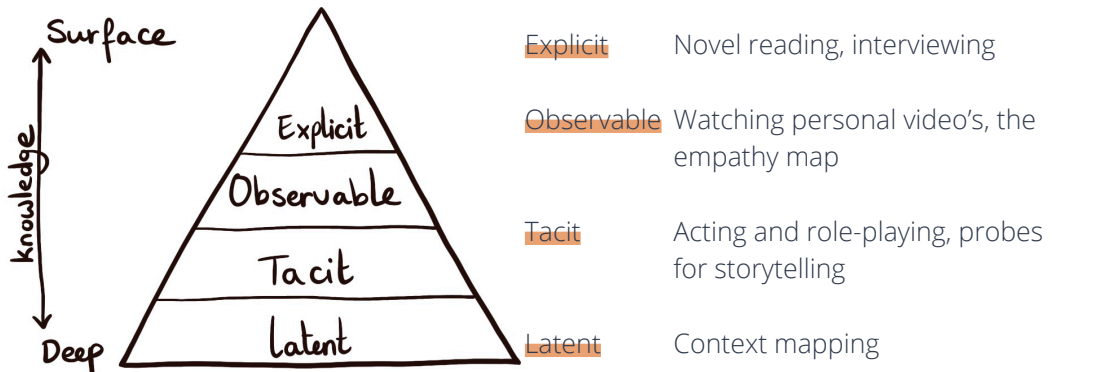
figure 34: Various design activities classified into the different levels of knowledge.

Explicit	Novel reading, interviewing
Observable	Watching personal video's, the empathy map
Tacit	Acting and role-playing, probes for storytelling
Latent	Context mapping

change. The environment and the earth is not a person, so you cannot put yourself in her shoes. Environmental change is a slow process that really stirs no one's empathy, and as a result people often talk about more pressing topics that we can better remember (Bloom, 2018).

The individual-above-group pitfall
It is easier to empathise with one person than with a group. Reading stories in the news about the many immigrants that suffer does not trigger as much empathy as a picture of a tragically washed ashore child of a refugee (Pen, 2017). The suffering of one person affects us more than the suffering of entire tribes, or the suffering of the entire planet.

In a study by J Schroeder (2018), participants listen to or read a political opinion. It turns out that the participants who listened were less likely to dehumanize the individual. It seems that we are less able to show empathy once an extra medium, such as written text, is included.

Cognitive psychology also explains the difficulty people can have when trying to empathise with a marginalized group. The implicit bias called group attribution error explains that people tend to assume that the characteristics of an individual reflect the characteristics of an entire group. This effect is enhanced in groups with which

people have little personal contact. Then it is more difficult to view something from a different perspective, and generalization takes place more quickly. (Jansen, 2021)

The tribalism pitfall
People tend to care more about people that are part of their group, their tribe. This phenomenon is called tribalism (Vedantam, 2020). The closer this group feeling is, the less caring we are towards outsiders. This is a response to protect our group. Paul Bloom (2018) explains that 'we feel more empathy for people in our own social group: people who look like us, people who are very handsome, or young children. So our empathy is very biased.' In cognitive psychology this bias is called In-Group favouritism (Benson, n.d.).
Therefore people (and especially designers) have to be aware of the groups we are empathising with, and open ourselves up to other cultures, political views or radical ideas.

This chapter aimed to discover how designers can apply empathy to design more inclusively. Empathy is an essential skill that can be used in a positive way when working on a more inclusive approach. The main insights are listed below:

- For designers, compassionate empathy is what can give the best results. For this, they need to be aware of the residents personal situation as well as their emotions on the subject.

- Empathy is woven into many tools that designers already use, so during the upcoming iterative process it is important to find out what kind of tool best helps to enable an inclusive approach.

- It is important for the design team to collect as deep information as possible in the shortest possible time. role-playing and problems for storytelling are well suited for this.

- It is important that designers are aware of the challenges and how empathy influences humans.

3.4 SOLUTION SPACES

Previously research clarified a lot of questions and assumptions about what the design team needs as well as showing insights into what aspects are most crucial in inclusive toolkits. All this research should provide the right information to start designing a toolkit. However, a few questions remain, namely where to start the design of the toolkit, how to figure out what the tools should be, and how to come up with their placement within the design process of the team?
Since all information gathered makes it difficult to keep a clear overview, a reverging analysis and converging selection are used to provide the knowledge to further develop the toolkit.

The reverging and converging process at this point of the project, ensured that the data and information found could be interpreted. By analysing this data and information, it was possible to search for patterns and general findings to a broader scope to support the conclusions. (Ackoff, 1989)

APPROACH
To start, All results, insights, ideas and opportunities from previous research were gathered on post-its, as shown in figure 35. The clustering process is usually done by a team or together with participants that are part of the brainstorming process. Clustering with multiple people ensures that

figure 35: The various stages of reverging and converging process.

there can be new insights since everyone is connecting things in a slightly different way (Heijne & van der Meer, 2019). To imitate a similar process during the COVID lockdown, multiple clustering sessions took place. Forcing myself to find new connections beyond the initial ideas. After two rounds of clustering, a fellow student was invited to discuss the outcome. Inviting an outsider's perspective into the process and results helped to have one more opportunity for a broader view. This resulted in an exciting discussion. At the end of the discussion, eight solution spaces were identified. Because there was so much data and information that all had to be clustered, this was a long process that took several days.

RESULTS
During an input session with the design team, the solution spaces were presented to the design team. Each solution space was considered helpful to the design team. The eight solution spaces are explained below. The full process of the development of the solution spaces is provided in appendix 6. The appendix also contains the key insights that lead to the various solution spaces.

3.4.1 SOLUTION SPACES EXPLAINED

Solution space 1: Providing background information about inclusion

Inclusion is a complex topic. Depending on the context, other factors might play a role. This is certainly the case in the energy transition. Having a basic understanding of what inclusion means in the energy transition will help the team to pay attention to the groups that are being excluded. When they know what is important it is easier to pay attention to it. Also, the mindset should move from a traditional understanding of the term inclusion to a more dynamic understanding. In this new understanding not only disabled people should be integrated, but there should be a focus on all excluded groups in the context of the energy transition. By providing background information they can understand.

Solution space 2: A conversation guide to discuss inclusion with the client

Inclusivity is important to all parties, but currently the responsibilities and expectations are not discussed. Every intervention is different and has a different goal on its own. By discussing specific inclusion factors, the expectations from the intervention become clearer and can be acted upon by the different parties involved. If the team could have an open conversation with the client about the expectations, they can set goals, and decide who is taking which responsibility.
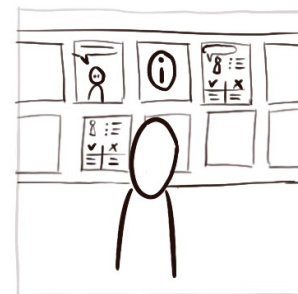
Solution space 3: Providing insights on marginal target groups

The design team is eager to learn more about marginal groups. By learning more about them, they can use this knowledge to design fitting interventions. Knowing more about marginal groups is important for the design team to be able to take these groups into account. By having some information it is easier to empathise with other people instead of falling into prejudices.
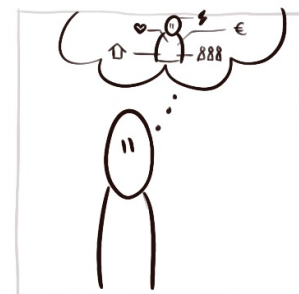
Solution space 4: Empathize with marginal groups

An empathy tool can help the team to step into the shoes of marginal groups. This will increase their motivation to include these people in the transition. By understanding their struggles it is easier to find solutions. Creating empathy is a great way to look beyond stereotypical persona's and prejudices. By showing empathy you are already more open towards others, which makes it easier to include other groups as well.
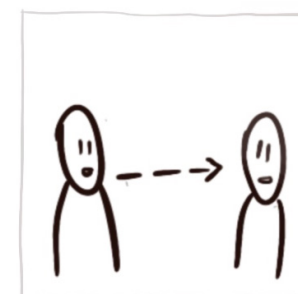
Solution space 5: Approaching methods to reach a diversity of residents in Reyeroord

The team can have great ideas on interventions for residents, but they have to approach and reach these residents before they can even start with these interventions, this is a challenge currently. Reaching more people will always make it more inclusive in the end.

Solution space 6: A conversation starter to introduce the topic of energy transition

Once the residents are approached, the designers need to identify the resident, convince them to stay in contact, explain the energy transition, while executing the designed intervention. How to make sure not to forget one of these things? Besides, the energy transition is a complex topic that many residents are not very enthusiastic about.

Solution space 7: A reminder to design inclusively

There are many things to keep in mind while designing interventions. Multiple stakeholders all have their wishes and demands. As designers, it is easy to lose sight of inclusion while having the best intentions. Being reminded of designing inclusively while designing interventions, helps the designer not to lose sight of the importance of inclusivity. Small reminders can nudge designers in subtle ways. A tool could serve as a tangible reminder and provide structure to act inclusive.

Solution space 8: An evaluation of the inclusiveness of an intervention

Becoming inclusive doesn't happen in one go, it takes time and is a longer process. It takes time to evaluate and improve and it is okay to make mistakes at the start. As long as the team can learn from them. By reflecting on the topic the team can improve their inclusivity as they go. By pinpointing what is missing, the team can improve themselves as well as the process. This can be done either during the design process of an intervention or at the end of a design cycle. Since the team is already evaluating using a retrospective, this evaluation can be implemented with little effort, while potentially having a lot of impact.

The basis of the toolkit

The solution spaces discovered during the analysis can be placed in the design process of the design team, this is illustrated in figure 36. The solution spaces are general enough to be applicable for the development of different interventions. While they hold enough information to improve inclusivity for the design team.

In the next chapter the solution spaces are a starting point for the iterative design process. This process leads to the development of the inclusion toolkit.
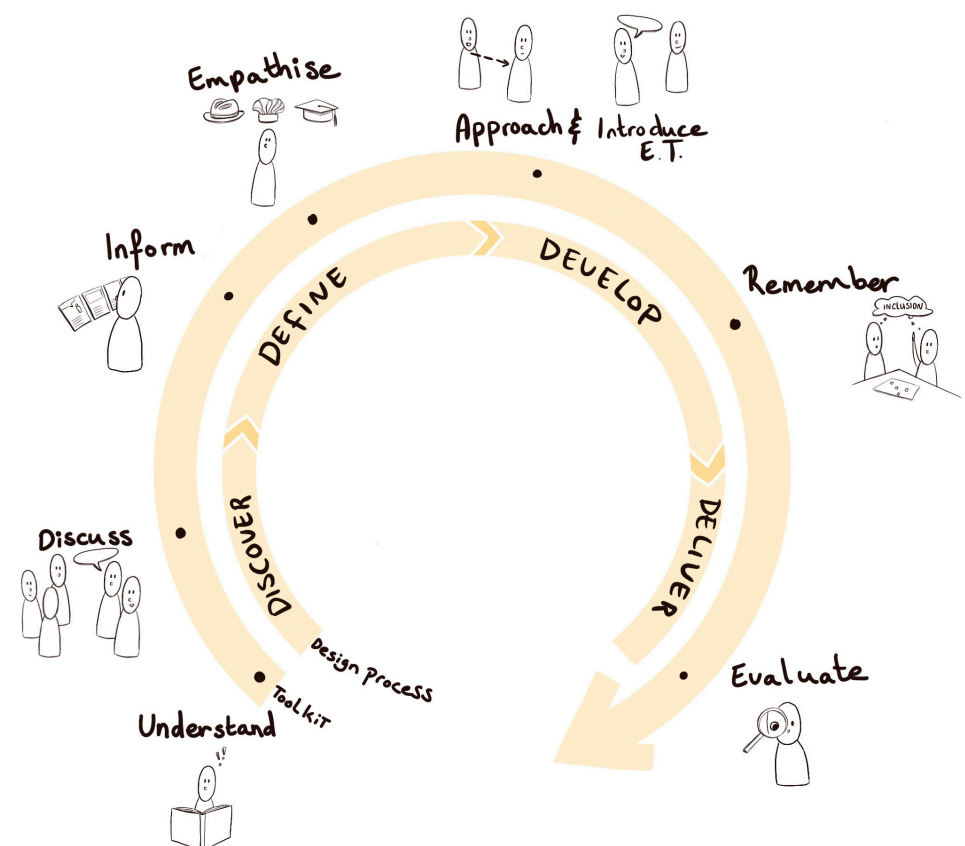
figure 36: The various solution spaces are being places in the design process of the design team. This reveals that the solutions are covering all phases of designing interventions.

3.5 THE DESIGN CHALLENGES

In the solution spaces, many different goals are coming together in clusters. The solution spaces are a simplified version of many different requirements combined. The table 1 lists the various design challenges per solution space. All design challenges emerge from the research and insights gathered before. This list ultimately works as a list of requirements to test the toolkit, once developed.

table 1: Collection of all requirements for the tool, divided into the different solution spaces.

Solution space	Requirement for the toolkit
Understand	Before getting started with the tools, it is important that designers understand what inclusive design is.
Understand	To be able to improve the current approach, designers need to be aware of the excluded groups.
Understand	Designers need to be aware that by improving for a specific target group, the solution also improves for other people.
Understand	The designers need to be aware that it is not possible to design for everyone. There is a difference between the target group and the groups reached.
Discuss	As a non-urgent but important task, inclusion needs to be put on the agenda of all stakeholders involved to create an impact.
Discuss	The tool needs to help make decisions about inclusion and support the allocation of tasks. Because if inclusion is everyone's responsibility, no one will take the responsibility.
Discuss	The designers and the municipality need guidance in dividing tasks about inclusion.
Discuss	The tool needs to guide to create concrete action points from the often vague and abstract topic of inclusion
Discuss	The tool needs to support the stakeholders to consciously express expectations, to make sure that everyone is on the same page.
Empathise	The empathy tool should be an addition to the already existing empathy tools.
Empathise	The tools should nudge designers to compassionate empathy, to ensure that the designers are motivated to take action and improve the situation of the residents.
Empathise	By speaking one-on-one you can empathize and understand better than when you hear data about an entire group.
Empathise	The tool should invite the designers to speak to people since this helps to look beyond prejudices and assumptions.vv
Approach	The tool should make it easier to approach residents in Reyeroord.
Introduce	The tool should make it easier to introduce the complex topic of the energy transition to residents.
Inform	The tool should provide the design team with in-depth information about different target groups.
Inform	The in-depth information should help the designers to empathise.
Inform	The in-depth information should help the designers to find possible starting points for solutions.
Remember	The tool should invite the designers to regularly practise with inclusivity as a skill.
Remember	The tool should remind designers of the importance of an inclusive design process.
Remember	The designers should be reminded that by solving problems for a specific target group, they also improve the solution for others.
Remember	The designers need to be reminded of the basic principles of the Persona spectrum.
Evaluate	The designers have to be stimulated to practise and try, and even make mistakes. Because learning from mistakes makes it possible to improve.
Evaluate	The designers need to be supported in keeping track of which groups are approached and involved and which groups are not yet.
Evaluate	The designers need to be supported in evaluating in collaboration with all other stakeholders to be able to improve to a more inclusive approach in upcoming interventions.
Evaluate	The tool should support the designers to decide on which specific target group to focus on in future interventions.
Toolkit as a whole	The tools should be able to be used independently of each other, depending on the intervention.
Toolkit as a whole	The tools must be generic enough to be applicable for all interventions, while still adding value.
Toolkit as a whole	The toolkit should not take more time than currently available by the designers.
Toolkit as a whole	The toolkit should include examples and clear explanations on how to use each tool.
Toolkit as a whole	The tools and toolkit should be visual.

04 DESIGN OF AN INCLUSIVE TOOLKIT

In this chapter, the solution is explored and developed into a toolkit. The developments are presented before the final design is discussed. The toolkit is validated with its users in section 4.3. With this, the aim is to answer the final research question: Can the inclusion toolkit facilitate the design team to practise a more inclusive approach?
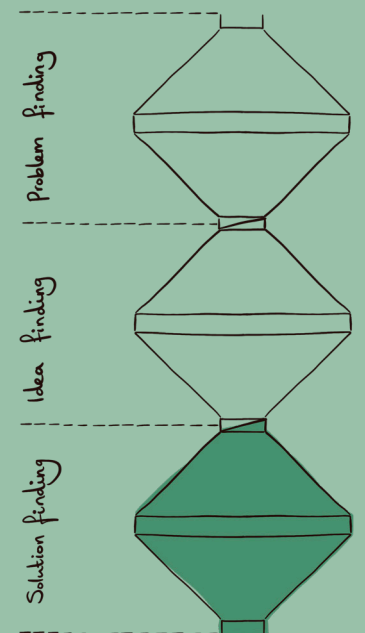
figure 37: The three diamonds approach: Solution finding.

4.1 DEVELOPMENT OF THE TOOLKIT

The framework's solution spaces, developed in chapter 3, are still abstract and do not provide enough guidance for designers to create impact. Nevertheless, the solution spaces are a good starting point for an iterative design process. In the iterative design process, questions and assumptions are validated in quick sprints and adjusted accordingly. The insights gathered are based on the experiences of the participants taking part in iterative testing. For this reason, all tests are done with designers, either students or junior designers from the IDE faculty or professional designers at Zeewaardig.
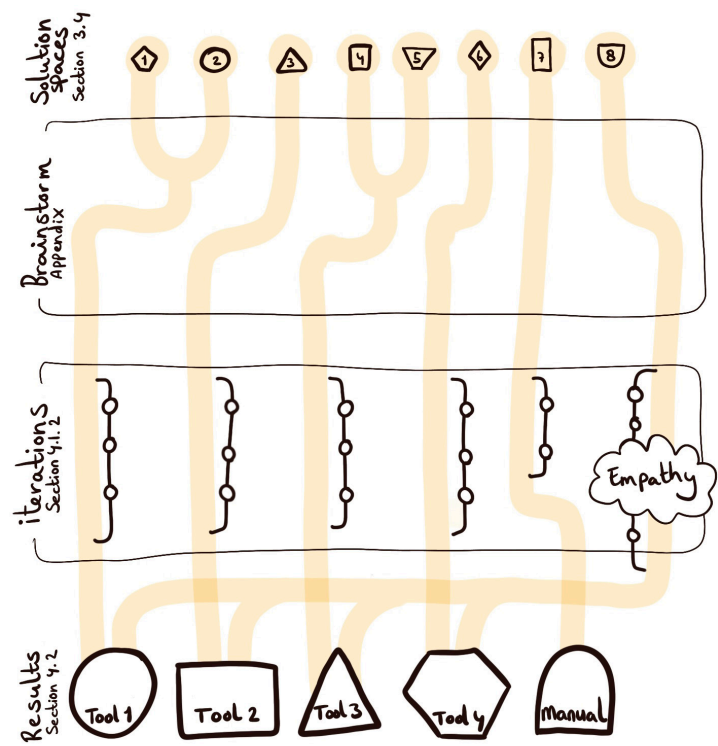

figure 38: The various routes that lead from the solution spaces to the final results. In the next section each iteration is elaborated.

OVERVIEW
This section focuses on the development of the tools from the design challenges of the solution spaces. figure 38 shows an overview of the development of the toolkit. The solution spaces with the associated design challenges were worked out during a brainstorming session and in some cases merged, as shown in the image. Then the iterative process started, in which many different tests were performed. In section 4.1.2 the development is discussed in detail for each path. These developments ultimately form the various tools as described in chapter 4.2.

Before all else, the methodology of the iterative process is explained in more detail in section 4.1.1. The various design activities are described. In section 4.1.2 the paths from the solution space to the result are described in detail and the most important design choices are explained.

4.1.1 METHODOLOGY
The iterative design process is a process where different design activities validate the evolving ideas. Various design activities include activities like brainstorming, MVP testing, Co-create sessions, filling knowledge gaps and preliminary concept testing. The various activities result in insights from multiple perspectives. The design activities are briefly outlined below prior to the detailed developments in section 4.1.2.

Brainstorming
The goal of the initial brainstorming was to explore the variety of directions and ideas that would support the solution spaces. The primary method used for this brainstorm was How-To's (Heijne & van der Meer, 2019 pp.100-103). How-To's are questions asked to participants
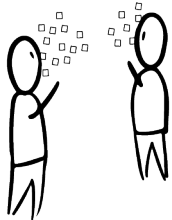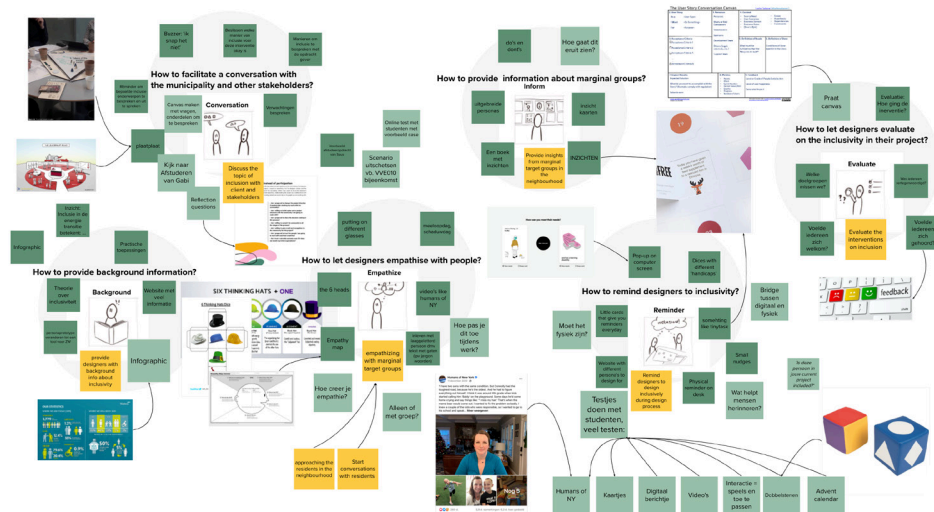
figure 39: The output of the brainstorm means the start of the iterative design process.

to get different perspectives on a problem in a broad spectrum of ideas and perspectives. During this brainstorm, four students were asked to write down as many ideas as they could. Answering the questions 'Which different tools can reach the goals of the solution spaces?' and 'How can these ideas be validated or rejected by running small tests?' The ideas generated in the brainstorm provided enough inspiration to initiate the iterative design process. The result of the brainstorm was gathered on a MURAL board (see figure 39). The brainstorming set-up can be found in appendix 7.

Activity: MVP tests
The Minimal Viable Product (MVP) tests aimed to use many small prototypes to investigate which triggers had the right effect. A total of 6 experiments were performed over three days. The various experiments tested which prototypes generate empathy and how users can be reminded to perform specific tasks. After the participants had completed the experiments, individual interviews were conducted to determine what had the most effect. The responses of the
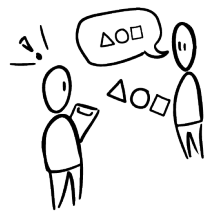
participants were later analysed into insights. An in-depth research plan of the MVP tests can be found in appendix 8.

Activity: Co-create session
During three co-creation sessions, prototypes of the tools that were not yet finished were further developed together with the users. The purpose of the co-creations was to think about what the tools will look like jointly. By involving the users in this process, it is expected that the final concept becomes better suited to this target group. The co-create sessions had the form of creative sessions. The end-users were facilitated to share their perspectives on specific topics and were encouraged to share new ideas using post-its. The set-up for the co-creation sessions can be found in appendix 9A-B and appendix 10.

Activity: Preliminary concept testing
The goal of the preliminary concept testing was to test the first versions of concepts with the end-users to gain insights into the usability of the tool. Most tools from the toolkit had preliminary concept testing. It involved the creation of prototypes to test with Zeewaardig and going to Reyeroord to test with residents. During the tests, feedback was asked from the users. The set-up of the preliminary concept tests can be found in appendix 11, 12, 13 and appendix 14. These results helped to improve the tools to the final versions presented in chapter 4.2.
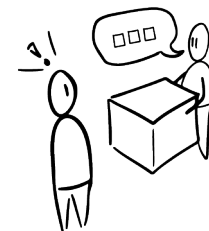
Activity: Filling in the knowledge gaps
Some of the assumptions needed more desk research into the topic to fill in the knowledge gaps. Research from literature and internet research provided more information that would later be utilised to develop the tools.

4.1.2 DETAILED DEVELOPMENTS

In this section, the development of each solution space into the final tools are presented in the six different overviews. The overview contains the main insights and most significant decisions that led to the final toolkit, presented in timelines. During the iterative design process the different paths were intertwined. For the readability of this section, the paths are untangled and explained per individual path. At the end of the upcoming six paths, all information about the development of the tools is explained, after which the inclusion toolkit, the final concept of the project, is presented.

A tool for discussing and evaluating

After the brainstorm session, it made sense to combine the two solution spaces Discuss and Evaluate, since both spaces include other stakeholders besides the designers. It made sense to make just one tool that would involve the municipality as an indirect user. In this way, the designers only have to explain one tool and share it with the municipality and other stakeholders.

During the brainstorm, overlapping ideas popped up to create a canvas that would guide the meeting and conversation about inclusion. Hence the first idea that would be used to iterate on were two canvases; one for discussing and one for evaluating.

The canvasses improved throughout several iterations, including two co-create sessions (Appendix 9 A-B), as shown on the right. The co-creations helped to scope down the topics on the canvases, and the canvas elements were tested during the role-playing. The session with Zeewaardig resulted in a more concrete canvas in the sense that it became more customised to the end-users.

The last step was to improve the overall appearance and add visual support guiding the user through the steps. The infographic in figure 40 shows a timeline of the design activities and their main insights. The final concept of the Canvas is presented in chapter 4.2.

Solution spaces:
Discuss & Evaluate

Brainstorm session
How to facilitate a conversation with the municipality and other stakeholders?
→ Reflection questions
→ Canvas

How to let designers evaluate on the inclusivity in their project?
→ Praatplaat
→ Questionnaire

Discuss and Evaluate can be combined to make one tool, because they both involve other stakeholders.

Co-creation Session with students
The canvas was improved through role-playing and co-creation. The main insights:
→ Target groups are an important element and need a distinct section on the canvas.
→ Adding a link to current intervention aspects helps the designers to scope.
→ The designers can prepare part of the canvas before the meeting starts.
→ Make use of existing design methods to improve usability:
  → How-To
  → WWWWWH

Co-creation Session with Zeewaardig
A run-through and co-creation with two designers from Zeewaardig. The main insights:
→ Empathise the most important elements, remove any unnecessary parts.
→ Providing examples and explanations in each step makes it easier to use.
→ The most valuable elements for de designers are the target groups, reflective questions and individual goals.
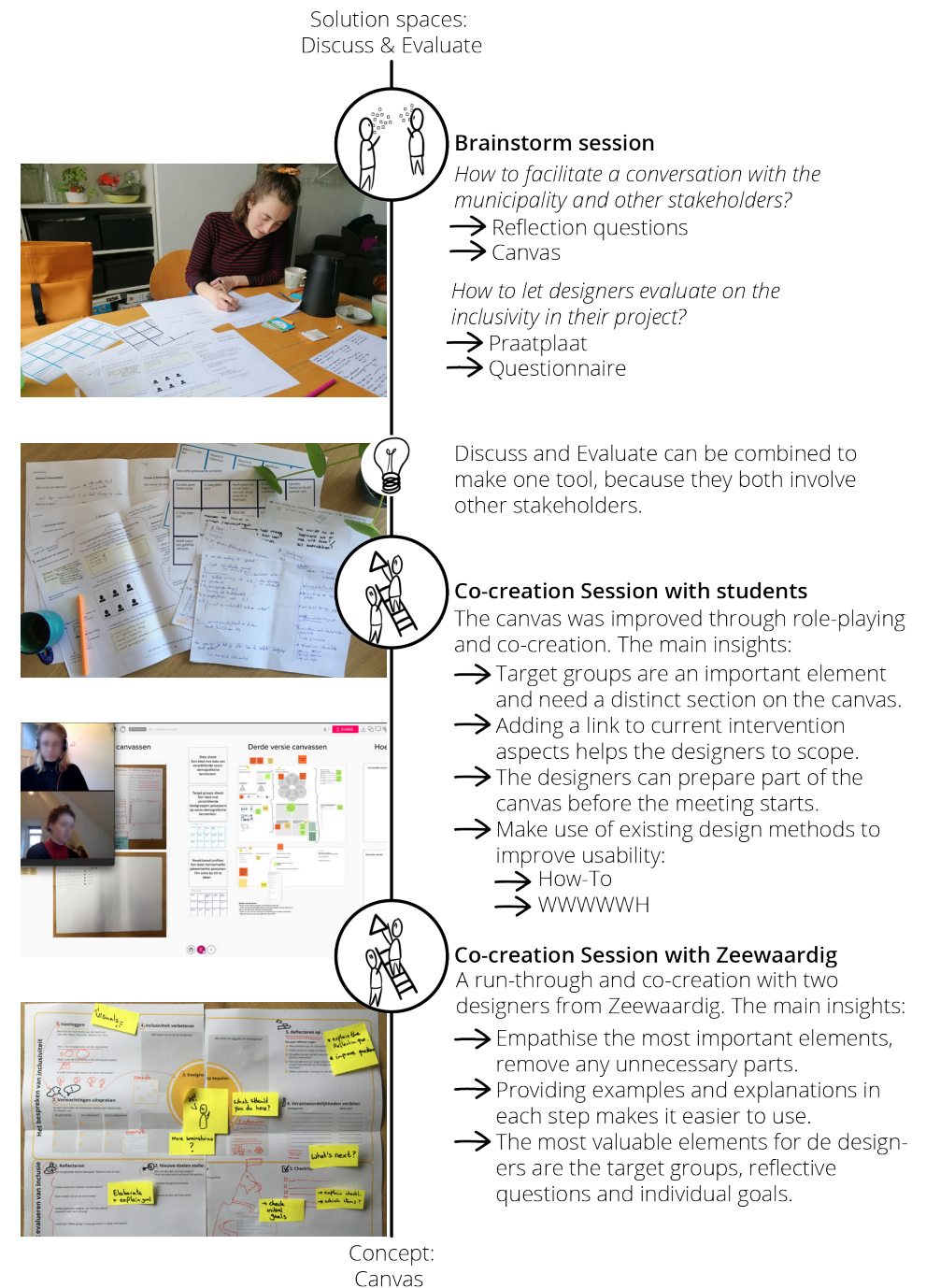
Concept:
Canvas

figure 40: The process of developing the solution spaces 'Discuss' and 'Evaluate' into the Canvas tool. The left shows images of the design process, the right provides the main insights.

A tool for informing

It is difficult for the designers and the municipality to collect information about the groups that are difficult to reach. The solution space "Inform" describes the need to inform designers about the excluded groups in Reyeroord.

Before informing is possible, the excluded groups needed to be identified, studied and understood. It turned out that there was an abundance of conflicting information. For example, various sources provide other information about the percentage of renters living in the area. The problem appeared to be in the large quantity of available information, not the lack thereof as assumed earlier.

Therefore, the challenge of this tool was to limit the extensive information to what matters most and communicate this information with the designers. For designers, the essential information was group sizes and how to account for these people. A first version of the cards was developed with these insights.

During the co-creation (appendix 10) the cards were improved by expanding their usability to multiple moments in the design process. Insight cards turned out to work well for this because they have two sides. The most important information can then be shared on the front, while more in-depth information can be found on the back. The above-mentioned steps are visualised in the infographic, in figure 41. The final concept of the insight cards is presented in chapter 4.2.

Solution space:
Inform

Identify the excluded groups
Through desk research, interviews with Zeewaardig and municipality of Rotterdam.

Brainstorm session
How to provide information about marginal groups?

Research group sizes and information
Literature and internet research to find information about the excluded groups. Data processing to discover group sizes per group.

The information can be captured in information cards, providing a summary of the most important information for designers.

Co-creation Session with Marlou
Discussing and deciding on the most imporant elements for the cards. The main insights:
→ Some disadvantaged groups overlapped with each other. Redifining the groups to remove any ambiguity.
→ Adding clear action points for designers to make the cards useful during the design process.
→ Add links to more information and video's that help designers to empathise.
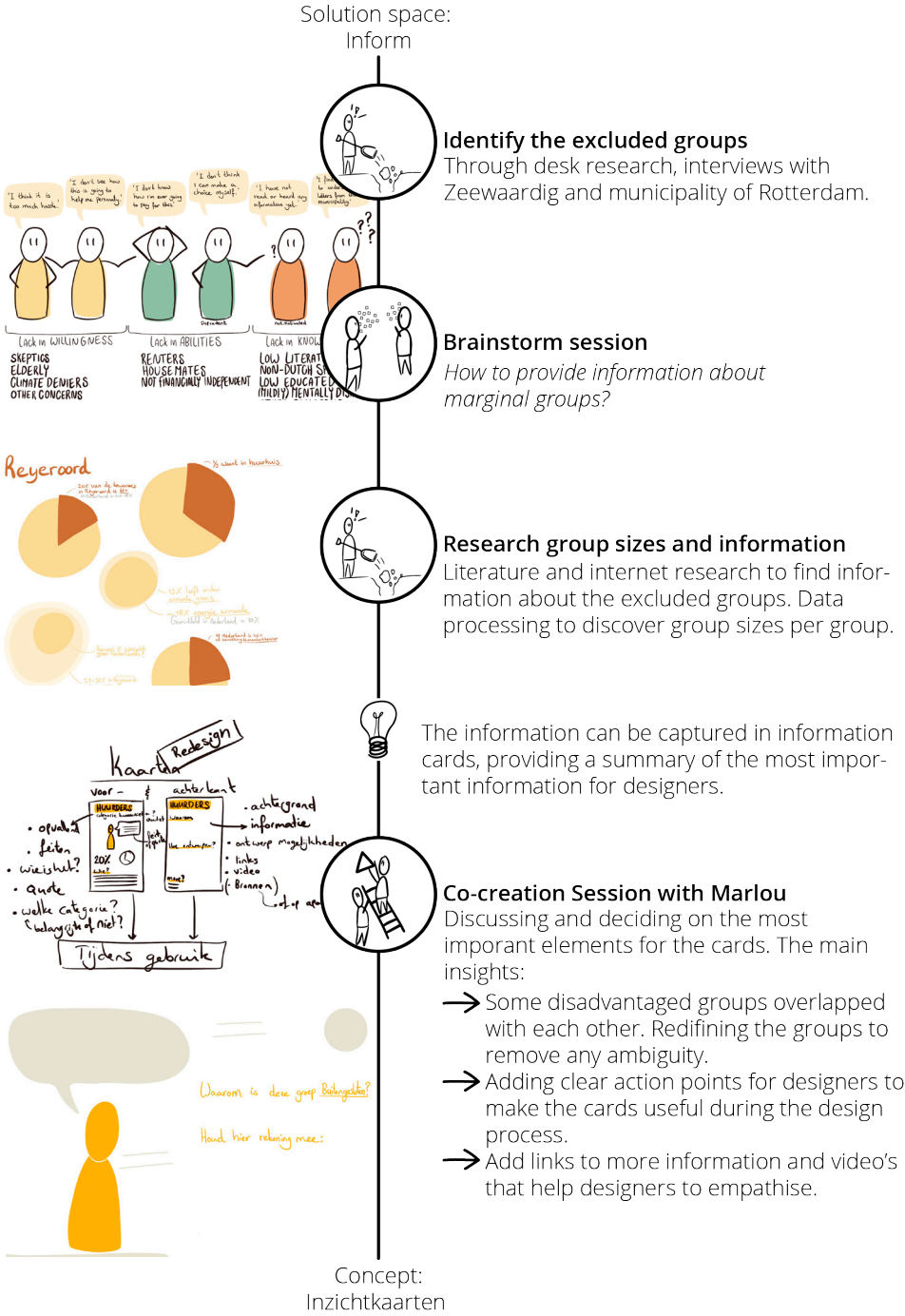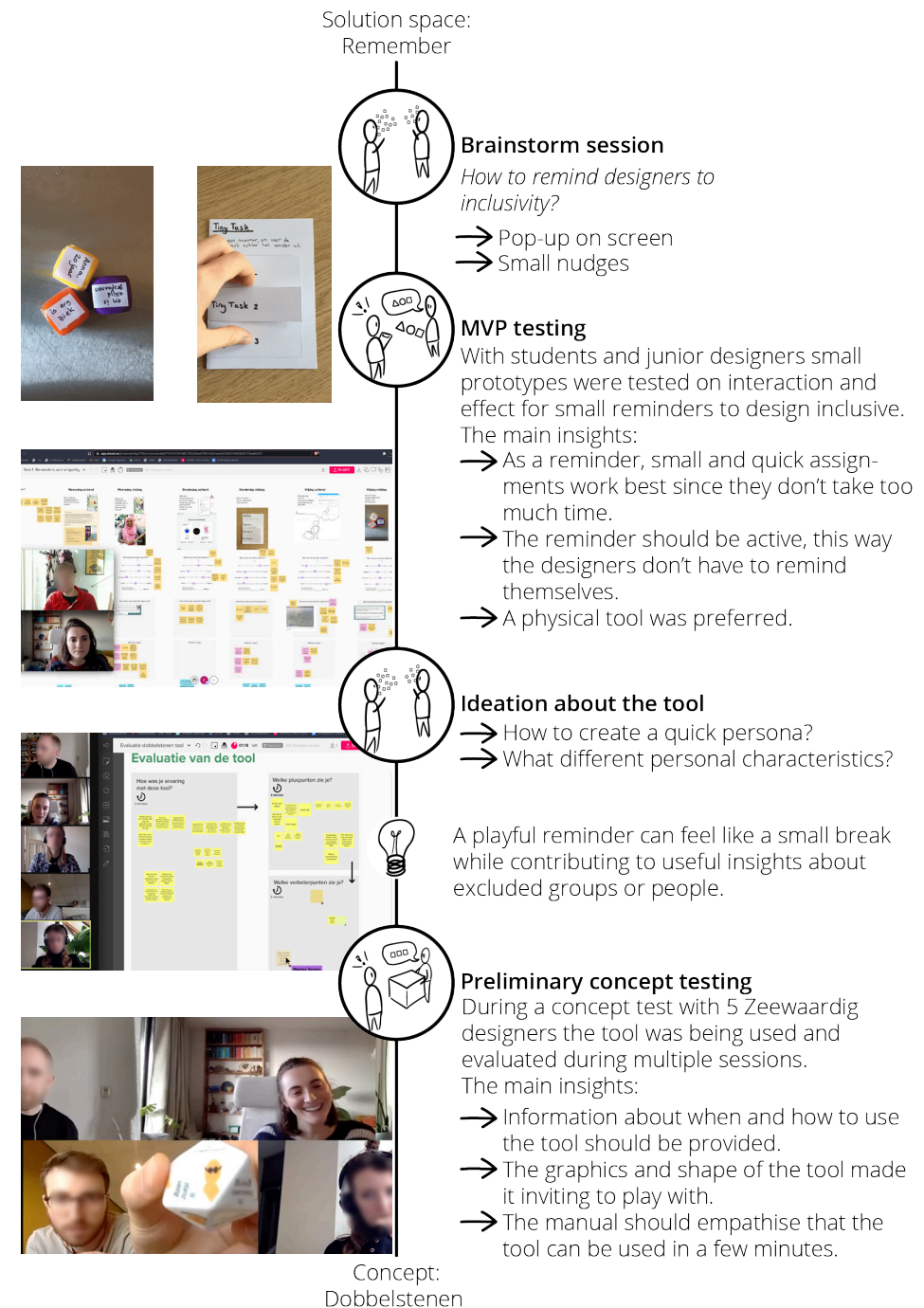
Concept:
Inzichtkaarten

figure 41: The process of developing the solution space 'Inform' into the Inzichtkaarten tool. The left shows images of the design process, the right provides the main insights.

A tool for approaching and informing

For the designers, it is helpful to identify and connect to residents in Reyeroord. By getting to know people in the neighbourhood, it is easier to involve them in developing the interventions, which helps the creation of more inclusive interventions. A tool that facilitates the meeting of residents and the first conversation, therefore, needed to be developed.

It appeared to be difficult to connect to excluded groups in Reyeroord which is why the first version of the tool included quotes and statements, representing excluded groups with other opinions or concerns. Asking residents which quotes and statements they recognise can be an accessible and easy way to identify different groups. This small exercise also works as a conversation starter.

After testing the tool through role-playing with different students, the final version was created to be used in a COVID proof way, keeping enough distance from others while testing the tool. At this moment in the design process, the Dutch government announced a Covid lockdown. As a result, physical testing could not continue.

Since the tool was developed to connect with strangers, it took time to adjust to a similar prototype that could be tested while staying at home. Eventually, a comparable test could be performed online, in which the physical tool was converted into an online survey (appendix 11). This test provided many insights into the tool. For example, it turned out that the quotes and statements did not always fit together, steering people into opinions that did not fit their personal opinions. At the same time, the quotes and

statements were an excellent conversation starter. More than half the people added a voluntary comment on whether they wanted to share any other thoughts about gas discontinuation. This was an affirmation that the tool indeed helped to start a conversation about this topic.

Ultimately, the physical prototype could also be tested in Reyeroord, with an adjusted plan to keep distance and COVID proof (Appendix 12). The findings in the neighbourhood were in line with the previously found insights from the online survey: the tool was an incredibly good conversation starter. While people did not always agree with the statements, it made for a good conversation. In addition, it was possible to make an estimated guess about the needs and opinions of the residents regarding gas discontinuation. Nevertheless, many obstacles were observed during testing; the loose cards were regularly blown away by the strong wind. There was no practical way of making notes during the conversation, making it hard to make clear conclusions from the conversations.

The tool was modified in the next iteration. In addition to being a good conversation starter, elements were added to continue the conversation with the resident. Also, a note form was added to process the conversation later. Through these iterations, the tool supports the designers throughout the entire activity of connecting to residents.

The infographic in figure 42 shows a timeline of the design activities and its main insights leading to the final concept of the Gesprekswaaier. This tool is presented in chapter 4.2.

Solution space:
Approach & Informing

Identifying the excluded groups
Through desk research, interviews with Zeewaardig and municipality of Rotterdam.

Development of the tool
Preparing the tool to test in Reyeroord.

Covid lockdown postponed the test.

Preliminary concept testing
Testing the conversation tool in Reyeroord. The main insights:
→ The quotes and statements helps to start a conversation about gas discontinuation.
→ Loose cards are not a good combination with strong Dutch winds.
→ The statements are incomplete and need to be updated.

Digital testing through an online form. The main insights:
→ The statements provoke people to share their opinion about gas discontinuation.
→ The answers from the form is a starting point for an interview, which was not possible through an online form.
→ There is a need for an extension of the tool which facilitates the main body of the conversation.

Additional research into interviewing techniques and adding the theory of empathising to gain deep insights

Concept:
Gesprekswaaier

figure 42: The process of developing the solution spaces 'Approach' and 'Informing' into the Gesprekswaaier tool. The left shows images of the design process, the right provides the main insights.

A tool for remembering

The solution space "Remember" responds to the fact that it is difficult to keep reminding to act inclusively. It should become a habit to add inclusivity to all design processes. By practising, one can cultivate inclusivity as a skill. With this in mind, an abundance of ideas arose during the brainstorm to remind designers of inclusivity.

An MVP test was developed to test all these ideas for possible opportunities as quickly as possible (appendix 8). In this test, four student- and junior designers were reminded twice a day with small prototypes. One prototype asked participants to put a token on their desk that could help them remember, while another prototype actively reminded participants with a notification to perform an exercise. Some tests were physical, while others were digital. The duration of the tests also varied.

After all interviews, the results were analysed. It became clear that small, physical exercises worked best for remembering to act as well as something the participants could do during a short break. In addition, it worked best if the participants were actively reminded instead of having a passive object on the desk. There had to be a new element every time to keep the user interested in using the tool. At the same time, the tool had to be valuable and related to the current project.

In the next iteration, two dice were developed as a physical reminder for inclusive designs. Research into different personality traits and needs resulted in a wide variety of options on the dice. During the preliminary concept testing (appendix 13), the dice were tested for two weeks by five designers from Zeewaardig. The designers were asked to use the tool regularly at a convenient time of their working week. After the experiment, the experiences and points for improvement were collected in an evaluation meeting. The designers were enthusiastic about the tool because there were many options, it was very accessible and the style was nice and simple. Some comments for improvements pointed out that the tool was best used in diverging processes and that the threshold to use the tool was sometimes still large. The infographic in figure 43 shows a timeline of the design activities and its main insights leading to the concept of the dice tool. The final concept is presented in chapter 4.2.
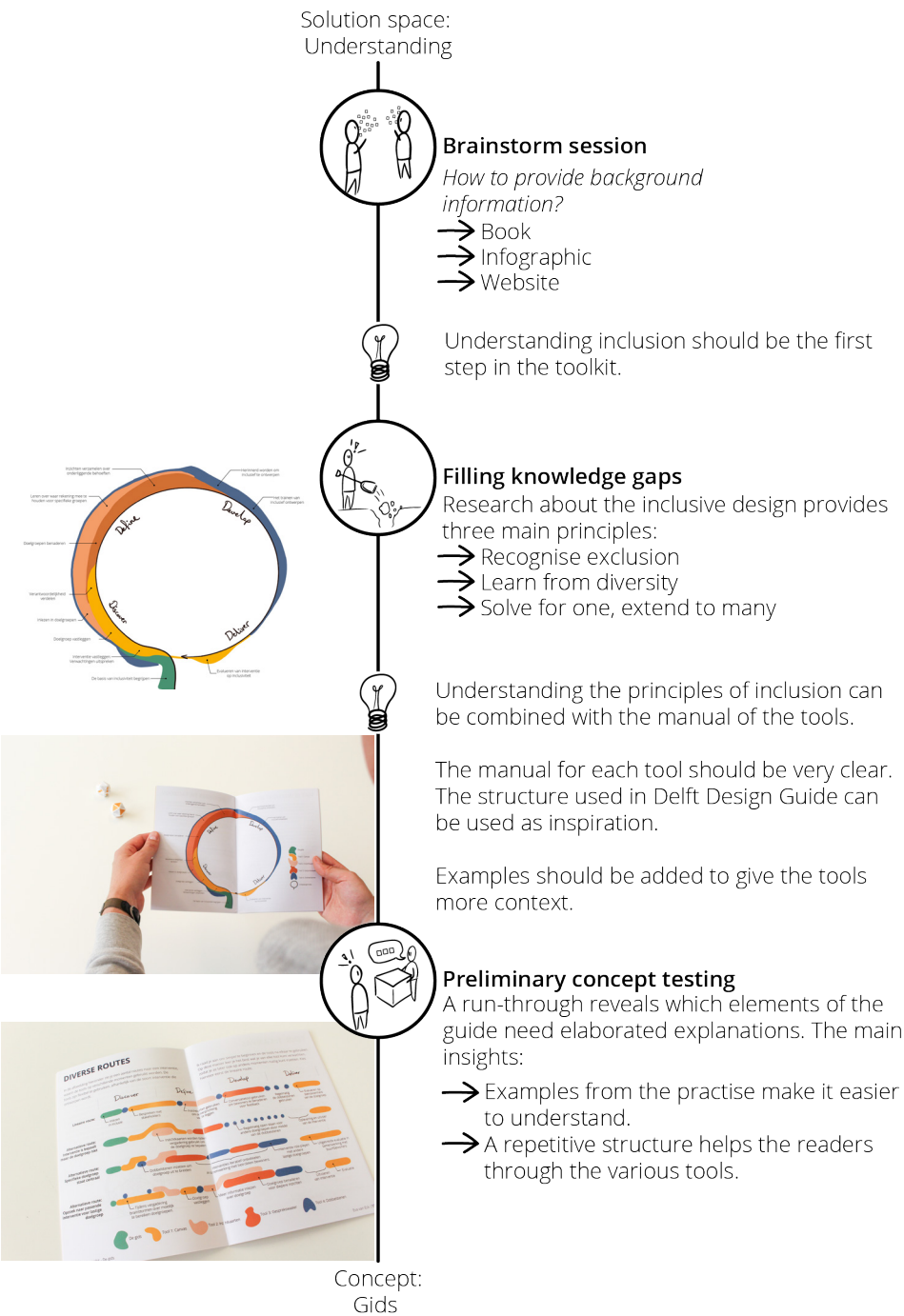

Solution space:
Remember

Brainstorm session
How to remind designers to inclusivity?
→ Pop-up on screen
→ Small nudges

MVP testing
With students and junior designers small prototypes were tested on interaction and effect for small reminders to design inclusive. The main insights:
→ As a reminder, small and quick assignments work best since they don't take too much time.
→ The reminder should be active, this way the designers don't have to remind themselves.
→ A physical tool was preferred.

Ideation about the tool
→ How to create a quick persona?
→ What different personal characteristics?

A playful reminder can feel like a small break while contributing to useful insights about excluded groups or people.

Preliminary concept testing
During a concept test with 5 Zeewaardig designers the tool was being used and evaluated during multiple sessions. The main insights:
→ Information about when and how to use the tool should be provided.
→ The graphics and shape of the tool made it inviting to play with.
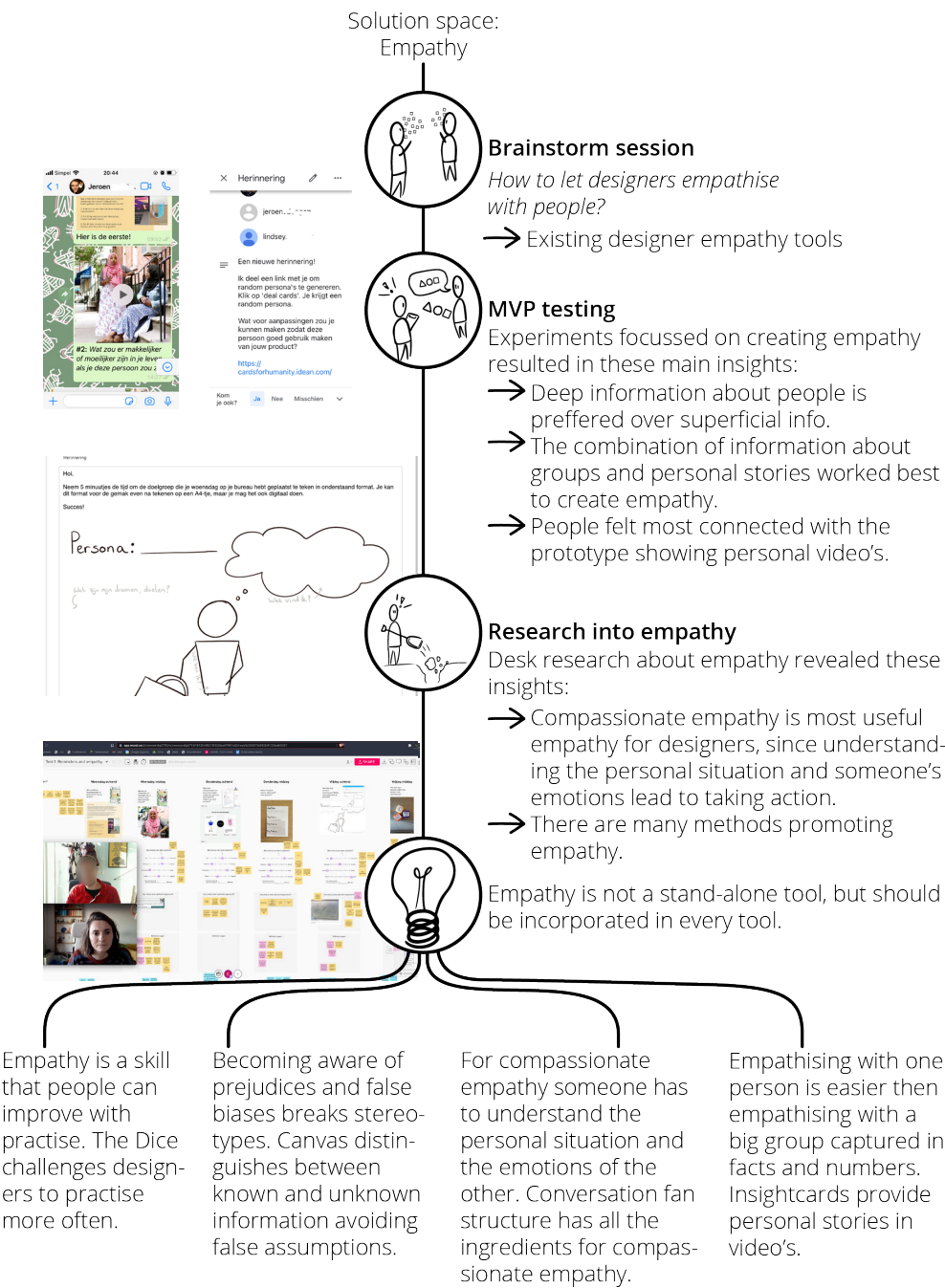→ The manual should empathise that the tool can be used in a few minutes.

Concept:
Dobbelstenen

figure 43: The process of developing the solution space 'Remember' into the Dobbelstenen tool. The left shows images of the design process, the right provides the main insights.

A guide for understanding

To be able to design inclusively, it is crucial to understand the philosophy behind the inclusive design, the goals of each tool, and its usability. Without this knowledge, it is difficult to use the tools efficiently. The brainstorm resulted in various options on how to share the understanding of inclusive design, but since each tool needs to have a detailed step-by-step explanation, it made sense to combine all the information in one manual.

This guide could provide a roadmap of each tool, as well as how to combine all tools in a design process. It can provide background information on inclusive design methodology.

During the development of the guide, it was decided to perform a detailed run-through. During this evaluation, participants were asked which parts they did and did not understand. The guide is improved to its final concept by adding additional examples and using shorter sentences to make it easier to understand.

The infographic illustrated in figure 44 shows a timeline of the design activities and its main insights leading to the Guidebook. The final concept of the guidebook is presented in chapter 4.2.

Solution space:
Understanding

Brainstorm session
How to provide background information?
→ Book
→ Infographic
→ Website

Understanding inclusion should be the first step in the toolkit.

Filling knowledge gaps
Research about the inclusive design provides three main principles:
→ Recognise exclusion
→ Learn from diversity
→ Solve for one, extend to many

Understanding the principles of inclusion can be combined with the manual of the tools.

The manual for each tool should be very clear. The structure used in Delft Design Guide can be used as inspiration.

Examples should be added to give the tools more context.

Preliminary concept testing
A run-through reveals which elements of the guide need elaborated explanations. The main insights:

→ Examples from the practise make it easier to understand.
→ A repetitive structure helps the readers through the various tools.

Concept:
Gids

figure 44: The process of developing the solution space 'Understanding' into the Gids. The left shows images of the design process, the right provides the main insights.

Integrating empathy

During the brainstorm, the question 'How to let designers empathise with people?' resulted in numerous ideas. Among the different ideas, there were also many existing design methods. It turned out that there are many different design methods in which people adopt an empathic attitude.

During the MVP testing (appendix 8), the participants were asked which prototypes made them feel most empathy for others. This research helped to understand the principles of empathy. As a result, the participants mentioned that hearing personal stories created compassionate feelings. It was hardest to feel empathy for made-up personas or superficial information.

Later research showed that empathy has many different layers. The most effective type of empathy is compassionate empathy. Compassionate empathy happens when one empathises with the other's personal situation as well as their emotions. This combination allows a person to fully empathise with another, which leads to taking action to help this person. This information confirmed the results from the MVP tests, where people were interested in seeing someone in person as well as having in-depth information. Other research was done on ways in which empathy can be used, providing various opportunities for the toolkit. Empathy is a skill people can improve. For example, reading novels can improve empathic abilities. Stereotyping and making false assumptions obstructs the ability to feel empathy. The main ingredients for compassionate empathy are understanding someone's personal situation and emotions. Empathising with one person is easier than with a big group represented in facts and numbers.

Nevertheless, developing a tool for designers was complex since designers are already using many techniques, tools and methods using principles of empathy, like interviewing, role-playing and generative interviewing. Finally, I realised

Solution space:
Empathy

Brainstorm session
How to let designers empathise with people?
→ Existing designer empathy tools

MVP testing
Experiments focussed on creating empathy resulted in these main insights:
→ Deep information about people is preffered over superficial info.
→ The combination of information about groups and personal stories worked best to create empathy.
→ People felt most connected with the prototype showing personal video's.

Research into empathy
Desk research about empathy revealed these insights:
→ Compassionate empathy is most useful empathy for designers, since understanding the personal situation and someone's emotions lead to taking action.
→ There are many methods promoting empathy.

Empathy is not a stand-alone tool, but should be incorporated in every tool.

Empathy is a skill that people can improve with practise. The Dice challenges designers to practise more often.

Becoming aware of prejudices and false biases breaks stereotypes. Canvas distinguishes between known and unknown information avoiding false assumptions.

For compassionate empathy someone has to understand the personal situation and the emotions of the other. Conversation fan structure has all the ingredients for compassionate empathy.

Empathising with one person is easier then empathising with a big group captured in facts and numbers. Insightcards provide personal stories in video's.

figure 45: The process of developing the solution space 'Empathy' into the integration in each tool. The left shows images of the design process, the right provides the main insights.

that empathy should not be a separate tool but should be integrated into every toolkit tool since empathy is such an important aspect of human-centred design as well as inclusive design.

From thereon, research, brainstorming and experimentation with empathy was performed. It appeared to be relatively easy to integrate relevant elements into the development of the tools. Since empathy is something people can improve with practice, this can be anticipated with the Dobbelstenen tool that reminds designers to design inclusively. It is challenging to become aware of one's personal prejudices. The Canvas tool facilitates different stakeholders to discuss their knowledge and biases, discovering each other's prejudices.
Since it is easier to empathise with individuals than bigger groups, most Inzichtkaarten provide videos to personal stories. This provided the designers with a glimpse into the lives of their target group. The Gesprekswaaier supplements the cards because the designers engage with local residents. Interviewing residents creates personal stories. By paying attention to someone's situation and emotions during these conversations, it becomes easier for designers to feel compassion. The infographic in figure 45 shows a timeline of the design activities and their main insights. Combined, empathy becomes a recurring element in the toolkit.

CONCLUSION
This section started with explaining the development of the various tools through an iterative design process. The separate activities are presented and show how the tools have been developed in various iterations. Four tools and a guidebook ultimately emerge from the eight solution spaces. This development is the basis of the final toolkit described in the next section.
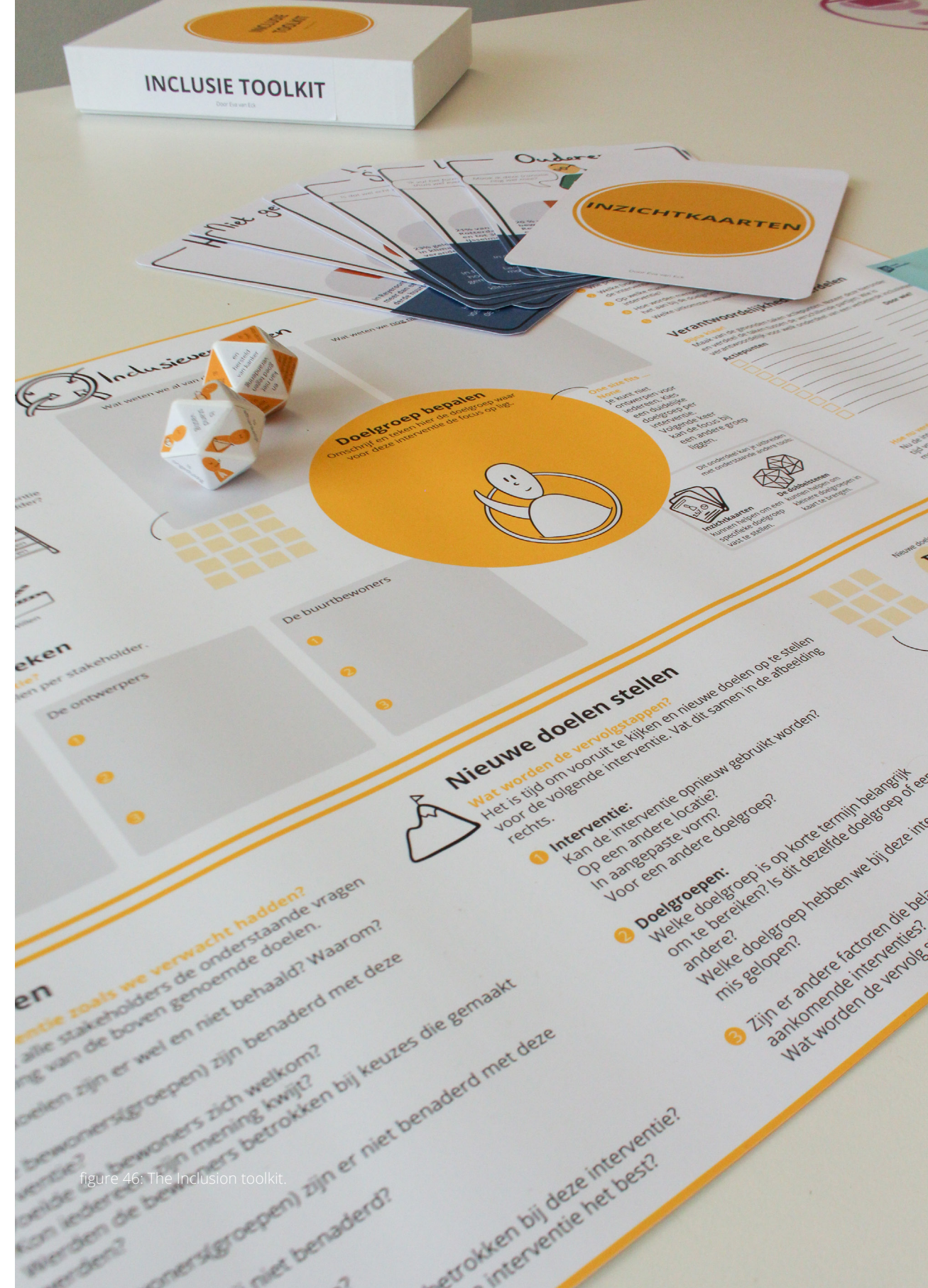
figure 46: The Inclusion toolkit.

CHAPTER 4.2 EXPLAINING THE TOOLKIT

The iterative project approach helped bridge the abstract theory of inclusive design to a concrete way of applying and facilitating it into a toolkit used by designers. During this process, the tools took shape, leading to the final concept that is presented in this section. The toolkit is shown in figure 47. First of all, the outline of the toolkit is explained, which puts the toolkit components in context. Afterwards, each tool is introduced to show how the theory of inclusion is defined in the individual tools.

4.2.1 OUTLINE OF THE TOOLKIT
The goal of the toolkit
The toolkit's goal is to enable designers to

practise a more inclusive design process, especially in the process of designing interventions for the discontinuation of gas in Reyeroord. The toolkit guides the entire design process by suggesting different tools for each design phase. The tools support the process while highlighting topics that improve inclusivity. By making inclusivity an essential part of the design process, diverse groups or people with barriers are already considered during the design. This makes the outcomes of the interventions more inclusive and enables designers to create a positive impact by reaching a broader range of people and groups.

figure 47: Each tool of the Inclusion toolkit displayed.

The goals of each tool
Each tool is essential in the toolkit as they support the designers at different moments in the design process from Discover, Define, Develop into the Deliver phase.

The Guidebook
The guidebook provides two primary goals. First, it provides the designers with essential guidelines for inclusive design. Second, it guides the designers by using the tools by providing step by step explanations and giving examples of when to use the tools.

Tool 1 Canvas
The Canvas enables designers to discuss the inclusion topic with the municipality and other stakeholders. This is important because inclusion is an abstract topic that is hard to discuss in specific aspects. Utilising concrete examples and questions, inclusivity is made tangible so that all stakeholders are aware of the subject and its importance.

Tool 2 Inzichtkaarten
The cards summarise the excluded groups in the energy transition in Reyeroord. This includes insight into the size of the group and information and tips for designers. The cards support the designers in making decisions. For example, when deciding on which groups to focus on or what design tactics to use when focussing on a specific group.

Tool 3 Gesprekswaaier
The Gesprekswaaier facilitates a conversation between the designers and residents from Reyeroord. The conversation starter helps to identify the residents regarding the different disadvantaged groups. The tool provides a structured way of including residents more often in the entire design process. This is important because when the residents are more involved during the design process, the approach as a whole can become more diverse and inclusive.

Tool 4 Dobbelstenen
The dice are a physical attribute that serves as a constant reminder for the designers to design inclusively. This is important because of all the urgent design work that designers have to do; it is easy to forget to focus on inclusivity. The tool consists of two colourful 20-sided dice. As a result of its shape and colours, it invites play.
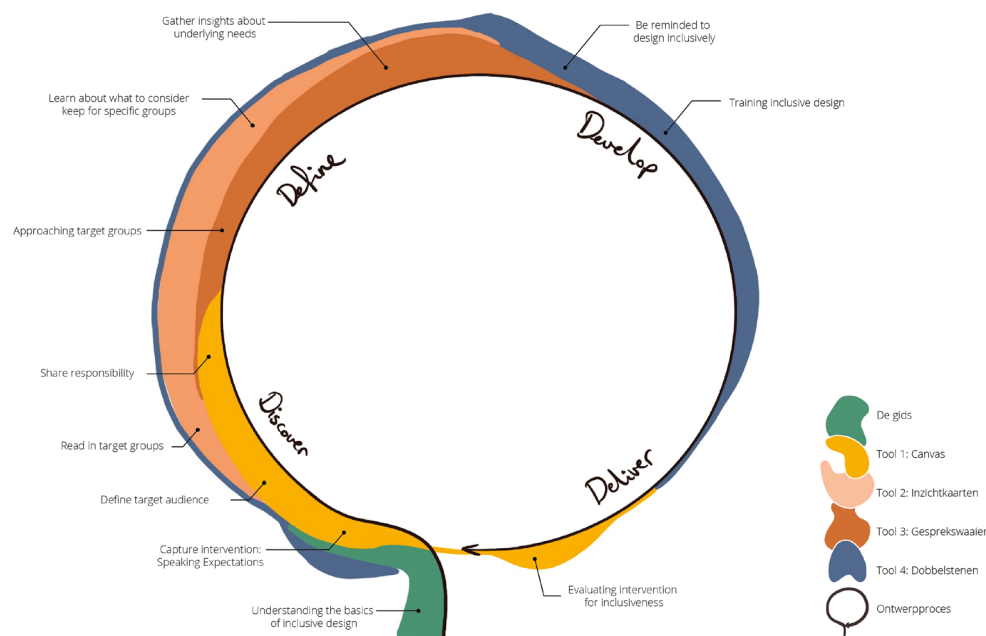
figure 48: The various tools are used in different moments of the design process. Each colour represents one tool, the density of the line represents how how much the tool is being used in that part of the process.

The users
The toolkit was iteratively designed and tested with design students and design professionals to fit their needs and work. The toolkit was created for the design team of Zeewaardig working on gas discontinuation interventions in Rotterdam specifically. However, some tools can be used in another context as well. How the tools can be used in other contexts is elaborated in chapter 5.1, the discussion.

When to use the toolkit and tools
The toolkit is designed to be used throughout the design process and development of interventions. The toolkit overlaps the design process and is therefore used on several occasions. figure 48 shows

how the tools can be used in different moments of the design process. Each colour represents one tool of the toolkit.

The toolkit assumes that the designers do not solve the energy problem in one design sprint, and therefore need several design cycles. An improved inclusive approach also takes time and multiple iterations. The designers will have to go through the process several times. The tools can therefore be reused every iteration to improve the skills of the designers.

At what moment each tool is used depends on the interventions that the designers are working on. In figure 49 various routes that designers can go through when using the

tools are illustrated.
The Guidebook is used at the start of the design process or when using the toolkit for the first time. The Gids navigates the designers through the process and use of the toolkit. The Canvas is used at the beginning of the process when decisions about the interventions are made in consultation with the municipality. At the end of the Deliver phase, the Canvas provides a structure to evaluate the results on inclusivity. The Inzichtkaarten are used in the Discover and Define phase when the design team chooses a target group or learns about the target groups. At the same time, the Gesprekswaaier helps to reach out to residents and include them in the development of the intervention later in the process. Dobbelstenen can be used throughout the entire process but

will be used most frequently at the start of the project for inspiration and while developing the intervention for improving the intervention on inclusivity. Therefore, the exact moment to use the tools depends on the different routes that the designers are taking when developing an intervention.

How to use the toolkit
The toolkit and the individual tools can be used independently by the design team using the guidebook to move through the process. However, a facilitated session explaining the process and tools were seen as a useful addition to start using the toolkit. During such a session, the tools are practised with a case study in a pressure cooker, which will be guided by a facilitator. The use of each individual tool is elaborated in the following subchapter.
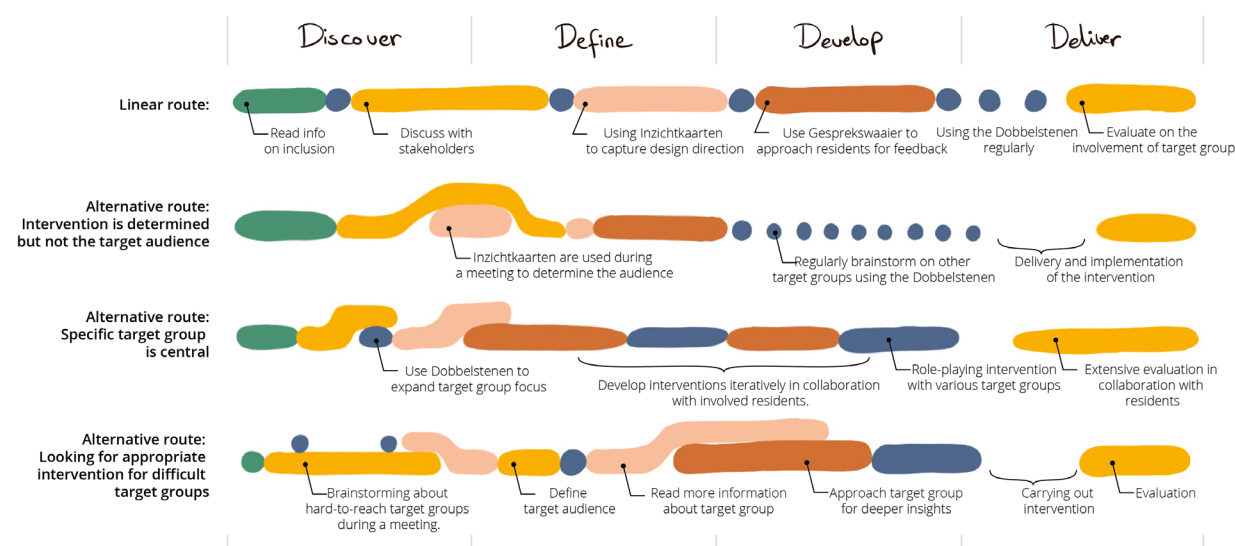
figure 49: The use of the tools may differ per intervention. Interventions with different starting points or goals will deploy the tools in a different way.

4.2.2 THE TOOLS ELABORATED

The use of the toolkit as a whole has been discussed earlier. In this section, each tool will be described, and its use explained.

THE GIDS

The guidebook is the first item of the toolkit. It helps the users of the toolkit to go through the toolkit. It provides background information about inclusive design. This helps the designers to understand the underlying principles of inclusive design. It also provides the framework and various roadmaps since the tools can be used flexibly in the design process. There are some different examples provided showing some roads that lead to improved interventions using the tools. For each tool, the tool's purpose and the application are described, followed by a detailed step-by-step approach and some example cases. The guidebook is handy when the toolkit is used for the first time or when new interns of Zeewaardig want to get familiar with the tools.

There is a physical copy of the guidebook included in the toolkit and a PDF attached to the digital Toolkit that can be found at tiny.one/inclusietoolkit.

The guidebook includes interactive links to the digital tools and additional information using QR codes.
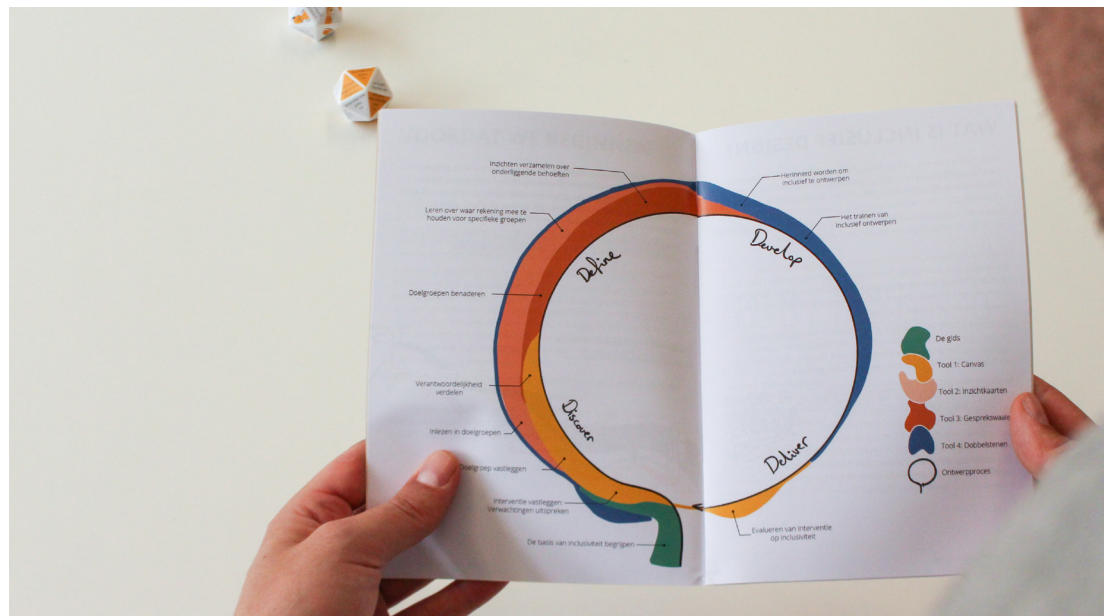
figure 50: The gids explains each tool step by step and explains the methodology of inclusive design.

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TOOL 1: CANVAS

Wat doet de tool en waarom?
Inclusiviteit is een vrij abstract begrip. Het is lastig om concrete acties te ondernemen die zorgen voor een inclusievere aanpak. Dit canvas ondersteunt ontwerpers om inclusiviteit bespreekbaar te maken met andere stakeholders en samen tot actiepunten te komen. Door afspraken vast te leggen geldt Canvas meteen als een onderlinge overeenkomst, waar later op geëvalueerd wordt.

Wanneer
De tool C
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Canvas
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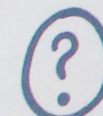
Sleutelvragen
? Wat zijn de verwachtingen? Welke doelen stellen we? Wat is de doelgroep voor deze interventie? Welke groepen moeten er (later) nog bereikt worden?

Hoelang?
1 tot 2 uur (+ voorbereidingstijd)

Wie?
Ontwerpers, gemeente en andere stakeholders
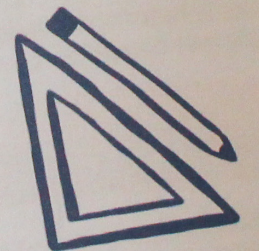
Benodigdheden?
Het canvas (fysiek of digitaal) en Post-its

16| Inclusie toolkit - De gids

figure 51: The explanation of the Canvas tool provided in the Gids.

TOOL 1: CANVAS

Inclusivity is a somewhat abstract concept, as discovered in Chapter 2. For the design team and municipality, it is challenging to take concrete actions that ensure a more inclusive approach. This canvas supports designers to discuss inclusivity with other stakeholders and to arrive at action points jointly. By capturing the decisions that are being made, the Canvas immediately applies as a mutual agreement, which can then be evaluated at the end of the design cycle.

When to use it?

The Canvas tool helps to structure the conversation between the designers, the municipality and possibly other stakeholders. The Canvas is used in the first and the last part of the design process. At the start, If the target group is still unclear, or if an appropriate intervention still needs to be devised for a specific target group. At the moment, the design team and municipality meet online. Therefore the Canvas can be used in its digital format in MURAL. The Canvas can also be used physically, printed on an A2 sheet. At the end of the design process, the Canvas is revisited and used to structure an evaluation with all stakeholders.

How to use it?

Canvas consists of three parts: the first part focuses on discussing the intervention, recording the goals and expressing the expectations. The second part focuses on the intended target group and structures the process to make the intervention more inclusive. The final step of the Canvas is to reflect with a realistic view and divide actions and responsibility regarding inclusion.

The designers complete the first part of Canvas and share this with the other stakeholders to prepare the meeting. During the meeting, The Canvas is presented in its physical or digital form. The three parts are run through in succession. In each step, the instructions are explained on the Canvas. If the team needs more guidance, an example Canvas is provided that can be used as inspiration.

After the implementation of the intervention, the various stakeholders come together once more to evaluate whether goals and target groups have been reached. The checklist in the lower right corner of the canvas helps to access the inclusive approach to the intervention.

THE CANVAS IN DETAIL

Below, the canvas is elaborately explained by focussing on each part individually, the steps show the corresponding element. Starting at the top left, moving to the bottom right.

Step 1: In the first element, the designers are asked to describe the intervention that is being developed. By preparing this before meeting the other stakeholders, they make sure there is something to talk about. It is easier to discuss something, even if it is not complete or correct yet. The designers are asked to define the scale size, level of participation and activation aspect of the intervention. These have an influence on how to deal with target groups. For example, if the intervention will have a very big scale size, like an awareness campaign, it is less likely to have a very specific target group. While if the intervention is focused on a few individuals from one building, the target group can be more specific.

Step 2: In the next element, the stakeholders are asked to share their expectations and goals. As shown in the bubble, the goals are separated per stakeholder, providing a stage for every stakeholder involved. This creates the awareness that not every stakeholder will have the same expectations and goals in mind. From this step onward, all parties are involved in filling in the canvas.

Step 3: Next up is to define the target group for the specific intervention. The main target group is described in the centre of the Canvas in a bright yellow circle, emphasising its importance. The users are asked to focus on one group only, per intervention, since 'A solution for everyone fits no one.' At the same time, comparable interventions can focus on slightly different target groups to reach multiple groups.
The canvas suggests that the Information cards or Dice can be used in this phase of the canvas. The cards can be used if there is no focus yet for a specific group. The cards can give some guidance and information on the sizes of specific groups that

can be chosen as target groups. The Dice can help to identify smaller target groups or work as inspiration.

Step 4: Once the target group is defined, the users are invited for a small brainstorm. In the two grey boxes, they are asked to brainstorm about what they know about the target group and what they don't know yet about this group. The municipality can have information about groups that the designers are not aware of, or people can discover they have false prejudices about some groups. By examining what information is still missing, the importance of the Gesprekswaaier Tool also becomes clear. This follow-up tool can help fill knowledge gaps by talking to residents.
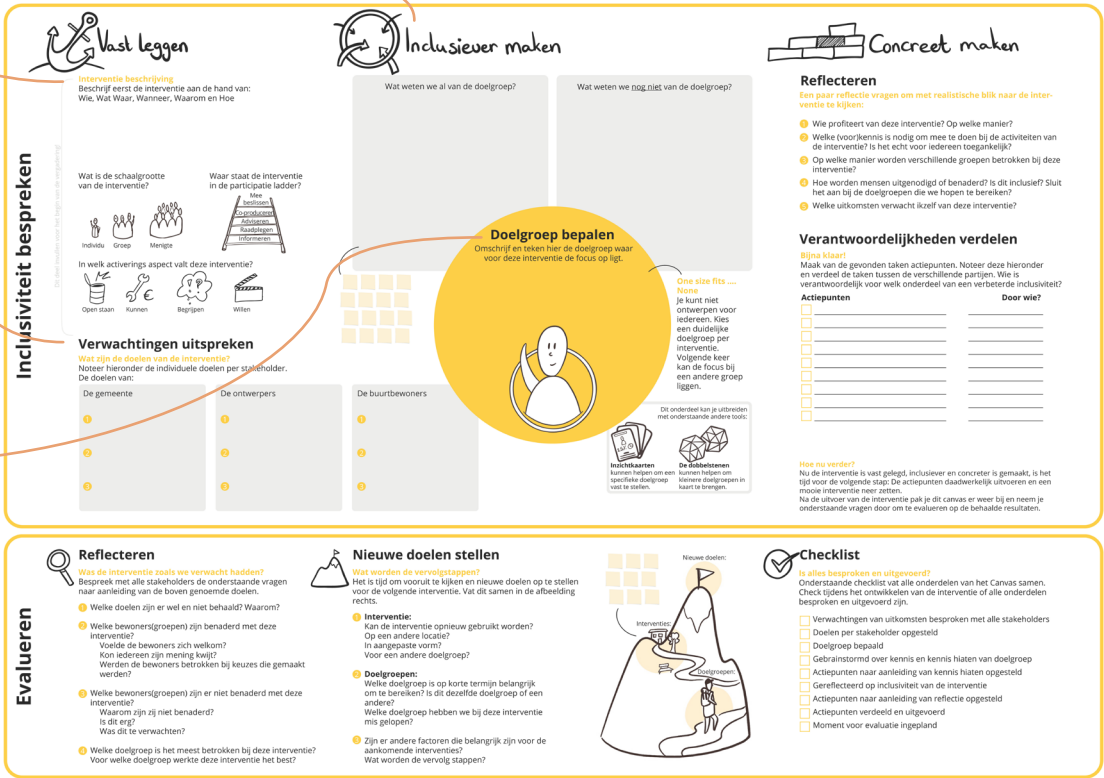
figure 52: The various elements of the Canvas explained.

figure 53: A part of the Canvas.

Step 5: During this phase, the users are reflecting on the intervention developed this far. By now, the intervention and the target group are becoming more concrete. By asking some reflective questions, the users are taking some distance from the design activities. Questions like, 'Who is profiting from the intervention?' or 'What kind of outcomes would I expect myself?' are asked.

Step 6: Lastly, there is an element that asks the users to create concrete action points from the discussed material before. Identifying what the most important elements for a more inclusive intervention are and who is responsible for this. Since inclusion is often an important but non-urgent task, it is easy to postpone taking action. By making people accountable with tangible action points, this can be prevented.

In the end, the users are asked to plan a meeting to evaluate the process after the implementation of the intervention.

figure 54: The evaluation part of the Canvas.

Evaluation

Step 7: At the end of the design cycle, the designers and other stakeholders are asked to evaluate the intervention and the set intentions. The first step is to reflect on the goals of each stakeholder and discuss which goals are reached and which not. Next, the users reflect on the target groups that are reached and not reached. With questions like 'Were residents involved in choices that were made?' or 'Which residents are not approached by this intervention? Is this a problem?'

Step 8: At the next phase, the users are asked to set new goals. This is done in three different steps. Firstly, the intervention is discussed: 'Can the intervention be done again? In a different location? For a different target group?' Then new goals for the target groups are set: 'Which target groups are important to reaching short notice?' and 'Which target groups did they miss out on during the previous intervention?' Lastly, other important factors that influence new goals are discussed. The new goals are concluded in the illustration of the mountain.

Step 9: The checklist is created as a small summary of all important elements on the canvas. During the design cycle, the designers can check if all components are being done. If necessary, they can remind other stakeholders to perform certain tasks.

TOOL 2: INZICHTKAARTEN

The insight cards provide information about the excluded groups in the Reyeroord district energy transition context. The cards provide a summary of the information found, insight into the size of the group and tips for designers.

When to use the tool

These cards can be used at different times during the design process. For example, to decide on which target group to focus on or when more insight into a specific group is desired during the research phase. The cards can also be used while developing an intervention since they provide insights that are useful while designing.

How to use it?

The front of the cards answers the question "Who?". The back of the card explains "Why and how?" In addition, a QR code refers to more information and a video in which experts share their knowledge and background. It can be difficult to empathise with a big group when provided with numbers and facts, as explained in chapter 3.3. Therefore the videos with personal stories help the designers to empathise with the target group.

figure 56: User reading the information on the Inzichtkaarten tool.

INZICHTKAARTEN IN DETAIL

There are eight cards representing the eight excluded groups identified in the energy transition in Reyeroord in chapter 2.4. The eight groups are; low literate, low income, not represented, sceptical, elderly, the information does not match the experience world, tenants, and other concerns.

Each card has a front and a backside that is structured in a similar way. On the front, the group is represented by a title and a unique character. The character shows emotion through its body posture, reinforced by the different quotes. The left corner gives information about the sizes of the groups. The bottom of the card contains a description of the people who are represented in this group. These are all elements that the designers would like to have quickly at hand when discussing new target groups, as discovered in the co-creation session. The most important element is the group sizes in Reyeroord.

At the back, more information about the groups is provided. Starting with information about why these groups are excluded in the energy transition in Reyeroord. Central on the card are some important components that designers should keep in mind while designing for these target groups. This is followed by QR codes that lead to more information about the group, a video that shows a personal story from experience or a podcast related to the group. At the bottom interactive links can be found to the sources used to gather the data shown on the cards.

figure 55: Various Inzichtkaarten presenting the front and backside.

TOOL 3: GESPREKSWAAIER

This tool consists of a number of cards bundled in a fan and with an additional 'Note Form' for note-taking. The Gesprekswaaier helps designers to start a dialogue with residents and to structure the conversation. The order of the questions helps designers gain empathy with the people they talk to. The corresponding Note Form helps the designers to ask the right questions regarding inclusion and provide a structure to summarise the insights gathered during the conversation.

When to use the tool

Designers can use this tool when going to the neighbourhood to speak to people. If they want inspiration from residents, they use the tool to make a summary per conversation on the note-taking sheet. If the designers want to gather information from the conversations, they will have to analyse the data later.

How to use it?

The conversations have a fixed structure. The designers go through 6 different steps with each conversation.

Step 1: Identify whom they are speaking to. This is similar to the other tool: insight cards, but is more extensive because there are also other groups. The quotes provide a first indication, by subsequently asking about the statements the resident agrees

with, the designer can discover nuances about the resident's attitude towards natural gas-free.

Step 2 and 3: In these steps, the designer finds out which topic is most important to the resident. He or she asks about the resident's opinion on this subject. The subject and the opinion about this are consciously separated in order to be able to keep a distance as an interviewer and not to go into the subject by explaining, but only asking questions objectively.

In steps 4 and 5: the designer asks about the feelings and personal situation related to the topic of conversation. These two parts are important to ask questions about because emotion and understanding the situation are two ingredients for compassionate empathy.

In the last step, the designer concludes the conversation with a positive conclusion. This can be done by an easy-to-answer question or a positive outlook.

figure 57: Users testing the Gesprekswaaier and Note form.

GESPREKSWAAIER IN DETAIL

The tool Gesprekswaaier is an interactive conversation starter that the designers can use to start a conversation with any resident. When the cards open like a fan, quotes are revealed. These quotes have different statements in which people can recognise their own thoughts or opinions about the topic of discontinuation of gas.

After the residents choose one to three quotes, they can reveal the rest of the card. There are a few statements presented on each card. The residents are asked to mark the statements that most closely represent their situation or concerns, using a non-permanent marker. The statements provide nuances in the earlier selected quotes and help to understand how the residents interpret the quotes. In total there are 16 quotes to choose from and each quote contains three to five corresponding statements.

One example is shown in image figure 58. The quote reads 'I don't see how this can personally help me'. There are various reasons why a resident would select this quote. The following options are listed in the corresponding statements:
- I live in a rented house.
- It costs a lot of money but gives me nothing.
- I don't believe in climate change.
- I don't want to get off natural gas.

The different statements help the designer to identify the resident. The first statement corresponds to the excluded groups of renters. Residents selecting the second statement could have financial issues. This can be explored with follow-up questions. The third statement corresponds to sceptical residents. The last statement also shows resistance against the plans of the municipality. Follow-up questions will prove the residents' attitude.

The follow-ups can be noted on the back of the cards, where there is space for notes. These belong to step 2 and 3 of the conversation. There is room to select the topic that the residents find most important and space to write comments and citations of the residents.

figure 58: One cards from the Gesprekswaaier.
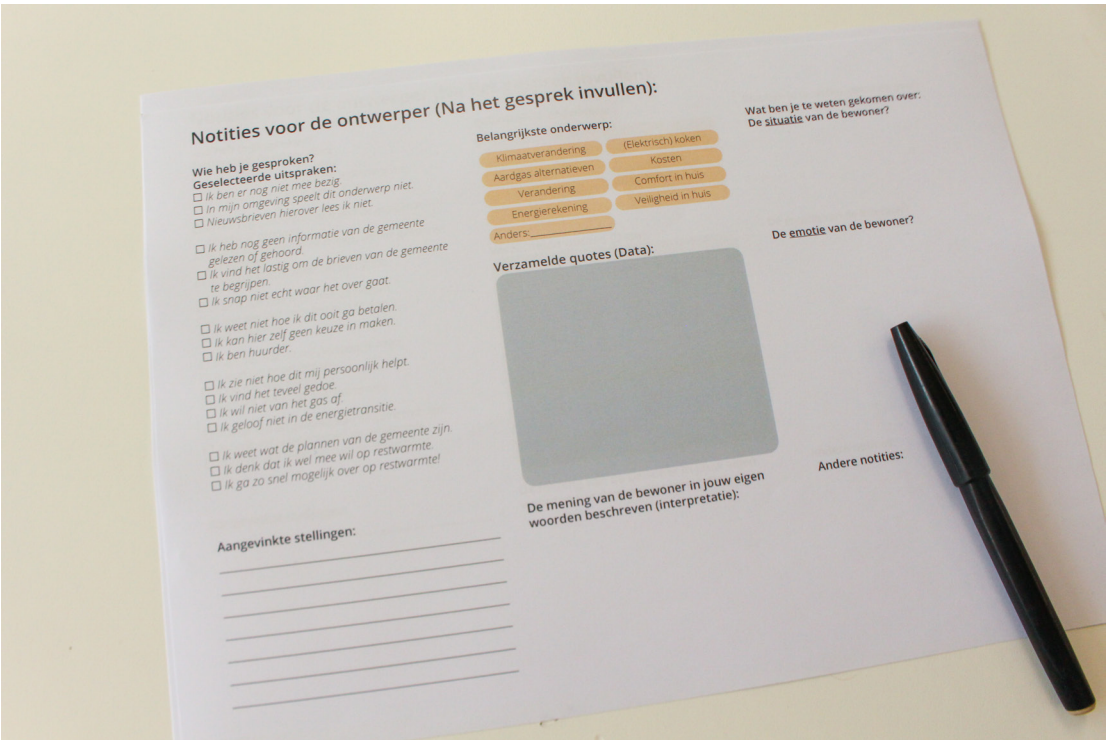
figure 59: The note form included in the Gesprekswaaier tool.

Note form

At the end of the conversation, the designers collect the insights on the note form. The note form is structured such that all critical aspects are covered. It asks about the opinion of the resident as well as their emotions and personal situation. The note form acts as a summary that the designers can use later when analysing the conversations from the neighbourhood. To ensure reuse, the designers can clean the Gesprekswaaier by erasing the ticked statements.

TOOL 4: THE DICE
This tool reminds the designers through small playful assignments to apply inclusion to their daily designing routines. By regularly reflecting on different users or target groups, an inclusive mindset is trained. Through training, the designers improve their skills in inclusive designing. The dice have different characteristics and personality traits that create 200 unique personas.

When to use the tool?
The tool is used in diverging processes, for example as brainstorming, for inspiration for target groups, during exploratory talks with other stakeholders or during the preparations of a session or workshop. The use of the tool can vary from a short inspiration session of 5 minutes up to a more elaborate brainstorm of 15 minutes.

For the best results, the tool should be used regularly by the designers. To achieve this, the designers plan specific moments during the week to use the dice. By putting the dice on their desk, it is an inviting playful break from the regular work.

How to use it?
Before throwing the dice, the designer has to decide on a question that they want to answer. The trigger questions help to focus on relevant issues and guide the process. For example, the designers can challenge themselves to find prejudices about the persona or brainstorm solutions to include this persona in their current project, design or intervention.

The game can be played individually or in a small team. After coming up with some solutions, it is best to share the outcomes with someone else to reflect on the personal outcomes. This way, the designers can learn from each other's insights and test their own biases.

figure 60: The Dobbelstenen tool

THE DOBBELSTENEN IN DETAIL

The dice playfully remind the designers. Since all kinds of factors can influence exclusion, there are also items on the dice that one might have to think twice about, why someone with that obstacle could be excluded. In table 2 a list of the various obstacles and personality traits that are included on the dice is collected.

The dice have different properties, divided over the two dice. The permanent, temporary, and situational obstacles, from the persona spectrum (as explained in Chapter 2) all require different needs to trigger designers to adjust or alter their designs to create more inclusive interventions. The personality traits provoke the designers to think about situations where some people might need additional attention than others. The traits also help to imagine real people instead of only imaginary personas. Some of the obstacles are visualised on the dice in small icons, as shown in figure 61. This triggers the designers to think for themselves and gives them freedom of expression since there is no right or wrong in what they imagine the image represents.
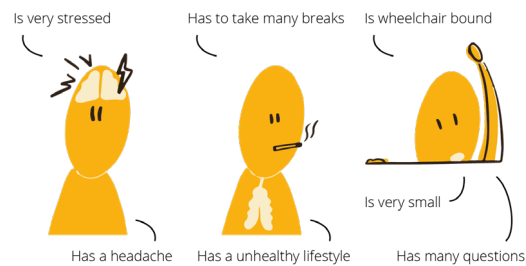
figure 61: Various interpretations of the personality traits are possible.

table 2: Various interpretations of the personality traits are possible.

Permanent (or long term) obstacles	Temporary obstacles	Situational obstacles	Personality traits
Low literate	Smokes	Listens to music	Curious
Financially independent	Is emotionally unstable	Is blinded by the sun	exuberant
Low digital skills	Is sick	Carries a baby	Independent
Dutch as a second language	Just had a child	Looking at mobile phone	Stubborn
conspiracy thinker	Has a broken arm	Received bad news from	Easily stimulated
Practically educated	Doesn't like to make	a relative	Uncertain
Dyslexia	calls	Has a headache	Steadfast
Non-binary			Lazy
Hermit			Impatient
			Unintentionally racist
			Outspoken opinion
			Can't stand change

4.3 VALIDATION OF THE TOOLKIT

In this section, the validation of the toolkit is presented. In the validation test conducted with the designers. First, the approach of the validation is discussed, followed by the results. Then, the question was answered whether the toolkit supports the designers in enabling a more inclusive design process.

APPROACH
It is not possible to test the toolkit in its entirety, because a design cycle of an intervention can take several months. Therefore, the toolkit can only be tested at the level of the individual tools. A forecast can be made about the long term effects of the toolkit. The validation of the toolkit is spread over three sessions with various designers of Zeewaardig, as illustrated in the table 3.

In the first session the Dobbelstenen tool was introduced and tested with five designers. Each designer has received a set of two dice at home, which they could test

for two weeks. At the end of the second week, the use of the dice was discussed in a joint evaluation session and discussion.

In the second session the Canvas tool was introduced and tested. During this session two designers shared their insights about the usability of the canvas. These insights were taken into account to adjust the Canvas to its final design. Since the content of the Canvas did not change, there was no need to validate the Canvas again. During the last session the Inzichtkaarten tool and the Gesprekswaaier tool were tested with four designers. During this one hour workshop the designers were divided into two teams that each prepared and played a role-play. In the first part, the designers used the Inzichtkaarten to empathise. The Gesprekswaaier was then used to simulate the role-play between a resident and a designer. This was followed by an evaluation and a discussion about the experience using the tools.

The evaluation of the session consisted of the set-up shown in figure 62 on the right. The results of the evaluation have been analysed and the recorded sessions have been reviewed to gain the results and insights about the validation of the toolkit. The validation test set-up can be found in appendix 15, 16 and appendix 17.

RESULTS
In the section below, the results of the three validation tests are described. First, the comments of the designers about what they liked about the tool are discussed, followed by points for improvement. Any remaining questions will then be addressed. After that, it is examined to what extent the tools meet their objectives as described in chapter 3.5. Finally, it is examined to what extent the toolkit as a whole is desirable, viable and feasible.

table 3: The three validation tests mentioning the amount of participants, length of validation test and the goal.

Validation test 1	Validation test 2	Validation test 3
5 participants	2 participants	4 participants
1:00 hour	1:30 hour	1:00 hour
Evaluating the Dobbelstenen tool	Evaluating the Canvas tool	Evaluating the Inzichtkaarten & Gesprekswaaier

figure 62: The questions of the validation tests as presented to the participants.

RESULTS OF VALIDATION TEST 1: THE CANVAS TOOL
During the validation of the canvas (appendix 15), a number of elements were indicated to be very valuable to the designers. Explicitly naming the different goals, clearly dividing the roles and the reflection questions can already solve a large part of the problems. A short brainstorm with the stakeholders was also seen as valuable. One designer mentioned that some stakeholders already have a lot of knowledge about certain target groups and that it is therefore useful to share this knowledge with each other in advance.

Both designers had some doubts about the format of the canvas since it takes a lot of time to go through the entire canvas. A suggestion would be to break it down into smaller parts in slides, for example. Someone mentioned that it could be difficult to use the canvas, despite the examples and explanations. It might be an addition to have a facilitator who is familiar with the canvas. A facilitator can also have a neutral role in filling out the canvas, which is an extra positive side effect.

All designers see the usefulness of the canvas and it has already been proposed to use the canvas in other projects in which municipalities and other stakeholders are collaborating. The biggest question remaining is when would be the best time to use the canvas. To find answers for this, it should be tested with the other stakeholders involved.

"I think, taking those responsibilities, that is really [the main problem]. In the end nobody really does anything with it, because you keep shifting it to someone else, because it's so difficult. So I think, if you have a clear idea of what those roles are, that can also solve a very large part of the problem."

"[Sharing] what we already know about the target group is very valuable. The municipality sometimes thinks they already know a lot because they think they know [things] about other neighbourhoods."

< *"As a designer I would like to be a little more guided in this step on the canvas, with questions or suggestions. I think I could fill it in much better and more intuitively."*

< *"I think it also works for our clients. They may also become much more aware of inclusion. We designers already intuitively think of these kinds of topics. I know that's not your target [for this graduation project], but I think it helps us enormously in raising awareness at the municipality."*

Does the Canvas tool achieve its objectives?
The Canvas tool combines the two solution spaces 'Discuss' and 'Evaluate' into one tool that facilitates communication with other stakeholders. There are nine requirements regarding these solution spaces, these requirements are summed up in appendix 18.

The main intention of the Canvas is to facilitate all stakeholders to discuss inclusion. To reach this goal, the Canvas proposes more detailed questions that all influence the inclusivity of the project or intervention. In this way, the canvas creates opportunities to debate and discuss the topic. Some of these objectives refer to specific parts incorporated in the Canvas. Requirements 2-5 have been processed into specific questions and assignments on the canvas. The Canvas forces to divide tasks between the stakeholders. By first going through the sub-questions, the topic is divided into concrete elements. This later leads to concrete action points. Each stakeholder is also asked to express their expectations, which are written on the Canvas and discussed. The Canvas facilitates evaluation by first reflecting on the previous intervention and then looking forward to future interventions. This stimulates to discover mistakes that were made, and try to improve them for the future.

During the validation, it turned out that the canvas elements were perceived valuable for the designers. By means of specific questions, the Canvas helps the designers to make inclusivity a topic for discussion. It helps to put inclusion on the agenda with other stakeholders. Currently, the canvas has only been tested with designers. An area for improvement would be to test the canvas with other stakeholders such as the municipality. This allows testing whether other stakeholders also see the added value and understand the use of the canvas. These results could still influence the content of the Canvas.

RESULTS OF VALIDATION TEST 2: THE INZICHTKAARTEN AND GESPREKSWAAIER

"By putting myself in the role of this low literate resident, I became aware of his limitations and also where there are opportunities."

"Perhaps for another project or in another district, we should check again whether there are target groups that will be added or lost and check the percentages there."

During this validation (appendix 16), two designers focussed on preparing their role as a resident using the Inzichtkaarten. The other two designers prepared the interview using the Gids and the Gesprekswaaier.

Valuable elements of the Inzichtkaarten included that it is short and to the point, the QR codes increase the awareness of the problem of the target group and the cards make it easier to become aware of limitations and opportunities for a target group. It was suggested to add an extra step to reflect on what this could mean for the project.

Valuable aspects of the Gesprekswaaier included a good appearance, neat and positive look. The tool is a good guideline for a conversation and it reduces the threshold for a conversation. There were various suggestions on how to improve the tool, for example arranging the questions so that the residents are first asked about the present and the past, then about the future, or organising the cards into various categories which will make it easier to use by the designers, since at the moment it was difficult to go through all the cards. Therefore a simplification of the tool would make this easier. Also, some questions could still be too complicated for many residents. Many designers noted that it takes some practice to use this tool.

Does the Inzichtkaarten tool achieve its objectives?
The Inzichtkaarten tool originates from the solution space 'Inform'. There are three requirements in the list of requirements that the tool should provide. These are listed in appendix 18.

The Inzichtkaarten is meant to inform the designers. They combine information on one A5 sized card per target group and provide external links and sources. To facilitate empathising, the cards include QR codes to videos of people living in the corresponding situation. The manual provides different assignments with the cards that stimulate empathy, like role-playing. The cards include suggestions of possible opportunities concerning the groups.

< 'The cards can help to get a conversation going, it reduces the threshold for a conversation.'

< "As a designer, it is hard work to convey everything clearly because there are really many options."

During the validation, the designers mentioned that the cards provided sufficient information to empathise and inform them of the target groups. After some use, the designers might feel the need to gain new information because they are aware of the info provided on the cards. This long-term impact of the cards needs to be further investigated. Since even after some use, the cards can still add value to new stakeholders or new colleagues, who join the project later.

Does the Gesprekswaaier tool achieve its objectives?
The Gesprekswaaier tool combines the solution spaces 'Empathise', 'Approach' and 'Introduce' into one tool that facilitates conversations with residents. There are five requirements regarding these solution spaces, which can be found in appendix 18.

The Gesprekswaaier was developed to start and facilitate conversations with the residents of Reyeroord. The physical tool makes it easier to approach people, while the quotes provide an introduction to the topic of the energy transition. The manual guides the designers during the interviews, by providing examples of in-depth questions. This helps to gather all information needed to be able to empathise with the residents.

The validation demonstrated that the tool is good for starting a conversation, but it also showed some flaws. It appeared that for the designers the tool is difficult to use because they have to remember many different steps. The tool is less suitable for a short conversation and is better suited to a longer interview, which might need another setting than currently suggested. The tool currently supports approaching residents while in the neighbourhood, therefore to use the tool they have to physically go to Reyeroord. From the studio, or at home during a lockdown, the tool does not facilitate getting in touch with local residents.

At the moment there are many different things coming together in the Gesprekswaaier tool: different insights are obtained about the resident, information about which group the resident falls into, what the resident thinks is most important, and how the resident feels about the subject. Gaining all this information is asking a lot from the designers. They are expected to be able to identify the residents, while also applying the correct interviewing techniques, and then also asked to analyse the data. All these different parts make using the tool complicated. A simplification of the tool that focuses on one part is probably easier, because there is a clear goal for the designers.

RESULTS OF VALIDATION SESSION 3: THE DOBBELSTENEN TOOL

In this test (appendix 17) the Dobbelstenen were validated. The designers indicated that they enjoyed receiving the dice. The dice and supplied manual look cheerful and playful. The design made use easy and accessible. The first time use was done jointly during a workshop. This made it easy for the designers to replicate the use themselves next time. The designers indicated that it was nice to use it for the first time in a workshop setting as they could immediately receive tips on how they could improve its use. Some designers found that they could use the dice quickly and that it provided good insights due to the many options. Others commented that they hadn't been able to use the dice very well as they were completing deadlines. The tool is therefore better to use in diverging processes. There were several comments about the content on the dice. Some suggestions included to add a question mark, and to explain the small illustrations on the dice. Someone commented that some sides were not that useful for their project, and that he would have liked to replace them with other more relevant personal characteristics.

One designer commented that the illustrations on the dice confused him because there was no explanation about them. Despite this criticism, the illustrations triggered exactly what was intended: several people shared what they saw, sparking a lively discussion.

Some of the remaining questions were about the use of the dice. Currently there is no consequence if the designers do not use the tool. The question is how the designers can be reminded of the use, or how a direct consequence can be linked if someone forgot it.

Does the Dobbelstenen tool achieve its objectives?

The Dobbelstenen tool originates from the solution space 'Remember'. In the list of requirements, there are four objectives that the tool should accomplish. These requirements are listed in the appendix 18.

The Dobbelstenen have been developed as a tool that can be used in a few minutes. The intention is that the dice are used by the designers at least once a week. This allows the designers to regularly practice with the subject of inclusion, while each time they can ask themselves a different question, related to their current project. The manual explains the importance and principles of inclusive design. The properties on the dice are arranged so that the different aspects of the persona spectrum are all covered (as mentioned in chapter 4.2.2). If the designers do not consciously remember the persona spectrum, the dice nudges them to discover the different spectra. As a result, the Dobbelstenen meets the given requirements.

The validation showed that the designers experience the benefits of the Dobbelstenen. However, maintaining the regularity of use could be improved. This can be done by scheduling a fixed moment in the agenda or by using a digital plug-in that forces designers to use the dice. Currently there is no explicit explanation that the tool helps with practicing the Persona Spectrum and the principles of inclusive design, this can be emphasized in the manual.

CONCLUSION

This chapter presented the development of the toolkit, the final result and the validation of the toolkit. These activities were done to answer the question; Can the inclusion toolkit facilitate the design team to practise a more inclusive approach? During the development, the solution spaces were merged into 4 tools and a manual that were developed in co-creation with the designers of Zeewaardig. The tools have been worked out in detail, allowing them to be thoroughly tested with the design team. The tools were finally tested in three validation tests to discover what works and what could be improved. Each tool has been compared to the list of requirements to inspect if all objectives are met.

Reflect on the design team's challenges

Finally, it is possible to examine to what extent the toolkit solves the problems of the design team, or at least makes it easier to tackle. Considering that the toolkit has to be used for a longer period of time to see an effect on certain challenges, some assumptions must be made.

The toolkit provides the designers with various tools to integrate inclusion in concrete tasks in their project. In the canvas, tasks are explicitly set up to integrate inclusion. As mentioned by the designers, they think that "it helps enormously in raising awareness at the municipality." (Validation test). The other tools primarily make it easier to make inclusion an urgent and important task. The meaning of an inclusive energy transition is defined and the basic principles are explained in the guide. Because the Inzichtkaarten provide insight into the excluded groups, the designers can involve these groups more consciously in future interventions. The Gesprekswaaier helps to get in touch with the residents. The toolkit encourages the designers to determine a specific target group for each intervention and to involve them in the project.

Design team's challenges (as in 2.6 Design Brief):
- Inclusion is no urgent task to act upon
- The definition and responsibilities for inclusion are not clear
- Approaching excluded and disadvantaged groups
- A limited reach of residents
- Little diversity in involvement

This allows the specific needs of different target groups to be better taken into account, and the reach of the transition can reach more residents. "While developing [one intervention], the question suddenly arose for which target group we were actually designing. The reflection questions reminded us of this in time" (Validation test). By also focusing on smaller or harder-to-reach groups, participation in Reyeroord also becomes more diverse. The effects of reach and diversity will become apparent when the team uses the inclusion toolkit for a longer period of time. For now, the validation gives reason to believe that the toolkit will benefit the challenges the designers experience.

Possible improvements

During the validation, some improvements to the toolkit were discovered. The research showed that the Canvas can still be tested with other stakeholders. After such a test, further adjustments could be made to the design or form of the canvas. The validation test showed that the Inzichtkaarten are currently valuable, but in the long-term an update could be added. Another option would be a component that gives the designers the opportunity to add new information to the cards. The validation showed that the Gesprekswaaier has good elements, but is currently complex in its use. This could be simplified into an adjusted, simplified tool. Finally, the Dobbelstenen could be supplemented with more active reminders or a scheduled fixed moment in the week to use the tool. This can motivate the designers to use the tool more frequently.

The limitations of the research and the solution are covered in the discussion in the following chapter. The recommendations for future improvement are presented and ultimately, followed by a project conclusion .

05 DISCUSSION AND CONCLUSION

This chapter presents the discussion about the results of the project and the found solution. Recommendations are outlined and followed by a conclusion of the comprehensive report. At last, a personal reflection concludes this thesis.

5.1 DISCUSSION

This project investigated the topic of inclusive design in the context of the energy transition.

The goal was to develop a toolkit that supports service designers to adopt a more inclusive design approach. To achieve this research goal, an iterative design approach was followed, lead by four main questions:

RQ1: What does inclusion mean in the context of the project?

RQ2: How to ensure that the design team will adopt the new approach in their routines?

RQ3: Which ingredients are essential for an inclusive approach?

RQ4: How can a toolkit facilitate the design team to practise a more inclusive approach?

The different research questions were explored in the three phases, problem finding, idea finding, and solution finding. The problem was investigated, asking what inclusion means in the context of the energy transition. Several studies were conducted to gain insights and ideas for an inclusion toolkit. In an iterative design process, a solution was found that fits the design team. This result answers the question: What new approach can be implemented that will be used by the design team to design more inclusively?'

This discussion will first look at the interpretations of the results. It will provide an answer to the question about the applicability of the toolkit to other contexts. Then, the implications of the results and what this research contributes to the existing state of knowledge are shared. Next, a few limitations of the research are discussed. Finally, the recommendations for practical implications and further research are considered before concluding this report with a conclusion on this thesis.

Interpretation

A relevant question is in which domain the toolkit can best be placed. Are the tools mainly focused on the energy transition or on inclusion? And, in what other contexts can the toolkit be used? This question is best answered for each tool separately because each tool has its unique sub-goal. The domain also differs per tool, as illustrated infigure 63.

Tool 1, Canvas, can be used in other projects involving various stakeholders that need to collaborate. This can be used in both the energy transition domain or the design domain. The tool might need minor changes to the corresponding stakeholders and context. For example, the canvas currently focuses on interventions as the results of the collaboration. In other projects, this might be a product or a system.

figure 63: The individual tools belong to different domains.

Tool 2, Inzichtkaarten, can be replicated in mostly all other energy transition projects involving citizens' participation. The identified target groups will overlap considerably but need a critical assessment to determine if no groups are left out or under-represented. The data regarding the group sizes will need to be adjusted according to the context. The tool is difficult to use in other design contexts since other projects in, for example, healthcare or education, will have different groups that are excluded.

Tool 3, the Gesprekswaaier, is challenging to be used in another energy transition project. For the context of Reyeroord, this tool is important since reaching out to people is a big challenge in this neighbourhood, but the same might not apply to other areas. However, similar principles could be used in a design context when some adjustments are made. The tool could be used to gather insights from users using the insights gathered on the note form.

Tool 4, the Dobbelstenen, can be used in various projects in the energy transition but will most likely be used in the design field. The tool introduces a basic principle of the inclusive design approach, making it suitable for almost all projects and contexts that focus on inclusion. However, the tool is best used in diverging phases, as explored during the validation.

Implications

Although the results originated from the inclusive design methodology, the research contributes to new insights about applying this methodology to the energy transition context. The findings show that inclusion, and especially exclusion, are dependent on the context and the subject.The focus often lies on physical disabilities when it comes to inclusive design, while in the case of the energy transition, people with a physical disability are not necessarily the group of people excluded the most. The Inzichtkaarten provide an overview of the groups that are hindered in the energy transition and therefore excluded. The results of mapping these groups add to the research field to create a fairer energy transition. Considering the first principle of inclusive design, 'Recognise exclusion', only when the exclusion is acknowledged can we start identifying opportunities and solving the problems.

There is enough information available about the energy transition and its technical developments. However, experts just

start to understand the implications of the energy transition on a bigger societal scale and start identifying social injustice. Moreover, there is not much information available on how to make the energy transition fairer.

During my search for literature in the field of inclusive (energy) transitions, there was not much to be found about how to solve the existing problems. Therefore, the combination of the two fields, inclusive design and the energy transition, is a new research area that can be explored further by professionals and students in the future.

This project focuses on the designers active in the energy transition. A solution has been devised for this specific group through the toolkit. Of course, this is only one piece of the puzzle. Other parties are also involved in the energy transition. The question is where the responsibility for a fair energy transition lies.

Limitations
A relevant limitation, in my view, is how the inclusive design methodology is currently limited. The theory of an inclusive approach mainly focuses on physical, tangible designs and products. Due to this, the principles are easier to test and apply to physical products. My thesis is built on these principles; however, the interventions designed by the design team are not physical products. The complexity

of the project in Reyeroord concerns the inclusion and exclusion of people within a movement and a transition. It is more challenging to test the components and draw concrete conclusions. For example, 'recognise exclusion' is more complex for societal projects.. One can then wonder if people are excluded because the solution really excludes them, or because they are not yet ready for the transition and do not yet hold the needed knowledge. Are these people then excluded, or do they shut themselves off? These questions are difficult to answer, and the answers will change over time. In addition, the interventions are small-scale, making it more difficult to map the exclusion. As an example; , if twenty people are joining an intervention, it can be a coincidence that certain groups are not reached based on the limited group-size. Despite this limitation on the inclusive design methodology, the toolkit still applies to the designers. For this reason, the designers are recommended to regularly measure engagement and participation, as explained in the Canvas tool. In this way, it can be monitored over a more extended period of time whether groups are still excluded.

During this project, one of the biggest challenges was mapping excluded groups. It could be said that there is a paradox in this challenge. From the literature and discussions with stakeholders, several

excluded groups were identified as unusual suspects. The motivations of these people are unknown, making it difficult for the designers to involve them. It was one of the aims of the project to learn more about these groups by talking to them and discovering their motivations and needs. Since the design team did not know how to reach these people, they could not help in establishing the first contact. An option could have been to get in touch through advertisements in the neighbourhood or via social media. However, the people reached then would exactly be the people that were not looked. A possible solution would be to approach random people from the neighbourhood. But due to time restrictions and COVID lockdown in the winter, this was difficult to achieve within this project. At the start of this project, it seemed a good approach to apply context mapping, but it turned out to be too complicated to find suitable candidates because of the paradox explained above. Therefore, this project mainly contains literature and observations from the end-user of the toolkit, the design team. For future research, it should be recommended to investigate the motivations of different groups of people for whether or not to be involved in the energy transition. Context mapping could be a suitable method to realise this. Such research can strengthen the Inzichtkaarten with data and knowledge from actual residents.

5.2 RECOMMENDATIONS

During the research and design process, I found numerous opportunities for future exploration. These are outlined below as possible next steps regarding both practical implications and further research.

1. Focussing each intervention on a specific target group to increase and diversify the reach

One of the biggest challenges for the design team is to reach a large and diverse group of residents. Currently, the solution is often to develop general interventions that are intended for large groups. I recommend the addition of developing smaller interventions for smaller, more specific target groups. In this way, the needs of these specific target groups can be properly met and more diverse participation can be reached within a period of time.

2. Extend to other stakeholders and parties involved in the energy transition

The final toolkit was designed and tested with the designers of Zeewaardig. Although, the designers never work alone in this context. Other stakeholders and people from the municipality are always involved. A logical next step would be to extend the toolkit to these stakeholders and investigate whether other users need adapted or different tools. In addition, through collaboration with other parties, the lack of diversity within the project Reyeroord

Aardgasvrij can be compensated for through collaborations. By involving others in the project, diversity within the team increases, leading to broader and more deployable solutions. The toolkit is a good starting point for involving other parties. For example, the Canvas helps to discuss the topic, and the Gis explains the basics of inclusion.

3. Applying the tools in other design areas

The validation test showed an interest in specific tools outside the energy transition project. In order to use the tools in other design projects, some adjustments will have to be made. Questions specifically about the energy transition can be replaced, and other target groups can be mapped for other domains.

4. Evaluating the toolkit's effect on a longer-term

In this project, the tools were developed and examined in various validation tests for usability and possible improvements. The tools are designed to be used multiple times since the users can learn new things even after using the tools multiple times. However, the long-term effect will have to be investigated in a follow-up study in order to make a statement. Results from such research can be used to improve the toolkit or follow-up tools and methods for more advanced users.

5. Deep dive into uncovering motives and needs of excluded target groups through a generative research approach

A limitation of this project is a lack of involvement of local residents and incorporating their input, opinion and needs into the tools for the designers. This was due to several circumstances; difficulty to identify target group, COVID-lockdown and project planning. In a follow-up study, I recommend mapping these stakeholders as well. Through generative research, latent needs can be identified. These insights can be processed in the Inzichtkaarten or an additional tool.

6. Taking a closer look at the effect of an inclusive approach for a fairer transition

This project was aimed at the influence designers have in the energy transition. An inclusive design approach will ensure broader and more diverse participation for the designers in Reyeroord. From this perspective, the inclusive approach leads to a fairer transition in the tackled context. Although, it must be investigated what the significance of this effect can be on the system as a whole.

7. Integrating an inclusive design approach to the energy transition on organisation and political level

As covered in the discussion, designers are only part of the energy transition and movement in the Netherlands. The opportunities that designers have currently depend on government regulations, political decisions, and organisations from municipalities. In various ways, these systems are maintained and currently can cause an unintentional unfair transition. To adapt the entire problem, a more inclusive energy transition will have to be tackled on all other levels as well, such as regulations, political processes and organisations. Future research could investigate if an inclusive design approach is applicable at these levels.

5.3 CONCLUSION

This project set out to explore how service designers can be supported in adopting a new approach to design more inclusively. The designers work together with the municipality and other stakeholders to stimulate the energy transition in the neighbourhood Reyeroord in Rotterdam. Their goal is to develop interventions that activate the residents of Reyeroord in the discontinuation of gas.

It seems that the interventions by the designers attract only a select group of "early adopters", but ultimately the energy transition takes place throughout the entire neighbourhood and thus influences all residents. Therefore, every resident needs to be aware of the changes to come and make choices about the changes that likely impact their home environment. An inclusive design process is proposed to contribute to a broader and more diverse participation in the neighbourhood. The design goal of this thesis was formulated as: 'To design a toolkit that enables service designers to practise a more inclusive design process when designing interventions in Reyeroord for a fairer energy transition.' A three diamond approach was used to identify the problem, research possible solutions, and iteratively develop a solution.

The first diamond focussed on exploring the problem. The research identified that the meaning of an inclusive energy transition is not clear to the various parties, making it difficult to set goals and achieve them.

A shared understanding was drawn up, in which an inclusive energy transition aims to include and integrate all people and groups in the activity of shifting residential homes from natural gas to a residual heating system while promoting the reduction of energy use and insulation in homes, especially those people who are disadvantaged.

From the research, it can be concluded that an inclusive design approach looks different depending on the applied context. The complex context of the energy transition shows points for improvement and challenges that can be solved with an inclusive approach. The main challenges were to overcome the lack of understanding of an inclusive design process, the lack of division of responsibilities, and the difficulties to reach a broader scope of residents.

During the idea finding phase, relevant research was done to support the brainstorm for ideas. This explorative study focused on the users of the toolkit and the essential elements for an inclusive approach. The following activities led to opportunities regarding the designers' process, insights about building a toolkit and various components. The exploration led to the discovery of eight solution spaces, areas that show opportunities for the implementation of an inclusive toolkit, which formed the basis of the final toolkit. The toolkit should enable the designers to (1) understand the principles of inclusion, (2) enable a discussion with other stakeholders,

(3) inform the designers about excluded groups of people, (4) provide the opportunity to empathy, make it easier to (5) approach residents and (6) introduce the topic energy transition, (7) be reminded to the inclusive design methodology, and finally (8) be able to evaluate the inclusivity of an intervention.

In the final phase, an iterative design approach led to the development of the inclusion toolkit, including four tools that support service designers to a more inclusive design approach. The toolkit contains; a tool for communication with other stakeholders to discuss and appoint tasks relevant to a more inclusive process, a tool that provides insights about excluded groups in the context in Reyeroord, a tool that enables designers to approach residents about the energy transition, and a tool that enables regular practise with the design principles to improve inclusive skills of the designers.

Lastly, the toolkit was evaluated through a validation test to answer if the toolkit facilitates the design team to practise a more inclusive approach. The toolkit supports the designers considering that the excluded groups are identified, the information provided, and design opportunities are mapped. The toolkit helps distribute the responsibility for inclusion, while tasks for inclusion are being put on the agenda. The designers are encouraged to focus on smaller groups. This can lead to broader and more diverse involvement in the energy transition in the neighbourhood. With this

result, most of the design team's challenges are improved or solved.

The validation showed that some improvements could be made regarding the tools. The most crucial insight is that the Gesprekswaaier should be simplified to be appropriately used by the designers. Other points for improvement are that the Dobbelstenen can be provided with active reminders, the Canvas must be tested with other stakeholders, and the Inzichtkaarten can provide the option to add newly gained information.

The implications of the energy transition on a societal scale start to appear. The research identified situations in which the energy transition causes social injustice. This project addressed some of these issues, since a more inclusive approach contributes to broader and more diverse participation in the neighbourhood and ensures a fairer energy transition. This thesis showed how the methodology of inclusive design could be implemented in the domain of the energy transition by using a specifically designed toolkit.

There is yet much to explore about how inclusivity can create a fairer energy transition in the broader scope of the Netherlands. I hope that this project provides a starting point from which these explorations can be launched.

5.4 REFLECTION ON THE PROJECT

In this section, I will reflect on my design competence and personal learnings.

An ambition of mine has always been to work in a field where sustainable and social issues meet. The internship at Zeewaardig and this graduation project have been my first experience within this field. I am still very motivated to further develop myself in this field. In addition, my interest in inclusion and ethical design challenges grew during this project. I've learned a lot about this topic, and it's even more complex than I've been able to explore within the scope of this project. So I'd love to continue in this field and learn more about this topic in the future.

One area in which I have learned a lot and can still improve is project management. At various points during the project, I ran into problems that could often be solved by taking a pause from the content and looking at the planning and approach on a more abstract level. During this project, I learned to become aware when chaos ensues and learned to trust the design process.

Some parts turned out very differently than I expected at the start of the project. I wanted to apply a context mapping approach in which generative sessions could be used to retrieve information from local residents. The problem was that I could not easily take the first step to clearly defining the target groups. In retrospect, I held onto this approach for too long and could have abandoned it earlier because, besides this

challenge, it was also challenging to get in touch with residents due to the COVID lockdown. In the end, I decided to let go of the context mapping approach and adopted a different approach: gathering information from literature and experts. I experienced that despite these contrasting design approaches, the same goal could still be achieved. After some chaos, I managed to identify the disadvantaged groups in the energy transition.

Looking back at the theory of context mapping (convivial toolbox) and the different meta-levels in design and research (paper), I understood why it was so challenging and did not get me the correct results. Previously I had tried to mix different approaches and methods. Through context mapping, a generative design approach, the designer gains insights in which the user collaborates as a partner. The residents were just not the target group for whom I was designing. In this project, the designers of Zeewaardig are the users of the toolkit. During the iterative development of the tools, the designers were closely involved and were treated as partners in development. It all sounds logical since I gained this insight, but I mixed up different parts resulting in a chaotic project setup.

A personal ambition was to discover my personal strengths during this project. Since this project is an individual project, it was a perfect opportunity to explore what I'm good at and what I really like to do. I have learned that my strengths lie in developing concepts,

setting up tests and analysing the insights that come from them to communicate these in a visual representation. During various tests, I received compliments about the level of detail of my work. I know that I like to work on this part of the process. It is the phase where a lot is still possible but no longer the uncertain beginning: the fuzzy front end. Previously I thought that I was not good at analysing data. During this project, I discovered that I pay attention to small details that others might overlook.

I noticed that I enjoy collaborating and working in a team in the future. For me, by working together, everyone can join forces, and I feel that many creative processes deliver better results with a diverse group of people. The COVID lockdown has also made me realise how valuable it is to go into contexts as a designer. Interacting with people, interviewing and testing in real life can provide many insights that can not be found in books. I would have loved to have done this more during this project, but due to the circumstances, not much was possible.

Another learning I want to share is something I noticed the last few weeks. I noticed that I often lacked creative confidence when dealing with intangible and unsure phases in the design process. When feeling insecure, I could often search for others' confirmation instead of being open to new insights or experiences. With growing

creative confidence, also my personal attitude towards criticism changed, making it easier to tackle challenges with an optimistic view.

This project taught me to balance my work and wellbeing. I have started to understand my own boundaries during these last few months. There is a thin line between pushing myself to work harder or pushing myself too far. This period has taught me valuable lessons, and I am thankful to have learned this in this phase of my life.

Even though this is my last project as a student, I haven't finished learning yet. I look forward to delving into specific topics and continuing to improve my skills in design and project management.

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