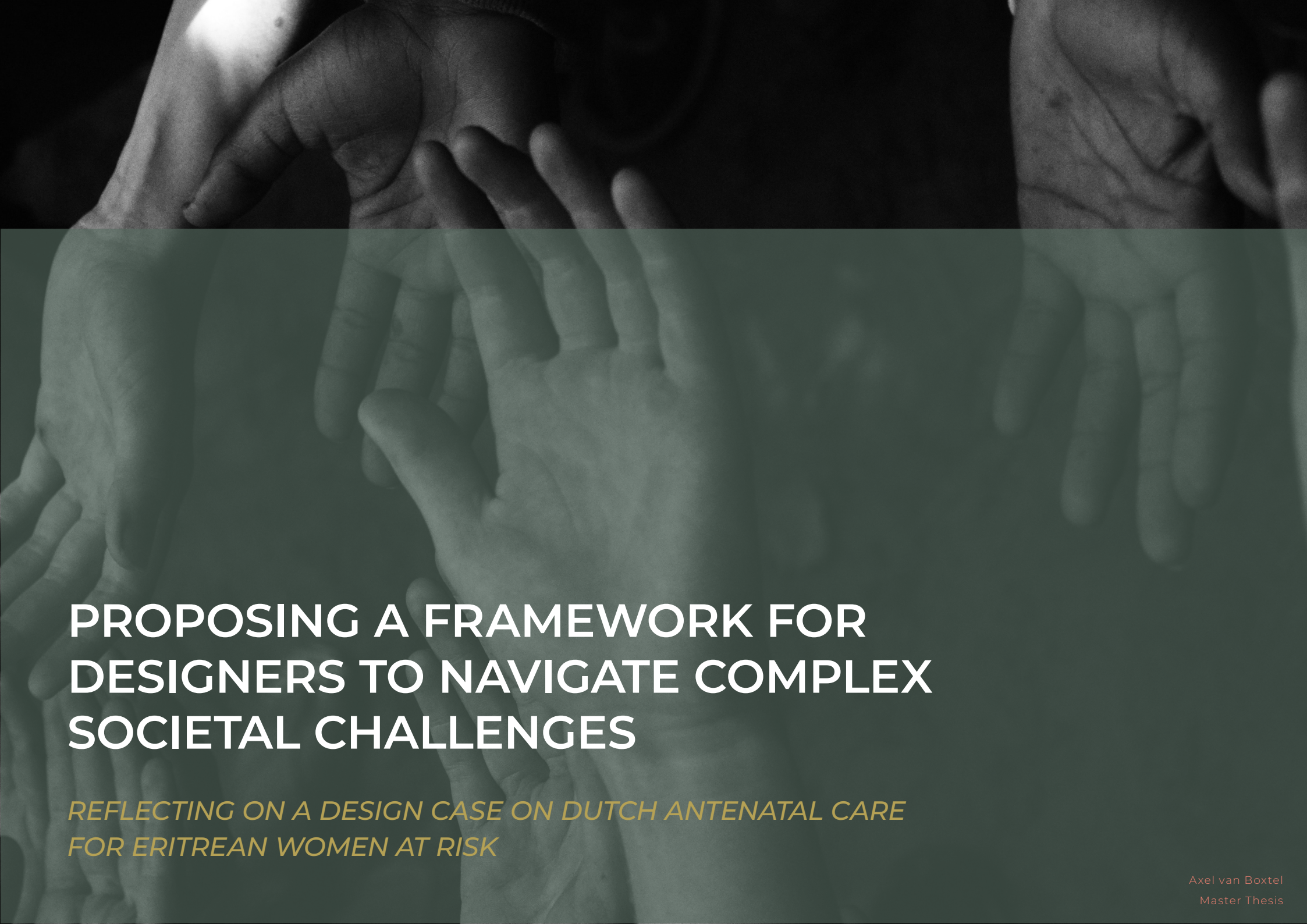


PROPOSING A FRAMEWORK FOR DESIGNERS TO NAVIGATE COMPLEX SOCIETAL CHALLENGES

REFLECTING ON A DESIGN CASE ON DUTCH ANTENATAL CARE FOR ERITREAN WOMEN AT RISK

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Master Thesis



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ABSTRACT

Complex societal challenges render confirmative problem-solving methods unsuccessful and demand a new approach to realize systemic change. Due to their empathy, creativity and ability to deal with ambiguity, designers are fit to play an important role in solving these complex societal challengese. This report argues for a leading role for designers in navigating these challenges and proposes a theoretical framework. The framework is introduced in a design case on antenatal care.

In addition to interviews, and prototyping efforts, multiple design workshops were organized where system interventions were co-designed together with designers, stakeholders and experts. As outcome of the design case, the Caring Pregnancy Toolkit is proposed. The toolkit embodies three interventions that enable care professionals and social workers to improve antenatal care for Eritrean women at risk. The toolkit is connected to an online co-design platform that faciliates an ongoing development of the tools. Expert interviews confirmed the potential of the concept and the toolkit provides a medium for further research and development.

The toolkit's design process was taken as a first use case to assess and reflect on the framework. The analysis clarified that the attitudes and behaviours presented in the framework appeared dynamically throughout the design process. Preliminary insights confirmed the potential relevance of such a framework for designers. Future work is proposed considering the development of the toolkit, and the evaluation of the framework.

PROJECT INFO

About

My name is Axel van Boxtel, I am an Industrial Design graduate at Eindhoven University of Technology with a background in Product design. I am inspired by the capacity of design to realize change and I value the freedom to explore new perspectives on potential the role of designers in future society. In this report I share my final master project in which I aim to combine my academic interests in creative leadership and transformation with my personal drive to make meaningful change by humanizing societal systems.

Research Group

This report describes the final master project at the Department of Industrial Design at Eindhoven University of Technology. Within the department, the project is conducted in the Systemic Change research group. Systemic change considers the role of design in societal challenges by studying the impact of interventions on community-level ecosystems (TU/e, 2020).

> *"Systemic Change uses Design and Technology to study socio-technical systems at the level of a community, by designing technology-enabled interventions addressing societal challenges and analysing their effect on the eco-system." (TU/e, 2020)*

Specialization Track

Additionally, the project is conducted within a specialization track. In this case being the 'Design Leadership and Entrepreneurship' specialization track. This track focuses on supporting design education that enables students to become design leaders or entrepreneurs. In this case the role of an entrepreneur is quite clear and can be defined by setting up your own business. The role of a design leader, however, is a bit more open and debatable but can be generally seen as enabling a community in their creative efforts. Design leadership is the focus for this particular project, and this will be further elaborated upon in the introduction.

Philips

The project is conducted in the form of a graduate assignment at Philips Experience Design located at the High-Tech Campus Eindhoven. Philips has an extensive history and expertise in design and has already won multiple awards for their systemic design efforts. Philips draws on their rich experience in the field of systemic design and social innovation to provide support throughout the process. My personal goal throughout this project is to draw on this rich and diverse body of expertise that exists within Philips to bring the design process and academic quality of this project to a higher level. The goal of Philips in this project is to receive a practical concept and prototype with which they can enter a testing phase.

Pandemic

this project was conducted during the course of the Covid-19 pandemic. This presented a unique set of challenges in the context for design due to sudden restrictions in social interaction, working from home and immediate closing of all unnecessary facilities. For example, restrictions made it impossible to visit organizations, facilitate physical co-design workshops, and build the relations needed to create an actual design network. In response, all design workshops were translated to an online environment and sessions were done to explore how design leadership qualities could be translated to a digital context. Moreover, it became impossible to directly collaborate with the women at risk which was mitigated by working with cultural experts and translators. Lastly, the onboarding activities at Philips had to be cancelled, so I organized online coffee meetups to get to know my colleagues despite the social distance. I want to address this because it greatly impacted the project, and some design choices might appear inappropriate without this understanding.

THESIS OUTLINE

This chapter elaborates on the structure of the thesis and provides a summary of the overall contents.

The report seperately adresses two nested components, the development of a framework, and the design of a toolkit. The components divide the report in three phases that are structured in the following manner.

Phase 1:
The report starts with drawing on the relevance of design for complex societal challenges and proposes a theoretical framework that supports designers to take a leading role in such challenges.

Phase 2:
The framework was introduced in a design case on Dutch antenatal care for women at risk. The progress of the design case is shared, and the Caring Pregnancy Toolkit is presented.

Phase 3:
The toolkit's design process was taken as a first use case to assess and reflect on the framework.

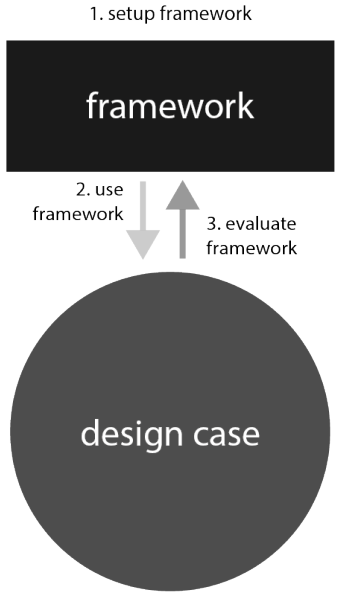


figure 1: overview of thesis structure

Summary

Complex societal challenges render conformative problem-solving methods unsuccessful and demand new approaches to realize systemic change. Due to their empathy, creativity and ability to deal with ambiguity designers are fit to play an important role in these complex problems.

Despite the growing body of literature on this subject there are few tools and approaches to support designers to navigate these challenges. This report argues a leading role for designers and a theoretical framework is proposed. The framework draws on literature from systemic design, creative leadership and systems leadership to establish a set of attitudes and behaviours that designers can use to navigate complexity.

The framework is introduced in a design case on antenatal care. Perinatal death is a pressing problem in the Netherlands and the group of women that is at high risk for maternal death consists mostly of non-western immigrants. This project focuses specifically on Eritrean refugees because Eritreans refugees are considered as the group with the highest risk due to influential factors such as: illiteracy, low education, language barriers. Moreover, this is one of the largest groups of non-western immigrants in the Netherlands.

The design process, started with an exploration of the ecosystem. Through interviews with experts an understanding of the problem space was found. After exploring the opportunities for design, the decision was made to take a participatory approach. Multiple design workshops were organized where system interventions were co-designed by designers, stakeholders and experts. The output from the workshop was analysed to outline to problem and solution spaces. The solution space was further explored in an extensive ideation and based on a review of the expert interviews, and a macro analysis of the ecosystem, the decision was made to combine multiple potential interventions in a physical toolkit. These tools being: healthcare maps, translation cards, and pregnancy passports. Finally, the Caring Pregnancy Toolkit is proposed as a concept that enables care professionals and social workers to improve antenatal care for Eritrean women at risk. The toolkit is connected to an online co-design platform that faciliates an ongoing development of the tools. Expert interviews confirmed the potential of the concept and the toolkit provides a medium for further research and development.

The toolkit's design process was taken as a first use case to assess and reflect on the framework. The analysis clarified that the attitudes and behaviours presented in the framework appeared dynamically throughout the design process. Preliminary insights confirmed the potential relevance of such a framework for designers.

PHASE 1
ESTABLISHING THE FRAMEWORK

INTRODUCTION

This chapter emphasizes the opportunity for designers to take a leading role in complex societal challenges.

Complex Societal Challenges

The twenty-first century confronts societies and governments with entangled sets of problems on a global scale (Jones, 2017). Take for example the Sustainable Development Goals formulated by the United Nations (2015). Contemporary society is facing increasingly complex societal challenges in ecology, social economy and governance. These challenges have become interconnected wicked problems. This increasing complexity is the result of globalization, emerging markets, speed and availability of information and economic and political uncertainty (McCauley, Van Velsor & Ruderman, 2010). These challenges are characterized by their high complexity, distributed power structures, and interrelatedness. Kees Dorst (2015) classifies the nature of these contemporary challenges as “open, complex, dynamic, and networked”. Scholars agree that the complexity of these challenges sidelines conventional problem-solving methods and demand new approaches, mindsets and skills (Dorst, 2015; Jones, 2017; van der Bijl-Brouwer, 2017).

Designers as Leaders

To take these new approaches mindsets and skills into practice means to establish new perspectives on leadership that encompasses the interrelatedness of problems and can deal with the ambiguity and connectedness that comes with these complex challenges (Nelson, 2016). In the past decades, developments in leadership literature have become increasingly directed towards societal change (Thornhill-Miller & Muratovski, 2016). The skills and mindsets that form these new types of societal-change-based leadership show remarkable commonalities with the skills and mindset of designers (von Thienen, Meinel & Nicolai, 2013). In addition to their creativity and empathy, designers are known for their ability to deal with ambiguity and facilitate a meaningful dialogue. Amongst others, these characteristics give designers the potential to provide a valuable contribution in leadership for these complex societal challenges (Koomans & Hilders, 2016).

Higher Order Design

At the same time, designers are moving into higher orders with their practice by stepping into complex domains such as organizational, and social transformation (Aguirre, Agudelo & Romm, 2017; Jones, 2017). Designing for complex societal challenges urges a normative reframing of future problem-solving possibilities. These domains demand approaches that consider different forms of stakeholder participation whilst leaving space for situated emergence (van der Bijl-Brouwer, 2017). This shows an adaption in design practices that have become increasingly systemic. Much work has been done over the past two decades through a variety of new approaches on design for macro-level problems (i.e., Social Design, Service Design, Transformation Design, Transition Design, DesignX). However, the circumstances in these contexts are too complex to address with any single practice or discipline (Jones, 2017). Scholars from these fields propose various ways in which an increased complexity can be addressed by integrating system thinking theories into design practices (Bijl-Brouwer & Malcolm, 2020).

Systems Thinking

Systems thinking builds on synthetic reasoning which considers individual elements that collectively form an indivisible whole through their relations. “A system is a relationship of parts that work together in an organized manner to accomplish a common purpose” (Richard Buchanan, 2019 p. 86). It was established because deterministic and reductionistic takes were found to be inadequate when addressing complex problems. In the past decades, systems thinking has established a rich body of literature and several schools of thought (Jonas, 2018). However, systems thinking has been criticized for failing to address complex societal challenges in practice by relying too much on engineering and modelling approaches, diminishing the social reality of human beings. It failed to integrate the lived experiences of the individuals acting in the system (Buchanan, 2019).

On the other hand, since the nineteenth century developments in design practice display the fundamental importance of experimentation and lived experience in how designers reshape society. These understandings in design challenge the shortcomings of systems thinking. Also, the theories from the various schools of systems thinking explore approaches to address the higher order challenges that design practices were aiming for. In searching for opportunities,

systemic design was found. Systemic design connects the fields of design and systems thinking to help designers address more complex challenges (van der Bijl-Brouwer, 2017). In contrast to the previously mentioned design approaches, systemic design considers these macro-scale challenges from a different perspective. It focuses on radical change of service systems and societal challenges through the creation of better suitable processes and practices (Jones, 2017).

Approach

The emerging resemblances between design, leadership and systems thinking reveal an opportunity to develop methods and tools that support designers in addressing complex societal challenges. This report goes a step further and argues that designers should take a leading role in addressing complex societal challenges. By drawing on literature from across the domains of design, leadership and systems thinking, the following chapter of this report aims to establish a theoretical framework that enables designers to decide upon appropriate attitudes and behaviours to navigate societal complexity.

1.2 FRAMEWORK

This chapter propses a theoretical framework for designers by drawing on literature in systems thinkinig, leadership and design.

The systemic design community provides a collection of theories and tools for designers to help them act in complexity and address this complexity with other stakeholders. This report tries to open up a space that describes behaviours and attitudes that help designers to address these challenges as leaders. The framework provides an abstract guidance that helps to steer the global direction of such projects and inform decisions. Peter Jones (2009) emphasizes on the need for stepping down and reformulating system thinking methods and models to become locally appropriate and accessible. The aim of the framework is to develop an instrument that supports designers to take a leading role when designing for complex societal challenges.

Systems Thinking

As mentioned in the introduction, systems thinking is a fundamental principle when addressing complex systems. This report draws on two domains that build on the concepts of systems thinking to shape practices to realise systemic change. Systemic Design and Systems Leadership step away from the theoretical and calculative nature of systems thinking by connecting and adapting it to a practice.

Systemic Design

Systemic design extends user-centered design to the context of complex, multi-stakeholder service systems (Jones, 2014). It is a pluralistic initiative where many different approaches are encouraged to thrive and where dialogue and organic development of new practices is central. To build on the emerging field of designers addressing complexity, the Systemic Design Association (SDA) was found in 2012 to advance the integrated discipline of systemic design (SDA, 2020). The SDA hosts the Relating Systems Thinking and Design' (RSD) symposium where scholars connect to establish a foundation for researching this emerging discipline. As is described in the introduction, Systemic Design is a new practice that refers to the combination of systems thinking and human centered

design that is intended to help designers to address the increasingly complex challenges society is facing (Jones & Kijima, 2018). Systemic Design combines the theories and models from system thinking with tools and methods from user centered design building on related theories such as Panarchy (Berkes & Ross, 2016), Cybernetics (Pangaro, 2013), and the Multi-Level Perspective (Geels, 2011) and translating these into methods, tools and principles for design (Jones, 2014; Namahn, 2020). To consider the context of social change within systemic design, this report draws on the work of Van der Bijl-Brouwer and Malcolm (2020). In their case study on systemic design in social innovation, they share five principles of systemic design being:

1. Opening up and acknowledging the interrelatedness of problems
2. Developing empathy with the system
3. Strengthening human relationships to enable creativity and learning
4. Influencing mental models to enable change
5. Adopting an evolutionary design approach to desired systemic change

These principles are implemented in the framework as an outline for attitudes and behaviours in systemic design.

Leadership

New forms of leadership play an important role in realizing change in complex societal challenges (McCauley, Van Velsor & Ruderman, 2010; Koomans and Hilders, 2016). To get a better understanding of leadership it is often compared to management, where management is described as an approach that aims to find stability in the short term, leadership focuses on the changes that are needed for the long term. Management and leadership never exist in isolation from each other, and both are needed to actually implement and sustain change. However, when relating to the role of designers in systemic change, management practices are less relevant since they focus more on incremental optimization rather than empowering and cultivating collectives on a journey to paradigmatic change. In this chapter I delineate the role of leadership in designing for systemic change.

Creative Leadership

Harris (2009) argues that formal conformist leadership approaches can suppress creativity. In response, Harris proposes that creative leadership is about connecting people with different perspectives so that mutual learning can occur through creative dissonance, disagreement and dialogue. It is about creating an environment that can capture creativity and challenge the status quo instead of stimulating individual conforming behaviour. "*the main task of a creative leader is to connect different people, ideas and ways of thinking*" (Harris, 2009, p. 11). Gheerawo, Flory & Ivanova (2020), note that creative leadership exists through three attributes which can be learned and sustained, the attributes being: empathy, clarity and, creativity. Randel & Jaussi, (2019) add that creative leadership fundamentally differs from traditional leadership styles because a creative leader should provide guidance and structure without promoting conforming behavior. Instead, a creative leader should stimulate autonomy and exploration and navigate the creative activities to fit within the organizational objectives.

A more fundamental definition of creative leadership is that of Mainemelis, Epitropaki and Kark (2018), they define creative leadership as "*leading others toward the attainment of a creative outcome*" (Mainemelis, Epitropaki & Kark, 2018, p.22). In their influential literature review on creative leadership, Mainemelis, Epitropaki & Kark (2015), presents three conceptualizations of creative leadership being "Facilitating, Directing and Integrating". These three conceptualizations differ in their ratio of leader/follower creative contributions. 'Facilitating' has a focus on stimulating employee creativity, 'Directing' builds towards the realization of the creative vision of a leader and, 'Integrating' is about finding a synthesis between the leaders and others' vision and creative contributions.

Systems leadership

Systems thinking also inspired scholars in the social innovation domain to formulate new leadership practices. The growing complexity of contemporary society and interconnectedness of societal challenges demands a new form of leadership (World Economic Forum, 2020). Systems leadership is about navigating situations where power is distributed and cannot be solved with a top-down approach that focuses on one single area. Systems leadership is a form of leadership that embraces challenges where no single actor can exercise meaningful control.

The World Economic Forum (2020) constructed attributes of a "systems leader" being: humility, integrity, interest in the system over one's self, ability to facilitate constructive dialogue. Nelson (2016) proposes three key roles of system leaders and places these roles within the context of three dimensions of systems

leadership. The three key roles are: "*1 cultivating a shared vision for change; 2 empowering widespread innovation and action; 3 enabling mutual accountability for progress.*" In addition to the roles, Nelson (2016) shares three dimensions of Systems Leadership distinguishing between, *Interactive, Institutional and Individual*. Interactive system leadership refers to a distinct type of organization that functions across a system to achieve scale and awareness. Such organizations are commonly referred to as backbone organizations that focus on connecting the right stakeholders and facilities around a challenge to cultivate systemic change. Institutional system leadership refers to organizations that meet their goals in a way that it contributes to the system in which it operates. This can be done through "*unilateral efforts, project-based partnerships, broader networks"* Individual system leaders have an awareness of the larger system they operate in. They can foster constructive dialogue and shift a focus from problem solving, to co-creation of a potential reality. Individual system leaders possess qualities such as: "*self-awareness, openness, curiosity, comfort with emotion and ambiguity*". These types of system leaders need the ability to live with the paradox that arises when you are combining the intention that is required to reach a goal, with the emergence that unravels in collective collaboration. Since interactive and institutional systems leadership focus more on organizations, individual systems leadership is taken forward in this framework.

Participation

What differentiates the theories that are selected for the framework is that they differ from traditional system sciences in how they relate to social reality. All domains have the commonality that they emphasize on the connection with the actors in the system. The word leadership can be misleading and trigger a top-down perspective. However, the framework emphasizes on the participatory aspects of these domains. Many scholars emphasize the importance of participation in systemic change. Working with the community and empowering them to work and realize change is fundamental. Leadership in this context should be considered a means to empower the actors in the system to collaborate and create on a desired future. The role of leadership is being an ambassador for a societal challenge and connecting both actors and experts around this challenge through purpose. In addition to the participation of people who are part of the ecosystem that is addressed, other forms of participation can be considered when designing for complexity.

A way to facilitate such participation is through design networks that unite a group of people around a common purpose. Buré & van der Bijl-Brouwer (2018) build on the concept of a design network founded by Manzini (2015). Design networks are highly diverse groups of people with different backgrounds that collectively address a complex societal challenge. Design networks share several distinctive characteristics. They consist of individuals that are divided over several teams or organizations connected with the goals to address a certain societal issue. Together they think of, and test novel ideas aimed at moving a system towards a shared purpose. And, the individuals in the network come from various companies or communities and take on diverse roles. Such networks differentiate by their scale, required input and the length of collaboration (Buré & van der Bijl-Brouwer, 2018).

Proposed Framework

Since there is no fixed process to address complexity, the framework does not entail specific steps or orders. The framework guides decisions by proposing attitudes and behaviours. Designers can select and combine the attitudes and behaviours they deem appropriate throughout their process to inform their approaches.

Systemic Design

Definition: *"Systemic design connects elements of systems thinking with elements of design to help designers address complex societal challenges."* (Bijl-Brouwer & Malcolm, 2020 p.1)

"*Systemic design brings human-centred design to complex, multi-stakeholder service systems. It adapts from known design competencies to describe, map, propose and reconfigure complex social systems.*" (SDA, 2020)

Attitudes and behaviours: Systemic design is characterised by: Opening up and acknowledging the interrelatedness of problems; Developing empathy with the system; Strengthening human relationships to enable creativity and learning; Influencing mental models to enable change; Adopting an evolutionary design approach to desired systemic change.

Systems Leadership

Definition: "*System leadership works by cultivating a shared vision for change, empowering widespread innovation and action, and enabling mutual accountability.*" (Nelson, 2016 p.5)

Attitudes and behaviours: Systems leaders operate across organizations, communities and social networks and act as an ambassador for societal change. System leaders should cultivate humility, integrity, an interest in the larger system and the ability to facilitate constructive dialogue between stakeholders from different perspective. Most importantly, system leaders should cultivate a shared vision for change, empowering widespread innovation and action and enable mutual accountability for progress.

Creative Leadership

Definition: *"leading others toward the attainment of a creative outcome"* (Mainemelis, Epitropaki & Kark, 2018, p.22)

"the main task of a creative leader is to connect different people, ideas and ways of thinking" (Harris, 2009, p. 11)

Attitudes and behaviours: Creative leaders either facilitate the creation of a vision of subordinates, direct a community to realise their vision or, synthesize both by connecting a community around a co-created vision that directs creative efforts. A creative leader should combine diverse perspectives to shape an atmosphere where creative dissonance and disagreement result in enriching dialogues. They stimulate autonomy and exploration and navigate creative activities to fit within the global objectives.

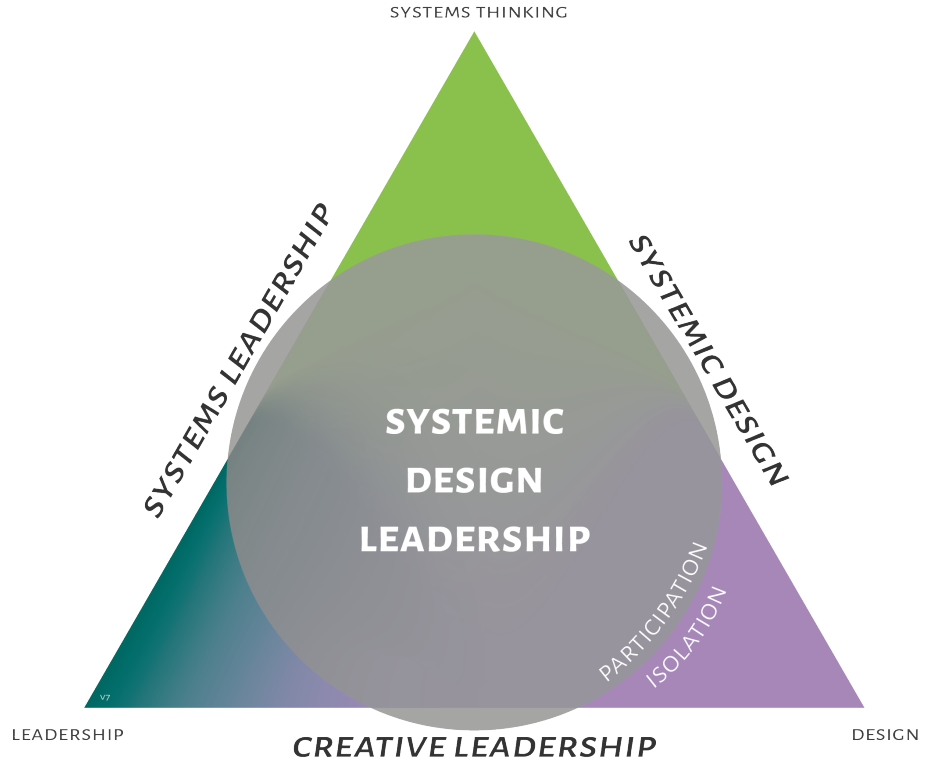


figure 2: proposed framework

figure 2: proposed framework

PHASE 2
INTRODUCING THE FRAMEWORK IN A DESIGN CASE

2.1 DESIGN BRIEF

In the Netherlands, maternal and perinatal mortality is an issue that disproportionately affects certain groups of women. In the Netherlands, perinatal mortality rates are higher for immigrants and much higher for non-western immigrants compared to women with a Dutch background (CBS, 2016; Garssen & van der Meulen, 2004; de Jonge et al., 2020). In addition, research shows that the areas with the highest perinatal and maternal mortality in the Netherlands correlate with socio-economically deprived neighbourhoods (Waelput et al., 2017). There are several potential causes for this situation; 1) Women living in deprived areas often book antenatal care visits too late which delays the detection of risks factors, 2) There is insufficient level of cooperation and shared care between different levels of healthcare providers. 3) There is a higher prevalence of specific medical and social risk factors amongst vulnerable women.

To overcome these issues, an initiative is set up with Philips Experience Design, Máxima Medical Centre Veldhoven and Eindhoven University of Technology, with the goal of Improving care of vulnerable women in the Netherlands by early identification of perinatal and maternal risks. As formulated by Philips, this initiative builds upon two complementary “Innovation Streams” that support the holistic development of interventions for system change. Innovation Stream 1 focusses on guiding and empowering vulnerable women for healthier pregnancy. TU/e Industrial Design Faculty is contributing to support the maternal journey of vulnerable women in the community. Innovation Stream 2 is about supporting seamless shared care team collaboration for earlier risk detection. Philips is collaborating with obstetricians and gynaecologists from Maxima Medical Centre and midwives to improve the collaboration and effectiveness across primary care and secondary for this stream.

The first stream is about raising awareness of the importance of appropriate care by engaging, empowering and supporting the women in understanding the healthcare system. The second stream is about navigating through the healthcare system and connecting the different care providers to supervise the women. This project is part of Innovation Stream 1. For this innovation stream, several design projects have already been done by TU/e Industrial Design students. This thesis builds upon these projects and combines the previous learnings of these more exploratory projects with the goal to design towards a more realistic implementable concept, focusing on the first step in this complex problem: connection and engagement of the vulnerable group.

This project aims to bring healthcare closer, moreover earlier to pregnant women at risk, and make the Dutch Healthcare System more accessible. We will rethink and support the first point of interaction with healthcare to help women better understand the healthcare path. Suitable channels need to be activated with appropriate tools that are tailored to the context, working towards an engagement strategy with a (subset of) tool(s).

Goal: Guidance & empowerment of vulnerable women for healthier pregnancy in the Netherlands.

2.2 EXPLORING THE ECOSYSTEM

During this phase a basic understanding of the system was established by connecting with a variety of experts and organizations. This phase consists of an interplay between exploratory design activities, desk research and interviews. As a result, the target group was specified and a mapping of the stakeholders in the system was made.

Expert Interviews

Since my knowledge on this subject was superficial, I wanted to explore the ecosystem and learn from the experts in the field. Therefore, semi-structured interviews (Leech, 2002) were conducted with three professionals that cover the variety of expertises in the ecosystem. The participants have a background as midwife, social worker, and cultural expert.

Interview Setup

The goal of the questions that were formulated for the interviews was to stay on the subject of antenatal care for non-western immigrants. The number of questions was kept to a minimal since the intention here was to learn from the expertise of the participants. The interviews were setup in the following manner: After making contact with the participants. The background of project was explained together with the purpose of the interview: learning more about the problem and the ecosystem it is situated in. This introduction naturally sparked a conversation on the topic and depending on the quality and direction of the conversation a selection of the following questions was addressed to guide the interview in the right direction.

- Could you describe your experiences with pregnancy among non-western immigrants?

- Could you describe your experiences with (antenatal) healthcare for non-western immigrants?

- Could you describe the role of your organization in the life of a non-western immigrant?

- Could you describe the role of your organization in the ecosystem of (antenatal) care for non-western immigrants?

Midwife

The midwife shared that fear of financial struggles is a barrier for vulnerable women to contact antenatal experts. She also noted that there are a lot of beliefs related to pregnancy that influence the need for healthcare. The highest risk of a miscarriage is in the first twelve weeks. Therefore, some people wait twelve weeks before contacting a midwife or general practitione. While they could help to prevent a miscarriage in these first twelve weeks. She also noted that vulnerable groups are at higher risk because of their psychological and physiological conditions. These conditions increase the risk of miscarriage and therefore it is even more important that these women access the healthcare system on time. The midwife informed me on the role of nuns in African communities during pregnancy and shares that religion is an important aspect of pregnancy for many cultures. She adviced me to work with ambassadors within a community and visit some churches.

Social Worker

The social worker shared that navigating healthcare is not something that is common for refugees, especially not in this setting. Despite the fact that some people are not used to receiving healthcare at all, there is the fear of dealing with these medical organization for people who are not legal citizens yet because they are afraid that they might contact legal authorities. Moreover, they are also afraid of unexpected costs since healthcare is a service for the rich in most developing countries. The social worker shared stories about women that were not considering care when they were pregnant because in their culture everyone gives birth in the community and if the child does not live then this is how it should be. Not receiving antenatal care is the norm for them. Also, some people are not in a safe environment yet and are therefore not considering their personal health. The social worker shares a recent story of a homeless pregnant women. Then finally there is the element of fear and shame for pregnancy as a result of extramarital intercourse or becoming pregnant before marriage, or pregnancy as a result of rape. And lastly, there is the barrier of language where people are not able to communicate effectively with healthcare providers. The interview with the social worker gave me a good realization on the complex reality of this issue.

Cultural Expert

The participant in this interview has a migration background and conducted research about antenatal care for Eritrean women at risk.

The participant shared that the main theme in this group relates to understanding of personal and reproductive health. The group of Eritrean women at risk is young, largely illiterate, has a low understanding of personal and reproductive health, is not on birth control and does not understand the healthcare system. There is a very low understanding of personal health, most women do not even know what a womb is, this makes it impossible for midwifes to properly support these women. Moreover, there are extremely large differences in communication and there is a lot of distrust towards care professionals. Women often withhold information because of shame or distrust.

In general, Syrians are better educated, better able to find information online and more used to having healthcare. For Eritreans this is highly difficult they don't know how a care system works and they don't know about their personal health. The expert emphasized on the importance of education with this target group and describes the following steps towards better antenatal health: educate on personal health educate on care system, improve trust, improve agency and improve motivation. Moreover, the expert shared that it is important to involve these women as soon as possible because there are so many cultural differences in the culture that this is the only way to learn if something works. Illiteracy is often underestimated and even developing a flyer becomes a highly complex and time-consuming process in this context.

The first contact point for refugees is the GezondheidsZorg Asielzoekers (meaning healthcare asylum seekers), commonly referred to as GZA. The GZA is the healthcare facility at asylum centres. The GZA provides only the essential care and postpones as much as possible. The facilities differ between the various asylum centre because there is no central contract and every GZA is responsible for arranging their own care facilities. On the asylum centre every refugee has a special healthcare insurance. Refugees are a complex target group because of the combination of factors. There is a language barrier, they don't know the healthcare system, they are often traumatized, they are mostly low educated, and they are in the legal procedure requesting citizenship. The future is very uncertain and perhaps they still have an entire family danger in their native country.

In the end of the interview, the expert emphasized that Eritreans are the most difficult target group because of their illiteracy, low education and highly introvert culture. This makes Eritreans more prone to health risks. This is very different with Syrians. The expert motivated me to narrow down the target group by finding out what group is the largest and most at risk..

Target Group Particularization

The interviews made me realize what this societal complexity means in practice. In order to address this challenge in the course a semester, I needed to reframe the problem and decide on a more specific target group. The overload of different parameters and ambiguity makes it impossible to design without input from the target group. As a next step, I conducted a short desk research to reframe the target group.

Eritrean women at risk

In the beginning of the project, the challenge stated 'vulnerable women' as a target group to design for. This group ranges from Dutch women from a low socio-economic class to Mongolian refugees. To be able to address this challenge in four months, I specified the target group. In the selection of the target group my goal was to get the largest impact. I searched for a balance between the largest group and the most vulnerable. I found that non-western immigrants are the largest group that have a very high perinatal mortality rate. The group of non-western immigrants is still very large, so I decided to dive deeper. However, since this group is still highly diverse in culture, I decided to focus on Eritrean and Syrian people since these were the largest group of non-western immigrants. Because low education is a predictor for perinatal risk, I decided not to focus on educated migrant workers and expats. After diving into the Eritrean and Syrian culture I found that there is a large difference in their level of education and health understanding. Multiple social workers and caregivers shared with me that Syrian women are more used to western way of working and are therefore less at risk. Also, almost all social workers and caregivers shared that they were worried about the Eritrean people because they were struggling to provide the right support for this group, and they found that this group has the most difficulties in integrating due to the very large cultural differences. This made Eritrean refugees the most relevant and largest group of non-western immigrants at risk of perinatal death. Altogether, these insights supported my decision to direct this project on pregnant Eritrean women at risk.

Neonatal and Perinatal Mortality

There is a clear cultural discrepancy in infant mortality figures. Data from CBS shows (Table 1) that the perinatal mortality promille (infants that die after the first 22 weeks of pregnancy) is 7.0 for Dutch people, 6.6 for western immigrants and 9.8 for non-western immigrants. Among these there are several cultures that stand out. The perinatal mortality promille is 9.4 for Moroccan immigrants, 7,2 for Turkish immigrants, 8,4 for Surinam immigrants, 11.8 for immigrants from the former Netherlands Antilles and 11.3 for all other non-western immigrants (CBS, 2016). In 2016, there were 34.646 non-wester immigrants giving birth (Table 2) , of them 7.452 Moroccan, 6.240 Turkish, 4.511 Surinam, 2.320 former Netherlands Antilles and 14.123 from other underdeveloped Asian & African Countries (CBS, 2016). The group of immigrants from other underdeveloped Asian and African countries is by far the largest group, has the largest number of perinatal deaths and also the highest number infant mortality. Because of their size in combination with a high vulnerability, this group is chosen for examining how these numbers can be reduced.

Asylum Seekers in the Netherlands

The group of non-wester immigrants from underdeveloped African and Asian countries mostly consist of refugees. A study of CBS monitored all asylum seekers that entered the COA-center since 2014 (CBS, 2019). Around half of the asylum seekers registers in at the COA as single. Only 3-4% of the asylum seekers enters with a partner but without children. From 2014 until half of 2018 (Table 3) the large majority of asylum seekers are Syrian (111.805 in 4,5 years) and Eritrean (22.800 people in 4,5 years). On average, asylum seekers have to wait 109 days from first entry to the COA to receiving housing in the municipality. Considering the average composition of asylum seekers this group consists mainly of Syrians and Eritreans (CBS, 2019).

Eritrean Culture

Eritrea consists for 67,8& of illiterate inhabitants and can be divided in nine groups with their own languages (Tigrinya, Tigre, Afar, Saho, Kunama, Nara, Bilin, Hedareb & Rashaida) (Ferrier, Kahmann and Massink, 2017). Despite the fact that Eritrea has no official language, the Tigrinya and Tigre are the most dominant languages.

perinatal deaths (per 1000)	
Dutch	7
Western Immigrants	7,6
Non-Western Immigrants	9,8
Marrocan	9,4
Turkish	7,2
Surinam	8,4
All other	11,3

Table 1: overview of perinatal death in NL (CBS, 2016)

number of non-western immigrants giving birth in NL (2016)	
Marrocan	7.452
Turkish	6.240
Surinam	4.511
Former Netherlands Antilles	2.320
Underdeveloped Asian & Afrian Countries	14.123
Total	34.646

Table 2: composition of non-western immigrants in NL (CBS, 2016)

largest groups of asylum seekers in NL (2014 to first half 2018)	
Syrian	111.805
Eritrean	22.800
Irak	6515
Afghanistan	3260
Marocco	2200
Somalian	1265

Table 3: composition of asylum seekers in NL (CBS, 2019)

Ecosystem

To improve my understanding of the ecosystem, I made an overview that contains all the initiatives and organizations related to the challenge. A preliminary desk research on initiatives and organizations that provide healthcare or social support for asylum seekers is conducted. The outcome of the desk research was combined with the initiatives and organizations that were mentioned in the expert interviews to create the visual below.

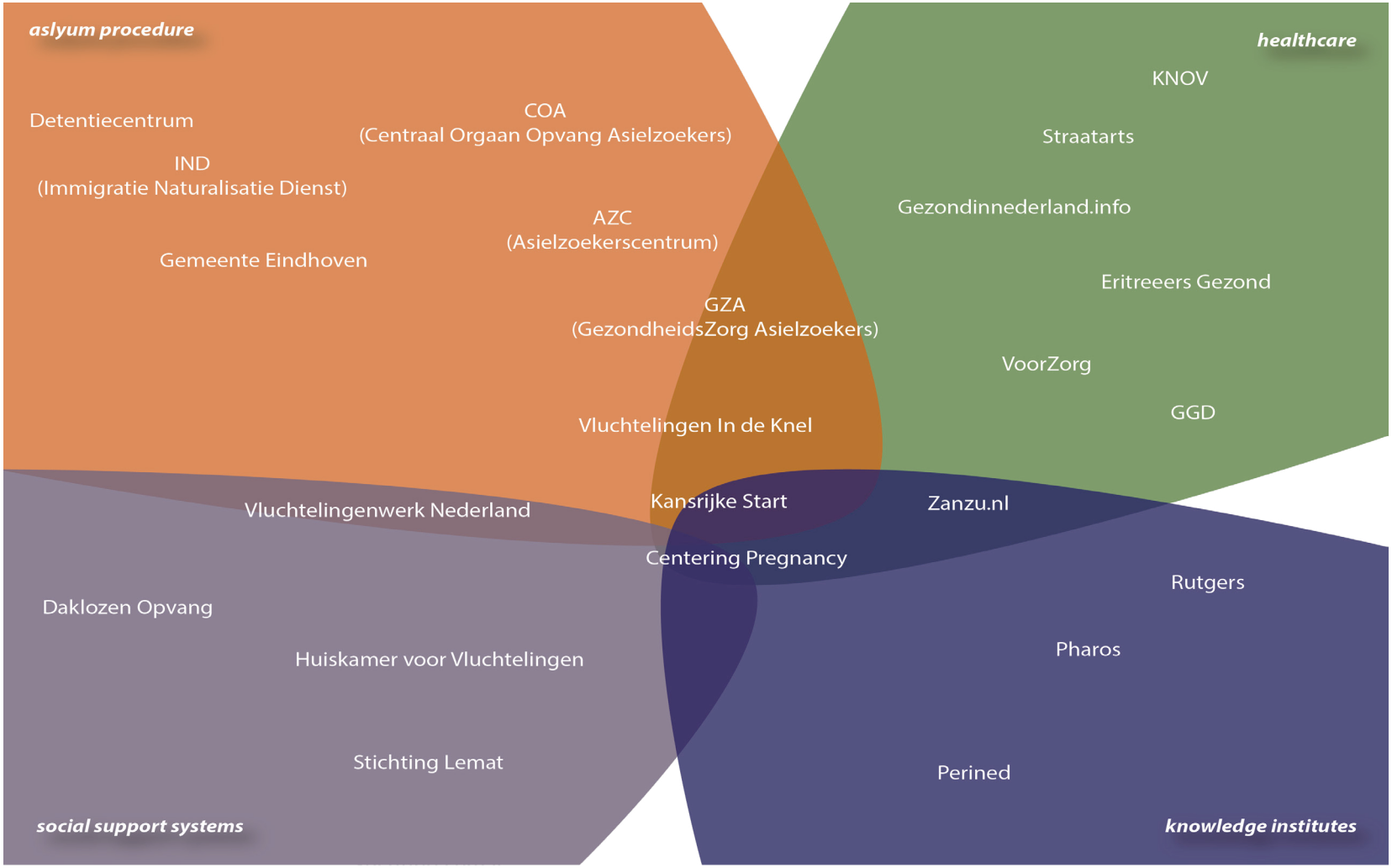


figure 3: stakeholder mapping of relevant organizations and initiative in the ecosystem

2.3 EXPLORING DESIGN OPPORTUNITIES

This chapter explored the opportunities for design by considering various forms and roles of design for this project. It started with an embodied exploration of prototypes. Followed by an interview that helped to narrow down the design space. Based on the large number and variety of design opportunities it was noted that the problem is too complex for individual consideration and a participatory systemic design workshop was considered.

https://vimeo.com/491417165

Prototyping

The large number of new insights from the previous chapter became overwhelming and made it difficult to frame a clear design opportunity. To get out over this complexity paralysis, I collected a highly diverse selection of prototyping materials and used it as stimuli to explore the possibilities of the design space (Jobst & Meinel, 2013). During this session I experimented with a variety of attributes such as exploring ways to grasp and visualize the complexity of the ecosystem or looking for ways to gather data within the highly different value landscape and social reality of the target group.

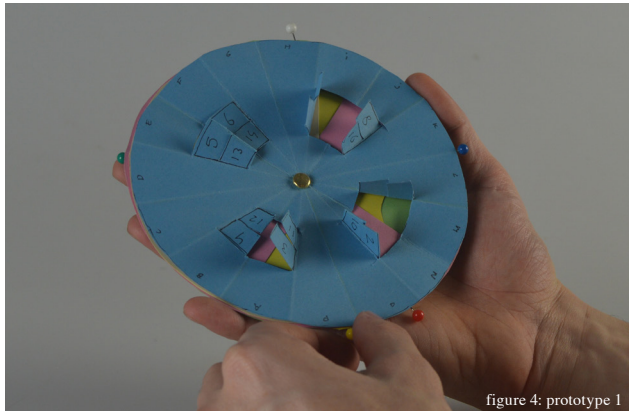


figure 4: prototype 1

Prototype 1: Visualizing the different processes in the life of the women at the moment of pregnancy to better understand how different journeys or services together shape difficult moments in life and how this could affect pregnancy, healthcare and stress.



figure 5: prototype 2

Prototype 2: Providing a vehicle for cross cultural communication through symbols that can spark various meanings in a interviews, co-creation session or in the context of use.

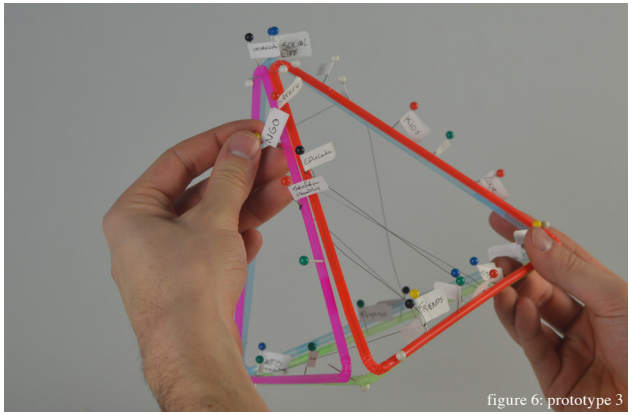


figure 6: prototype 3

Prototype 3: Visualizing the complexity by mapping out the different challenges, attributes and stakeholders in a physical pyramid.

Expert Interview

I conducted a semi-structured interview using the same format as the previous expert interviews. This participant works as a cultural expert and translator in group sessions that educate women at risk about pregnancy and birth in the Netherlands.

The expert shared that there is a pressing need for tools and materials that enable Eritrean women at risk to be better informed by care providers. The absence of appropriate information about pregnancy or care that is tailored to this target group is non-existent. Many care providers and social workers expressed the need for tools that help them to better understand and inform this target group. Moreover, the experts share that they are currently making the tools themselves to properly educate the Eritrean pregnant women about personal health and Dutch antenatal care. Female genetic mutilation, commonly referred to as FGM, is still highly common in Eritrea. FGM is something that Eritrean women rather not speak about and it is not known by Dutch caregivers. The women have very little trust in Dutch healthcare and care professionals. The expert also shared that there is a very high rate of depression among these women. Some commit suicide out of unbearable shame or hide their pregnancies as long as they can. There is no dialogue between caregivers and the women which makes it impossible for the women to trust their caregivers and difficult for the caregivers to attend to the woman's needs. Also, many women cope with heavy traumas which sometimes result in child abuse after birth. The expert elaborated on a recent experience with two pregnant women who died. One during pregnancy and one just after giving birth, finding the baby in bed with a dead mother after a day. It was emphasized that there is no education on personal health, reproductive health and antenatal care this is the most pressing problem that needs to be tackled first.

Design Opportunities

Looking back at all expert interviews I listed potential design opportunities. These opportunities are all highly relevant and it is therefore difficult to decide upon a single challenge. Moreover, because the problem is systemic, I tried to stay away from choosing a small part of the problem that needs a solution that makes very little impact. A systemic challenge is best addressed by developing multiple interventions and evaluating them in the lifeworld (van der Bijl-Brouwer &Malcolm, 2020). The design opportunities are listed below.

- Design tools to learn more about barriers of Eritrean women and their backgrounds
- Design tools that help educate Eritrean women about pregnancy in NL
- Design tools that connect important social stakeholders to care providers
- Design tool that enables vulnerable women to monitor their own pregnancy
- Design a tool that helps communication between caregivers and Eritreans
- Design an information provider that connects women to the system earlier
- Design tools that help social workers with educating Eritrean women
- Design tools that help to educate caregivers on Eritrean culture
- Design tools that improve the communication between caregivers and Eritrean women
- Design a tool that connects Eritrean women to social organizations
- Design tools for Eritrean women that inform them about reproductive health

Three Phase Model

Throughout the conversations I had with social workers, care providers and designers, I noticed that the problem could be split in three phases. The first step is to get women in contact with the right care providers to detect risks as early as possible the second step is to educate the women on the healthcare system to prepare them for their interaction with the system and manage their expectations to reduce stress and anxiety. The third step is to empower the women in their individual interaction with the system so that they can effectively communicate their needs and understand the advice of the caregivers autonomously.

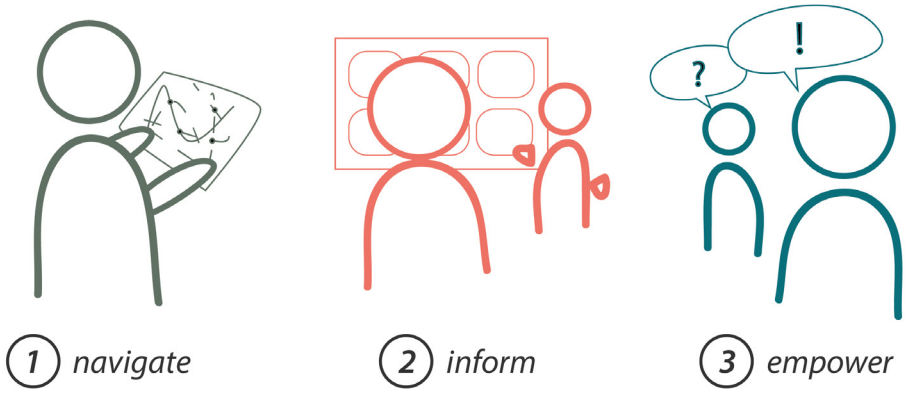


figure 7: visualization of the three phase model

Systems Analysis

As my understanding on the individual elements that were forming the challenge grew, I decided to create a synthesis map to inform future design decisions on leveraging intervention points (Jones and Bowes, 2017). I made a mapping of the challenge by connecting attributes and structuring them in a hierarchical order.

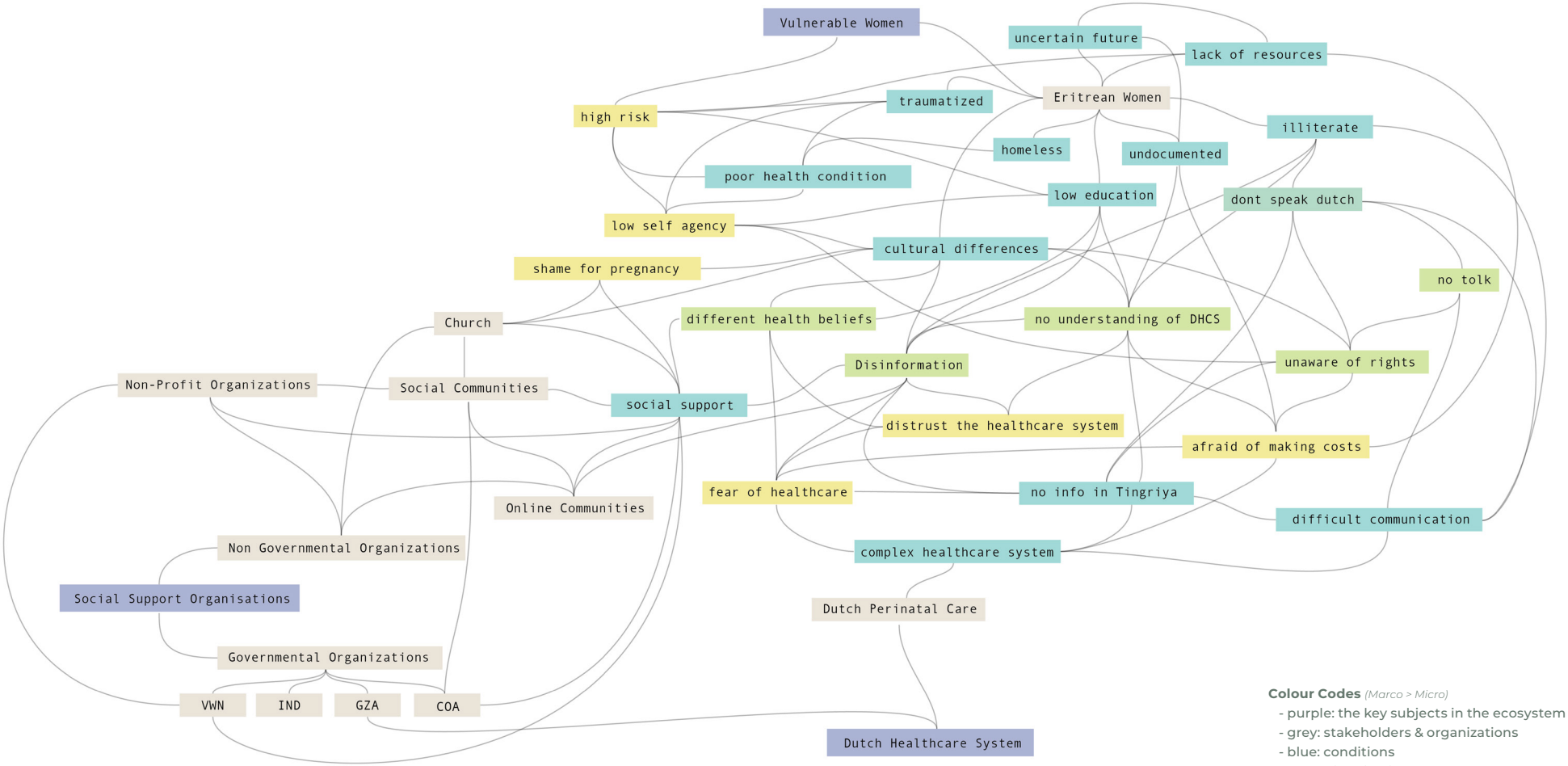


figure 8: synthesis mapping of the design challenge

Online Design Leadership

In the context of the theoretical framework, I noticed that creative leadership approaches demand a certain physical presence to make a connection with others and facilitate effective cross fertilization. I set up a small design workshop with two design students were we explored perspectives on design leadership and how these could be translated to a digital environment during the pandemic. The outcome of the brainstorm (Appendix A) provided the following practical takeaways that helped to translate the design leadership values online.

- Cultivating empathy and personal contact in 1 on 1 meetings
- Cultivating Online Presence & Transparency
- Inspire others by creatively coping with limitations
- Inspire others by presenting your work online



figure 9: workshop on translating design leadership to a digital context

Modularity for Complexity

In the context of these complex design challenges, it is difficult to build upon previous work because regular design deliverables are rendered ineffective in these complex contexts. Therefore, a workshop is setup with other designers who worked on this same subject. The workshop was setup around the question: “How can we (better) build upon prior work in complex societal design projects?”. We debate what are relevant deliverables in such design projects for others to take forward in their next steps (Appendx B). A good example we found to clarify the difficulty of transferring deliverables was that making stakeholder maps serves a double purpose. It is not only a way to visualize the ecosystem but the process of making it is also a way to explore the ecosystem in reality and build empathy with the system. We conclude that this topic of handing information and deliverables over has a different role in these complex societal projects than within regular design projects. We see potential in a digital platform where the problem space is interactively mapped and connected to different stakeholders. The main takeaway for this project is that it is difficult to handover systemic design projects and that visualizations like stakeholder mappings and system analysis serve a double purpose. Firstly, they allow the designer to build a network, make sense of the context and build empathy for the system. Secondly, we noted the actual visual makes the context more visual and communicable. The difficulty here is that transferring a visualization of the context and stakeholders does not give a recipient the rich understanding of the context that is built through the dynamic process of exploring and visualizing the context. We conclude in the workshop that new formats for deliverables should be explored to improve the transfer in these types of projects.

Stakeholder Participation

Throughout this phase I realized that in order to create something that makes sense in this context, It is impossible to absorb enough information individually to fully grasp the problem space because there are simply too many parameters influencing each other. In order to represent the complexity of the problem space, I need to connect with experts on Antenatal care, Eritrean culture, Social workers, and Asylum procedures. Only by connecting their expertise I can effectively evaluate the relevance of various designs and intervention. I decided to set-up a workshop to explore and co-design system interventions with stakeholders. After multiple brainstorms on potential set-ups for a workshop, I notice that the complexity of the challenge translates to complexity in the setup of the workshop. In order to work with stakeholders, the assignments in the workshop should be understandable and accessible. I need to explore how I can empower a community to collaborate on system interventions without paralyzing them with the complexity of the challenge.

2.4 WORKSHOPS

In this chapter multiple design workshops were setup in which diverse participatns were invited to co-design system interventions. The output of the workshops was analysed in a thematic analysis to outline the design and solution space. The chapter closes by sharing opportunity areas for design.

Van der Bijl (2018) elaborates on the value of design networks when designing for systemic change, connecting a group people around a common purpose. One needs to understand the various perspectives of stakeholders to entail complexity. Stakeholder sampling is an important determinant for success in this context. Its best to work with participants that have a rich experience in the ecosystem and understand the relevance of the issue that is addresses. An important element of participation in systemic design is the emergence that arises in collaboration. It is important to allow participants to build on each other's work. The act of creating together serves as a dialogic tool to understand the problem space and exchange perspectives. In this context, facilitators function as participatory orchestrators that navigate a variety of individuals, intentions, features, perspectives, and experiences to cultivate co-creative emergence by anticipating patterns and embedding intent (Aguirre, Agudelo and Romm, 2017).

> *"If we want to address the complex problem situations that the world is facing, being a smart systems thinker and innovator is not enough. We need to engage in new ways of collaborating that promote continuous, productive and collective learning and innovation. These collaborations require us to learn social skills, build social structures, and adopt attitudes of openness to learning, trust and responsibility, however hard it is to let go of the behaviours and structures that hold us back" (van der Bijl, 2018)*

To better understand how I could designs system interventions that support social change, I need to leverage the expertise of the people who are familiar with the system. The goal was to set up a workshop that combined the expertise and experience that is needed to fully grasp the complexity of the challenge with the creative potential of designers. By collaborating with participants from diverse backgrounds we can generate more creative ideas for interventions without losing touch with realistic implications (Jones, 2018; Hoever, van Knippenberg, van Ginkel & Barkema, 2012).

Sampling

The cultural differences and language barrier make it impossible for the target group to participate in collaborative sessions, even if there would be a translator. Theerfore, the sessions are conducted with stakeholders who directly work with Eritrean pregnant women at risk and cultural experts. A such the design is now directed towards the experiences of the experts and what they consider appropriate interventions. Working with social care providers and cultural experts to represent the reality of the problem context without being withheld from language barriers and cultural communication complexities. Sampling is done by sending an informational email with an invitation to diverse organizations that play a role in the ecosystem (Appendix C). In the mail, participants are asked to invite others through referral. In this way I aim to draw participants that understand the importance of the challenge to create a purpose driven community.



figure 10: workshop invitation leaflet

Goals

To be able to the adapt the workshop based on potential emerging factors, I decided to organize three separate workshops. In total there are four workshops of which one is a pilot. The workshop setup is evaluated and adapted after every session to get closer to the main goals of the workshop. The main goals of the workshop are listed below.

1: Collect insights from experts to better understand the problem context
2: Generate creative ideas for system interventions
3: Gather feedback on the usefulness and relevance of these interventions

This approach helps to learn about the challenges and opportunities in the local context from the experiences of employees and volunteers in social support

organizations who interact with Eritrean refugees in their work. It is important to learn how these people perceive the reality of the challenge and what they consider appropriate interventions in their work.

Setup

In the setup of the workshop, inspiration is taken from service design (Stickdorn & Schneider, 2010), systemic design (Jones, 2018; Namahn, 2020) and user centered design, taking account the importance of emergence in facilitation (Aguirre, Agudelo and Romm, 2017). The workshops are setup in three different phases each addressing one of the workshop goals.

In the first phase participants share their relation to the target group and other participants. Then they share their knowledge and experiences with Eritrean culture and barriers to healthcare. Participants are motivated to build on the work of others (van der Bijl, 2018).

The second phase focuses on generating a large variety of creative ideas of interventions. Based on regular design thinking methods, a large variety of ideas is generated on the various barriers that collectively shape the current challenge of perinatal risk (Thompson, 2003).

In the third phase the participants select the most promising elements and combine these in a concept. They present their concept to the group and give feedback on each other's work to get a better understanding of what the experts perceive as appropriate interventions (Rietzschel & Ritter, 2018).

Pilot Workshop

In the pilot workshop I wanted to try out new approaches for cultivating collaborative creativity in an online context. Moreover, I want to experiment with co-design as means to explore systemic interventions. It can be challenging to host collaborative design session on this scale as it is more difficult to work on such abstract complex concepts for new insights. I tried to keep in mind that participants should not be overwhelmed by complexity and that there should be a positive free atmosphere to stimulate creative thinking. I therefore want to take little steps in adding variables and make abstractions of heavy emotional complex attributes to motivate novel connections (Appendix D).

Throughout the pilot workshop it became clear that online facilitation of creative workshops demands a different structure. Normally a facilitator would be sensible to the overall atmosphere in a space and support the groups or individuals in need of help or guidance. I decided that every breakout room needed a facilitator, and I reconfigured the entire setup of the workshop. Timing is a very important determinant for success, a high paced workshop pushes creativity by focusing on quantity, but it should be dynamic based on the atmosphere in the group. Therefore, I gave the facilitators power over the timing in the breakout rooms to better adapt. Lastly it was noted that the assignments were quite challenging for designers and that it would

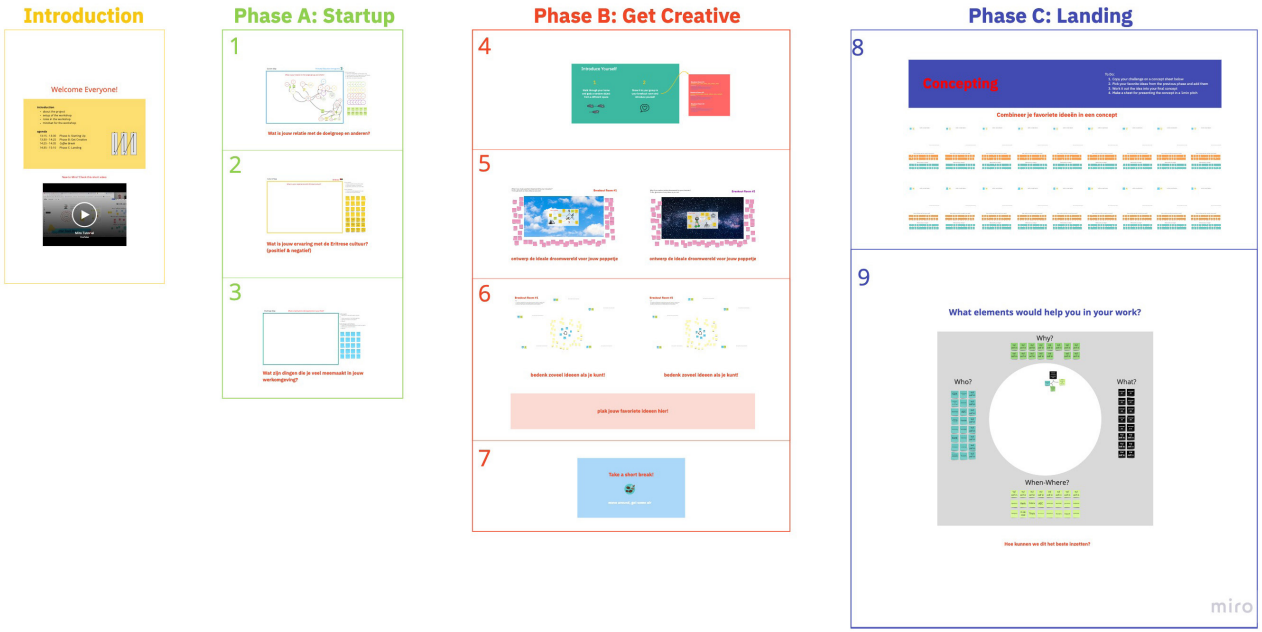


figure 11: final setup of the design workshop after all changes that were done between the sessions

probably be very difficult for experts to understand these challenges. I adapted the assignments to be more manageable for people without experience in creative workshop and online environments. To help the facilitators to adapt the timing and activities to suit the productivity and atmosphere in the group, I created a script for the facilitators that informed them on the parameters they could play with in the process (Appendix E).

Workshop Composition

As a result of the referral in the invitation, an unexpected number of participants enrolled for the workshop (30). This made it possible to gather the perspectives and ideas from sixteen experts and fourteen designers throughout three workshops of 2,5 hours each. Below I shortly elaborate on the composition of every workshop. The breakout rooms were created based on the backgrounds of the participants with the intention balance creativity and expertise in every group. Moreover, all facilitators were briefed in their behaviour and attitude towards participants. All designers and faciliators in the workshop were industrial design graduates. The composition of the participants is shared below.

Workshop #1
2 Nurses (at Asylum Centre)
2 Breakout room Facilitators
4 Designers TU/e ID students

Workshop #2
1 Researcher (on Antenatal Group Care)
2 Midwives
1 Social worker (Refugee Support)
1 Cultural expert (giving Pregnancy Education)
2 Breakout room Facilitators
3 Designers

Workshop #3
1 Nurse (at Asylum Centre)
4 Midwives
1 Social worker (at Asylum Centre)
1 Cultural expert (Giving Pregnancy Education)
2 Breakout room Facilitators
4 Designers

Analysis

An unexpected complication arose in the amount of time for the workshop and the energy level of the participants. Doing a workshop online appeared to be more exhausting which made it difficult for participants to contribute in the last phase of the workshop. Multiple changes were made to workshop to improve this problem, but this unfortunately only delivered minimal results in the last workshop. Therefore, we focussed on the input from the first two phases in the analysis.

The input from the first phase helps to outline a clear problem context by drawing on the experiences of the target group. The input from the second phase helps to sketch the perceived global opportunity areas for design. The workshops provided a large amount of data. Together, all participants shared a total of :

- 70 perceived barriers to healthcare
- 33 perceived important cultural differences
- 250 different ideas for interventions
- 26 elaborated intervention concepts

Instead of thoroughly processing the data to provide novel insights or arguments, the goal here was to sketch a global outline of the problem and solutions space as perceived by the stakeholders in the system. Therefore, a thematic analysis was conducted for the input of both the first and the second phase of the workshop (Braun & Clarke, 2006). The clusters that arose from these analyses provide an outline of the problem and solution space (Appendix F). The themes that resulted from the analysis are described below.

Output Phase 1: Problem Space

A need to improve agency by informing women on personal health and the Dutch healthcare system.

The lack of knowledge on personal and reproductive health is often men-

tioned as a barrier for caregivers to help women. Caregivers lack the tools and skills to inform and educate these women on subjects that form a fundamental basis for understanding medical advice. This also counts for understanding of the care system and how to navigate it.

A need to improve cross cultural communication between the woman and care professionals.

Caregivers lack cultural knowledge and language to effectively communicate with Eritreans. They are unfamiliar with the norms, values and habits of Eritrean culture. Caregivers want to learn how to build trust and communicate with these women to improve their services.

Output Phase 2: Design Space

Provide tools that improve cross cultural communication and provide relevant and comprehensible information

Many ideas showed an intervention that informed the women in manner that is appropriate for them and with information that is relevant to them. Examples of interventions in this space are: the healthy pregnancy cookbook, smart translators or the Eritrean ambulance.

Create a stable community for social support and information exchange that allows for a safe expression of self

A large amount of the ideas addressed the lack of trust in care professionals. Various ideas consider new approaches to build a relationship of trust between the women and care providers through informal interaction. Another common element is that of a safe social network that supports women in their healthcare journey.

Opportunity Areas

In the thematic analysis, I searched for appropriate connections between the problem and solutions themes. As an outcome, I framed six opportunity areas for design and used these to ideate on potential design directions in the next step.

- *Provide educational materials based on culture*
- *Provide cultural information for care professionals*
- *Facilitate a stable social community for support*
- *Facilitate informal activities with educational purpose*
- *Facilitate a healthcare buddy system*
- *Facilitate a space that is safe to express*

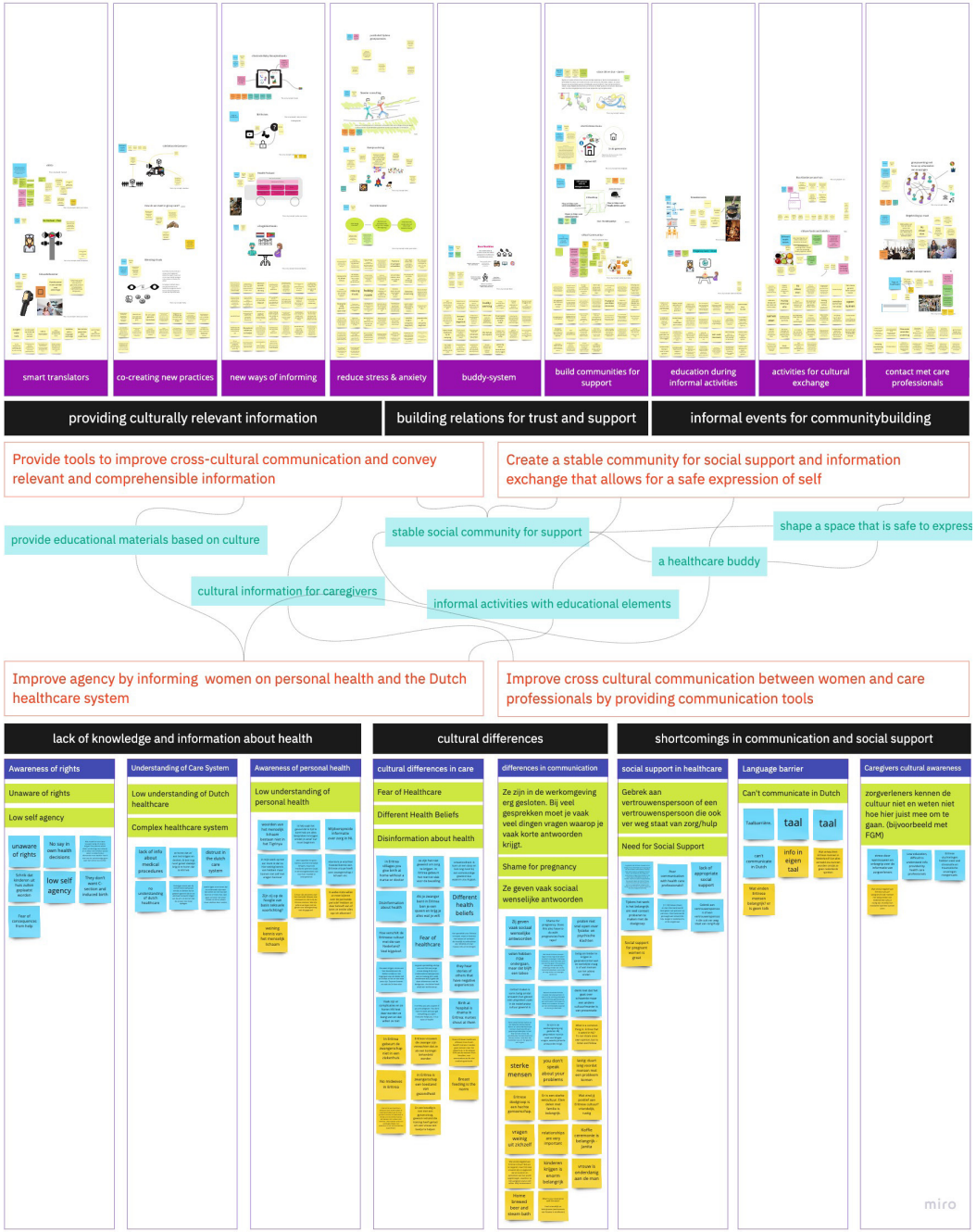


figure 12: visual overview of the setup of the thematic analysis (solution space on the bottom, design space on top)

2.5 SHAPING A CONCEPT

In this chapter, an exstensive idea generation was conducted. To inform the idea selection, a macro analysis was done and, previous interviews were considered. A concept direction was proposed an a first prototype was made.

Idea Generation

In the idea generation, I used the design opportunities from the workshop as a guidance. Moreover, I collected all ideas that were generated throughout the process and added these to the collection (Appendix G). All together, the ideas provide a rich collection of tools and interventions that could be considered. To make an informed decision, a macro analysis is done, to get a better understanding of goals and capabilities of the various stakeholders.

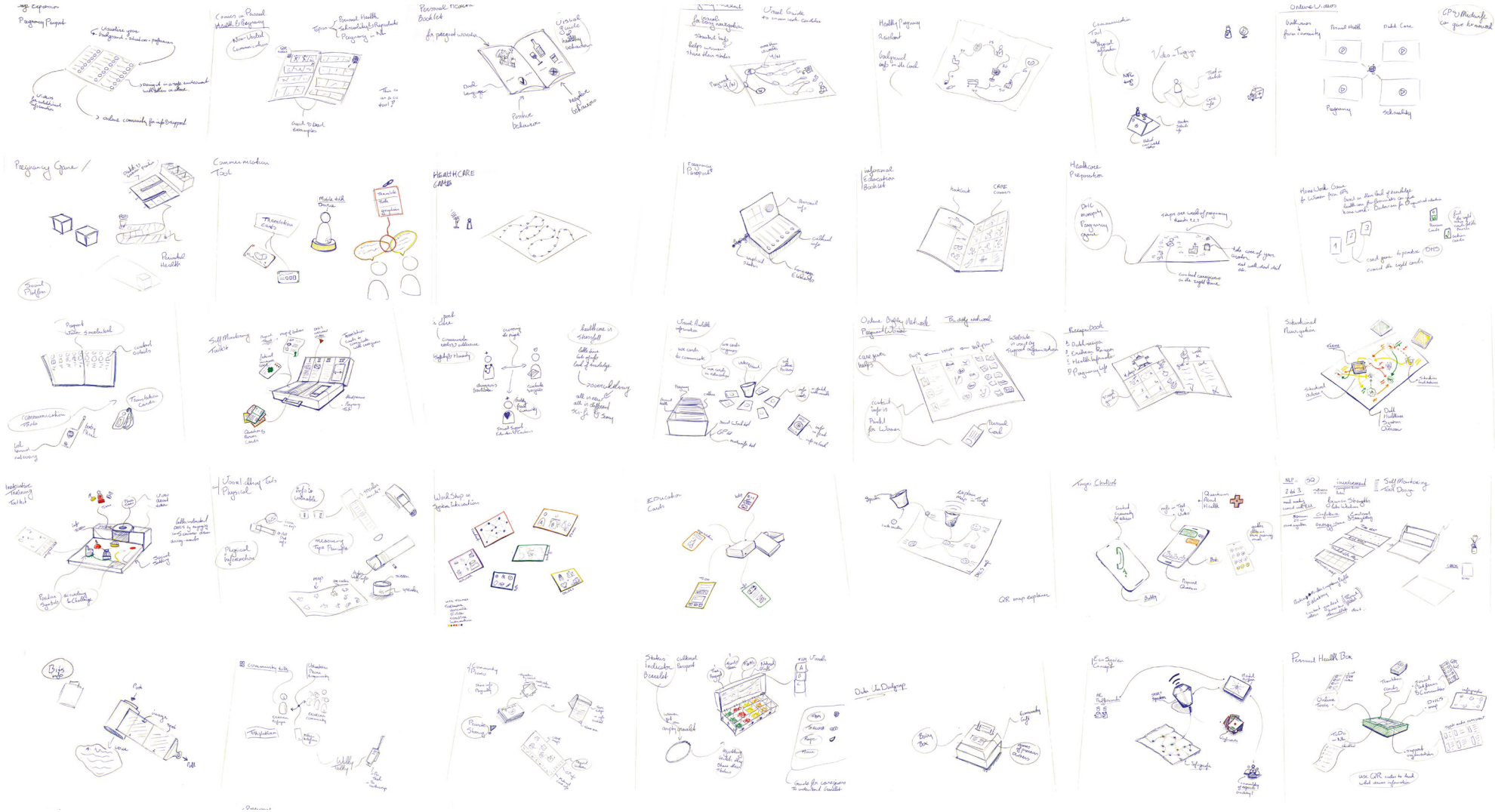


figure 13: visual overview of the ideas generated and collected in this chapter

Macro Systems Analysis

In a short desk research, I studied the macro relations in the ecosystem by finding out what the (economic) incentives of the various organizations are (Appendix H). I searched for the mission and vision statements of the organizations and their legal organizational structure. This gave me a better understanding of the roles of the various organizations in the ecosystem. It became very clear that non-commercial organizations that work directly with the target group do not have the time, expertise or financial resources to develop the tools that are necessary to support the target group. These organizations rely on the funding from private and public benefactors to do their daily work. This can be difficult for some because funding providers usually operate on a project basis. Moreover these organization depend on publically avaliable tools for their work. I want focus on organizations that have the resources to invest in tools and have a fundamental role in the life of the women to share and use the tools. I focus on asylum centres healthcare (GZA) and Midwife Practises that work with the asylum centre healthcare. These organizations play an important role in both the personal life and pregnancy of the women, to have the largest benefit from the design and all have the resources to invest in appropriate materials.



figure 14: visual repesentation of important organizations in the ecosystem

Idea selection

To make a selection for the assembly of the concept, I first considered what challenges should be prioritized and solved first. It was mentioned by both cultural experts that information and communication are the most pressing issues at the moment. There are no materials that support the education of the women on fundamental subjects like perinatal health reproductive health, personal health and the healthcare system. Additionally, cultural experts and care professionals alike emphasize on the implications of poor communication. The inability to communicate with caregivers has a tremendous impact on building trust, making diagnosis, giving suitable medical advice and understanding and adherence of medical advice.

> *"There is a very low understanding of personal health, most women don't even know what a womb is, this makes it impossible for midwifes to properly support these women" P1*

> *"there is a pressing need for tools and materials that enable Eritrean women to be better informed by care providers. The absence of appropriate information about pregnancy and care that is tailored to this target group is non-existent [...] many care providers and social workers expressed the need for tools that help them to better understand and inform this target group" P2*

> *"There is no education on personal health, reproductive health and antenatal care this is the most pressing problem that needs to be tackled first" P1*

> *"There is no dialogue between caregivers and the women which makes it impossible for the women to trust their caregivers and difficult for the caregivers to attend to the woman's needs" P2*

Considering the priority of the challenges sketched in the expert interviews and the relevance to the organizations that work with the women, three types of interventions are chosen to be beneficial for the majority of organizations working with the target group.

1: Educational materials for the Eritrean women to improve understanding of health(care)
2: Tool for communication between care professionals and Eritrean women
3: Document for women to inform caregivers on the cultural background of Eritrean women

First Prototype

I combined these elements in a toolbox and created a low fidelity prototype with basic paper tools and a foamboard box. The idea of a toolkit is an effective way to start developing a first concept without fixating on an intervention or tool before it is proven effective. Such toolkit can be a powerful way to reflect on interventions with stakeholders, experts and can also function a medium for first interaction with the target group



figure 15: first lo-fidelity prototype of the concept direction (scan QR Code on page 15 for a video presentation of the prototype)

2.6 CARING PREGNANCY CONCEPT

This chapter describes the reasoning that lead to the formulation of the first concept. The Caring Pregnancy Toolkit, and Caring Pregnancy Platform. The concept was elaborated upon and evaluated in two expert inteviews.

Throughout the design process, I learned about the challenges that care professionals and social workers meet when they are offering their services to Eritrean women at risk. Shortcomings in foreign languages and cultural understanding withhold them to adequately adapt their services to the target group. Moreover, the target group does not have the education or literacy to navigate the healthcare system themselves. Education of the women at risk is a priority as well as improving communication between the women at risk and the care professionals. These priorities are combined in the Caring Pregnancy Toolkit which embodies three types interventions in the form of paper tools (Appendix I).

Intervention: Educational material for the Eritrean women to improve understanding of health(care)
Tool 1: Healthcare Map

Intervention: tool for communication between care professionals and Eritrean women
Tool 2: Translation Cards

Intervention: Document for women to inform caregivers on the cultural background of Eritrean women
Tool 3: Pregnancy Passport



figure 16: translation cards



figure 17: pegnancy passport

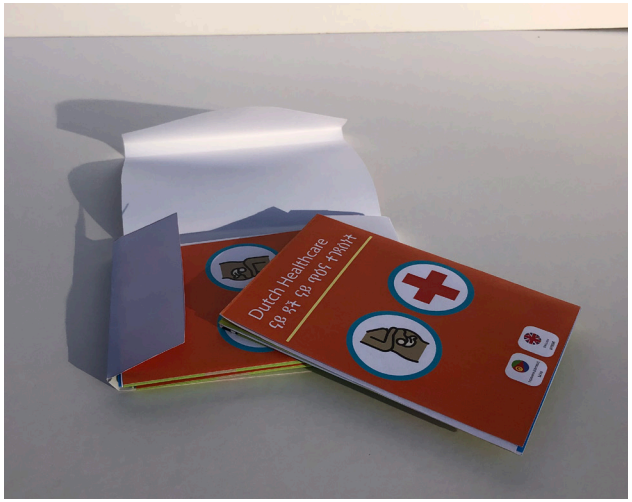


figure 18: Dutch healthcare map

Moreover, the impact of these tools should remain under continuous development, as scholars in the complexity domain found consensus on the conviction that complex systems require continuous development of multiple interventions rather than providing a singular, fixed solution (van der Bijl-Brouwer, 2017). Because a toolkit maintains a high flexibility whilst providing a starting point for testing and development it is a highly suitable medium in this situation. The toolkit is sketched here as a dynamic concept that perpetually adapts to its contextual reality. Connecting the physical toolkit to a digital platform allows to draw on the expertise and experience of the actors in the ecosystem.

The Caring Pregnancy Platform is introduced as a means to facilitate an ongoing development of the interventions in the toolkit by connecting the actors in the ecosystem to experts and creatives. In doing so, the platform builds on the notion of a Design Network, by connecting a diverse collective of individuals around a common purpose (Manzini, 2015; Buré & van der Bijl-Brouwer, 2018). The platform functions as an online co-design space, that connects users, experts and designers around the challenge of perinatal mortality. All components in the Caring Pregnancy Toolkit are rested with QR codes that link to the platform and give users (Care Providers, Social Workers, Eritrean Women) the opportunity to share their experiences on working with the tools. Moreover, other experts from the field (Translators, Cultural Experts, Researchers) can leverage their expertise on the platform by reviewing the tools, proposing redesigns or addressing reformulation of the challenges. Designers can use these insights to improve the composition and qualities of the interventions integrated in the toolkit.

It is difficult to reach the Eritrean women directly as a target group, therefore the toolkit is designed to be used and distributed by organizations that have the most contact with the target group. These being asylum centres (AsielZoekers Centrum - AZC), their healthcare organizations (GezondheidsZorg Asielzoekers - GZA), immigrant integration organizations (VluchtelingenWerk - VWN), Midwife Practises and Social Support Organizations. These organizations directly interact with Eritrean women at risk and are therefore a suitable channel to hand out tools or directly use them in their work.



figure 19: toolkit prototype

Caring Pregnancy Toolkit

The toolkit is an adaptable concept designed for social workers and care professionals. It contains tools that help to improve the antenatal care for Eritrean women at risk. All these tools are rested with a QR code that connects to an online co-design platform. The first version of the toolkit emodies three types of interventions: Healthcare Maps, Translation Cards, and Pregnancy Passports.



https://vimeo.com/493909524

figure 20: caring pregnancy toolkit

Caring Pregnancy Platform

The online co-design platform connects experts with creatives to facilitate a continuous improvement of the tools and the toolkit. Here the experts and users can share their knowledge on how the tools can be improved and the designers can improve the tools based on the insights that are shared on the platform.

This platform empowers a community around a common purpose and allows the interventions to be continuously improved to match the complex reality of the ecosystem.

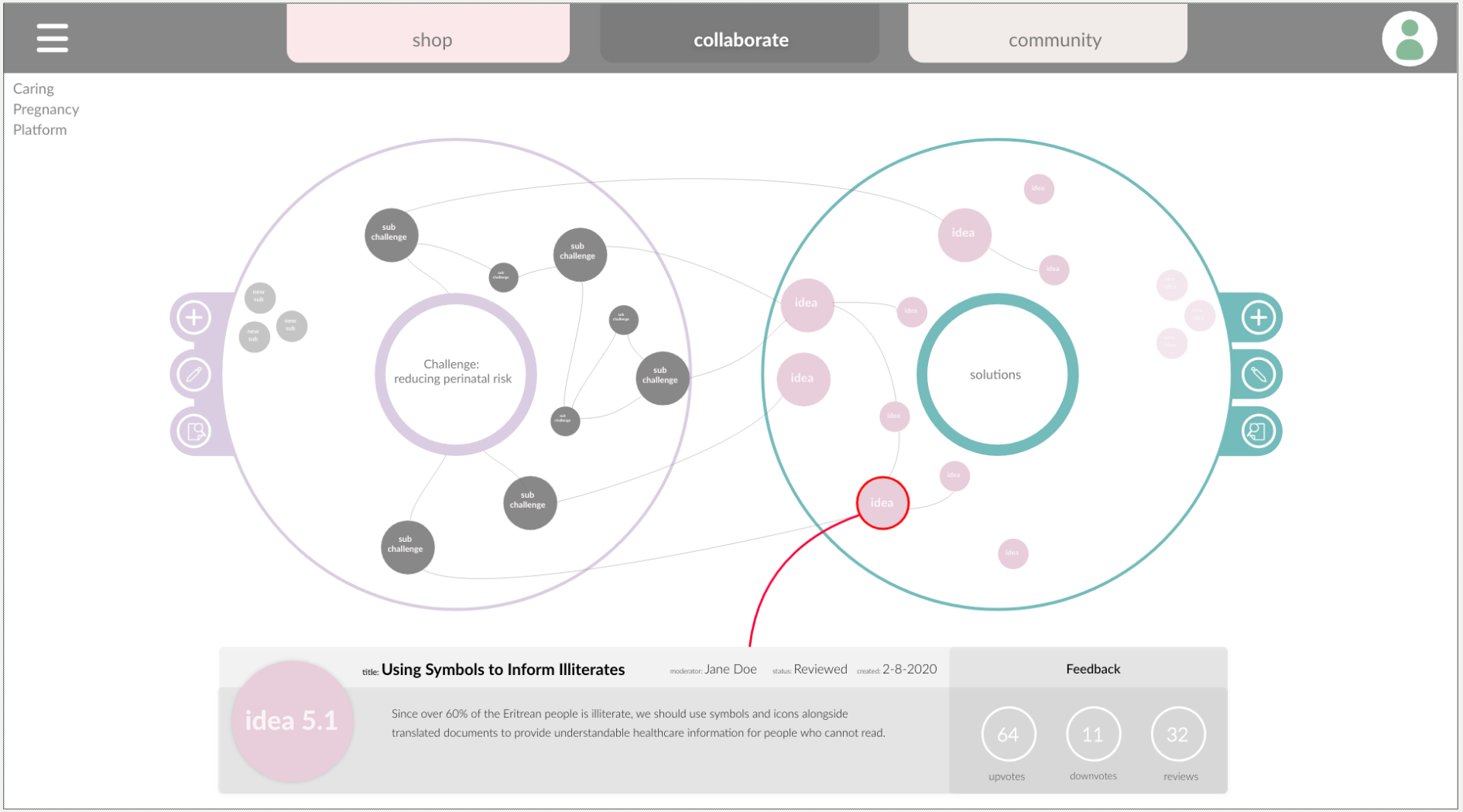


figure 21: caring pregnancy platform

Concept Evaluation

To review the concept direction of a hybrid toolkit, two semi-structured, interviews were conducted. For the interviews a nurse from the asylum centre and a midwife that often provides antenatal care at an asylum centre were contacted to represent the target group Prior to the interview, the participants watched a video that presented the Caring Pregnancy concept. The interviews were structured with the following questions:

Toolkit: (How) Could the toolkit support you in providing care to the vulnerable women?
Platform: (Why) Would you use the online platform to share your experiences?
Design Network: (Why) Would you be interested to become part of a design network to contribute to the development of such a toolkit?

Findings

In the interviews both participants shared a positive attitude on the potential of the toolkit. Both participants also noted several complications that should be considered. Firstly, both participants noted that all asylum centres work with translators when they provide care, this is compensated. The midwife emphasizes that this does enables her to provide adequate care and build a relationship with Eritrean women at the asylum centre. However, both participants mention that the toolkit would help them to mobilize information and better educate the women on health on the asylum centre. Both participants explain that people who leave the asylum centre for naturalisation are expected to speak Dutch but that this is almost never the case for Eritrean people. When these women are in need of care after being dismissed from the asylum centre, there is no compensation for translators anymore and the support of the asylum centre falls away. The midwife confirms that this happens in her practise and shares that the inability to communicate with the women make it difficult for midwifes to provide adequate care. The midwife shares that a toolkit could help the midwifes to improve their care. She emphasizes that it might also be interesting for general practitioners and gynaecologists since they have little time to communicate with the women and the tool could improve their quality of care whilst saving them time. Both participants share that they would have the time and space in their work to give feedback on the functioning of these tools with the online platform. The nurse shares that many colleagues like to contribute to pressing issues, and that they would definitely become part of such design network. The midwife also states her interest in contributing to a design network and emphasizes a feeling of responsibility by stating that its little effort for a great impact. Both participants express an enthusiasm about the potential of the Caring Pregnancy Toolkit and recognize the value of such a concept. Both participants share that they would use this in their work if available. However, both participants also mention the importance of the quality of the individual tools, since they did not physically interact with the tools, they are not able to evaluate if the tools themselves would work for them in their current form.

Takeaways

“At the asylum centre people are supported with translators, but as soon as they leave here translators are not used anymore because it is not compensated and takes a lot of time” - P6

Before refugees leave the asylum centre, we always try to tell them to learn Dutch as fast as possible. However, that does not happen in most situations and if they visit a regular general practitioner or midwife outside of the asylum centre, they might be willing to call a translator once but not every time. So, I think that it can be highly valuable to have good educational materials then.” - P6

“I think it is really good that there is a map that explains the Dutch system because that is something we often encounter. It is just very unknown among these women [...] A lot of people are unfamiliar with the maternal care system that we have in the Netherlands. It is something other cultures do not know, as these tasks are usually done by family members. Therefore, it is often a bit strange to them” - P7

“We also receive women that just left the asylum centre and I think that this toolkit might be even more suitable for them because they are not eligible anymore for a translator so then we really have to communicate by using our hands and feet [...] these women are often left by the wayside so think this toolkit could be a very helpful solution” - P7
”Do you notice that it affects the quality of your care if you cannot effectively communicate with these women?” - Interviewer
“Yes, definitely, absolutely.” - P7

Next Steps

Despite the small sample, the last interviews confirmed the direction of a toolkit as a fruitful starting point for development. Both participants share their interest in using such concept in their work. It is found out that asylum centres are compensated for translators and that therefore their main interest lies in the use of

educational materials. The midwife practise has use for more of the tools since they experience diverse barriers to providing care and are not compensated for translators outside of the asylum centre. The participants share that gynaecologists and general practitioners should be considered as potential users of the toolkit, since they are not compensated for translators and they are limited by time in their communication. An important learning is that translators are compensated at asylum centres and as soon as people leave the asylum centre, translators are not compensated since the people are expected to speak Dutch. This appears to be rarely the case for Eritreans. This means that there is a group of Eritrean women who does not speak Dutch, is illiterate, and has no right to translation. This part of the target group is most in need of support and should be the focus in further developments. For further development of the concept, several proposals are made.

The core value of the toolkit lies in the quality of its tools. The effectiveness of the interventions that are embodied in these tools are not proven since they are not het deployed and iterated upon. As a first step, the tools should be refined and developed in close collaboration with Eritrean women, translators, and various care professionals and social workers. In this case it is important to work with women and care professionals who would benefit most from having the toolkit. Throughout this process the impact of the interventions should be assessed. It can be useful to setup a design network for effective development and evaluation. After establishing a proven collection of tools, the distribution of a minimal viable product can be considered.

It is important to consider the core purpose of the toolkit. Can it become publicly available for free, or should it provide revenue for further development. Considering the goal of the project, I advise to explore ways to maximize the impact of the toolkit on perinatal health. This phase also requires a decision on the role of the online platform in the proposition.

Development of platform would be costly and time consuming without adding much direct value to the concept, therefore, it has a low priority in relation to perinatal health. However, in recent years various domains showed a growing interest in emerging approaches on participatory design on co-creative platforms (Stelzle, Jannack and Rainer Noennig, 2017). This shows that a more generalized version of the Caring Pregancy Platform could be a powerful tool to address other complex challenges. =The potential of online co-design platforms to facilitate participation on complex societal challenges should be further examined.

PHASE 3
REFLECTING ON THE FRAMEWORK

3. 1 ANALYSING THE DESIGN CASE

The design project provided a rich case to reflect on the relevance of the attitudes and behaviours that were presented in the framework. This chapter analysed the design process to reflect on the presence of the topics in the different phases of the design process. The analysis took forward an activity logbook held by the designer in addition to the process described in this report. The purpose was to evaluate the potential value of the framework for designers.

Process Analysis

Throughout the process, the framework was used as a guiding instrument to inform the design approach. The framework does not provide specific information on the best tools or approaches to be used but rather proposes multiple attitudes and behaviours that influences this decision-making process. To learn more about the potential of the framework, this chapter analyses the value of the framework during the design process. In doing so, the presence of the three described domains is considered for every phase of the design process. The presence of these domains is qualified in a range of four steps: none – low – medium – high. The following question is formulated for analysis

> *What attitudes or behaviours from the framework were present in the different phases of the design process?*

Phase 1: Exploring the Ecosystem

The first phase of the process consists mostly of exploratory activities. The activities are directed towards gearing an understanding and connecting with the ecosystem of the design challenge and building contacts. The phase started out with connecting to diverse organizations that could be connected to the challenge in an online and offline manner and conducting interviews with diverse experts from various organizations. These insights are taken forward in a desk research to refine the target group and a preliminary visualization of the ecosystem.

Systems Leadership: medium

The focus on connecting with a large variety of experts from different organizations to learn about the challenge and build relations strongly connects to the behaviour of "operating across organizations, communities and social networks as an ambassador for change" and "interest in the larger system"

Systemic Design: medium

The manner of offline exploration of the ecosystem and expert interviews were a clear way of "developing empathy with the system" that transcended the value of a desk research on the stakeholders.

Creative Leadership: none

No notable elements of creative leadership were present in this phase

Phase 2: Exploring Design Opportunities

The second phase of the process was more diverse and divergent. The intention throughout this phase was to explore the potential design opportunities to approach the challenge. It started with an exploratory prototyping session followed by an expert interview. The insights gathered in these activities were combined in a selection of design opportunities and a reframing of the challenge. Afterwards a systems analysis and two small design workshops informed the formulation of a design approach. Additionally, throughout this phase lies a continuous networking effort to attempt to setup a collaboration with parties that can connect the target group.

Systems Leadership: low

The networking activities that progress throughout this phase relate to the connecting of the actors as an ambassador of change.

Systemic Design: medium

Instead of creating something for presentation or communication, the motivation of the first activity was to explore complexity of the challenge in a physical manner. This take on prototyping shows a way of "opening up and acknowledging the interrelatedness of problems". Additionally, the conducting of the expert interview and creation of a system analysis helps to "develop empathy for the system". Lastly the design workshops and networking efforts throughout the process helped to "strengthen human relationships to enable creativity and learning".

Creative Leadership: medium

The short collaborative sessions that were organized in this phase showed some creative leadership efforts. Both workshops "combined diverse perspectives to facilitate enriching dialogues". Moreover, in both workshops the activities were setup to "synthesize creative efforts and co-create a vision that directs creative efforts"

Phase 3: Workshops

After outlining an approach, phase three started with the designing of the workshop and testing and evaluating it in a pilot. Followed by the activity of inviting participants and scouting and debriefing facilitators. Then during the workshops connecting a highly diverse group of participants and navigating their creative efforts within the objectives of the project. And lastly, processing the results from these sessions to outline for the design and solutions space and specify opportunity areas for interventions.

Systems Leadership: medium

The activity of contacting actors from different organizations, communities and social networks for the workshop strongly connects to systems leadership. Moreover, guiding the activities in the workshop demand "the ability to facilitate a constructive dialogue between stakeholders from different perspectives". Lastly setting up the workshops was an activity that "empowered widespread innovation".

Systemic Design: high

The motivation to establish the workshops came from the realization that complexity cannot be addressed individually. The workshops were a result of "opening up and acknowledging the interrelatedness of problems". Moreover, in the first part of the workshop were participants shared their experiences with the challenge which was a way to "develop empathy with the system". Lastly the co-creative efforts in the other phases of the workshop were a way of "strengthening human relationships to enable creativity and learning".

Creative Leadership: high

Throughout this phase creative leadership activities clearly prevailed. The setup of the workshop was a way to "direct a community to realise a vision". The decision to work with a diverse group of participants was a way to connect "diverse perspectives" and the global setup of the workshop was built around "shaping an atmosphere where creative dissonance and disagreement result in enriching dialogues". Both the way of guiding the facilitators, and the setup of the activities in the last two parts of the workshop "stimulate autonomy and exploration and navigate creative activities to fit within the global objectives".

Phase 4: Idea to Concept

In phase four, the output of the workshop was used in an extensive idea generation. A macro analysis of the system was conducted. Furthermore, by building on the outcome of the workshop, the macro analysis and the expert interviews, a selection was made regarding the ideas that are combined into a first concept. A low fidelity prototype of the concept is created.

Systems Leadership: none

There are no systems leadership elements in this phase.

Systemic Design: low

The macro analysis in this phase shows a way of "developing empathy with the system". There are no other systemic design elements standing out in this phase.

Creative Leadership: none

There are no creative leadership elements in this phase.

Phase 5: Final Concept

In the final phase, the concept is deepened, and a digital platform is added. A second prototype is made of the entire toolkit together with a first idea for the digital platform. A video is made and used to review the concept in two interviews.

Systems Leadership: medium

The implementation of a digital platform in the concept did not directly entail leadership behaviours but does show a certain mindset that connects to systems leadership. The purpose of the platform is a manner to operate "across organizations, communities and social networks and act as an ambassador for societal change" and "facilitate constructive dialogue between stakeholders from different perspective". Most importantly the platform aims to "empower widespread innovation and action and enable mutual accountability for progress"

Systemic Design: medium

Implementation the digital platform in the concept showed "an evolutionary

design approach to desired systemic change". Moreover, the adaptability of the tools and role of the community in the concept shows "opening up and acknowledging the interrelatedness of problems". Lastly the goal of the platform was to "build human relationships to enable creativity and learning"

Creative Leadership: medium

The design of the platform shows functions that "connect a community around a co-created vision that directs creative efforts". Moreover, the setup of the concept aims to "combine diverse perspectives" and "stimulate autonomy and exploration and navigate creative activities to fit within the global objectives". These elements are incorporated in the platform rather than being activities acted out by the designer.

Reflection

In phase four, little to none of the attitudes and behaviours from the framework were present. This phase consisted of idea generation and selection. Since these activities did play a valuable role in the design process, this exposes a potential shortcoming in the framework. Moreover, in the final phase of the project, the elements that were presented in the framework were embedded in the design concept rather than being present in the behaviour of the designer. It is unclear if this is an appropriate way to implement the domains in a design process.

Nevertheless, the uneven distribution of the different attitudes and behaviours throughout the process shows that the various domains in the framework can serve different purposes in a design process. This also shows that the domains that are addressed in the framework provide a relevant source of input to support designers in complex design projects. Moreover, in the concept review, the output from the design process was considered to be a suitable and promising direction according to experts. Considering the quality of the design outcome and the presence of the formulated attitudes and behaviours in the process, it can be argued that the framework showed the potential to support designers to address complex societal challenges.

DISCUSSION

This report argued for a leading role for designers in navigating complex societal challenges and a framework was proposed to support designers. To consider the added value of the framework, it is used in a design case on antenatal care. Preliminary subjective insights from the analysis of the design case confirmed the potential relevance of such a framework for designers.

Implications

The introduction highlights the connection between the potential qualities of designers as suitable future leaders and the ability of designers to address the complex societal challenges of the future. If designers were to become highly suitable leaders, how do can we equip them to play a leading role in the complex societal challenges that characterise the future? This report proposes a framework for designers to take a leading role in addressing such complex societal challenges. Future work should be done to further explore the role of future designers in leading complex societal challenges.

The Caring Pregnancy concept that is presented as outcome of the design case, functions as a next step for research on Dutch antenatal care for women at risk. The prototype embodies an adaptable base model that can be used for further development of the interventions in the toolkit. In doing so it marks the next step in this process by presenting an adaptable medium that be used for testing with the target group.

Limitations and Future Work

Since the project was conducted individually, the framework was created by the same person that conducted the design case. This introduces a bias that clouds the impact of the framework in the design process and the analysis of the design process. As the designer who created the framework had more knowledge on the topics than only the attitudes and behaviours that were presented in the framework which could have influenced the course of the design process. Moreover, the evaluation of the framework was a relatively subjective reflection. In an attempt to mitigate this effect a logbook was held throughout the design process and taken as input in the analysis. However, due to the subjectivity of the analysis, it is not clear to what extend the framework influenced the quality of the process. Before actual claims can be made, the framework needs further development to extend its academic accuracy and evaluate the interest in such framework in the field. Its quality should be reviewed by experts in the systemic design domain and the interest of the design community should evaluated with a survey. Lastly, the framework should be used by other designers to objectively evaluate its value and validity.

The Caring Pregnancy Toolkit proves to be a suitable starting point for further research. However, the contents of the tools need to be deployed in context to evaluate the impact of the proposed interventions. It was not possible to collaborate or test with Eritrean women during the project, as the pandemic made it impossible to be physically present with others, especially vulnerable groups. Moreover, other mediums of collaboration with this target group were not possible due to illiteracy and barriers to technology. This effect was mitigated by working with cultural experts. However, user tests, focus groups and co-creation sessions should be prioritized in next steps when possible.

In the final interviews, the experts shared opportunities for the relevance of this toolkit for care professionals whose time is more pressing and for whom improving communication is earned by through the quality of care and reduced interaction time. The experts shared the gynaecologists and general practitioners might be interested in the toolkit. This deserves further exploration in the development of the tool.

The digital co-design platform that is presented as part of the Caring Pregnancy concept shows potential to become an effective tool for designers to setup a design network. During the analysis of the design case the digital platform appeared to encompass many of the important elements that were described in the framework. Throughout the interviews, four experts mentioned the need of a central platform that connects all the tools and expertise. Moreover, looking back at the design process, a digital platform that allows to connect diverse stakeholders and facilitate co-design activities, could be a highly powerful tool. Such online co-design platform that can connect a design network around a complex societal challenge and enable them to collaborate definitely deserves further attention.

CONCLUSION

This report argues that designers should play a leading role in navigating complex societal challenges. A theoretical framework is proposed to support designers in designing for such complex societal challenges. The framework draws on theories that connect systems thinking, design, and leadership to present a selection of attitudes and behaviours. The framework functions as a guiding instrument to support designers throughout the design process. The framework is used in a design case on antenatal care.

As outcome of the design case, the Caring Pregnancy Toolkit is proposed. The concept consists of a physical toolkit with paper tools that embody three different interventions. The toolkit is connected to an online co-design platform that connects experts and creatives to continuously improve the contents of the toolkit. Expert interviews confirmed the potential of the concept and the toolkit provides a medium for further research and development.

Analysis of the design case clarified that the attitudes and behaviours presented in the framework appeared dynamically throughout the design process. Preliminary insights from the analysis confirmed the potential relevance of such a framework for designers.

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APPENDICES

- Appendix A: Output Online Design Leadership Session
- Appendix B: Output Complexity Modularity Session
- Appendix C: Design Workshop Invitation Leaflet
- Appendix D: Setup of Pilot for Design Workshop
- Appendix E: Facilitator Worksheets
- Appendix F: Thematic Analysis
- Appendix G: Idea Generation Output
- Appendix H: Macro Systems Analysis
- Appendix I: Paper tools
- Appendix J: Versions of the Framework