

Reducing the Health Inequality Gap

Design Thinking to Create Healthier Neighborhoods for People with a Low Socioeconomic Status

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Abstract

A discrepancy in health has become visible between people with a low and high socioeconomic status. As our health depends partially on the places we live and work in, it is important to create healthy neighborhoods, especially for the most vulnerable. Over the last century, the discourse on planning has evolved from using top-down methods to giving way to collaborative approaches that involve residents and other stakeholders in spatial decision-making. However, these collaborative approaches have proven to be ineffective in dealing with complex urban problems and have been prone to powerful actors dominating the planning process. In this thesis, it is studied how ‘Design Thinking’ – a creative and innovative approach towards problem-solving that is often used in product design and related industries – may improve the spatial decision-making process on how to collaboratively create healthier neighborhoods and, therefore, reduce the health inequality gap. Based on a comparative case study analysis, the results show that through design thinking’s human-centered focus the wishes and needs of residents are taken more into account and a deeper understanding of the problem is realized. In addition, barriers to collaboration are overcome by using innovative tools in the process. Furthermore, in contrast to the premise of the collaborative rationale, this research shows that planners taking the lead may actually be beneficial when dealing with complex urban problems like health inequality. We conclude that design thinking enriches collaborative spatial decision-making, particularly when working with people with a low socioeconomic status.

Keywords

Health inequality; Design thinking; Spatial decision-making; Collaborative planning practices; Socioeconomic status

Table of contents

List of figures and tables	5
List of figures	5
List of tables	5
1 Introduction	6
2 Theoretical framework	8
2.1 Defining health inequality	8
2.2 The relation between health and the living environment	8
2.3 Planning to reduce health inequality	10
2.4 Design thinking in the social sciences	12
2.5 Design thinking in planning	15
2.6 Conceptual model	16
3 Methodology	17
3.1 A comparative case study analysis	17
3.1.1 Case criteria	17
3.1.2 Case description	17
3.1.3 Case justification	19
3.2 A triangulation of methods	20
3.2.1 Document analysis	20
3.2.2 In-depth interviews	20
3.3 Ethical considerations	22
3.4 Positionality	22
4 Results	22
4.1 Defining health	22
4.1.1 Paddepoel shopping mall - Groningen	22
4.1.2 The Blauwe Loper - Maastricht	23
4.1.3 Elderly home - Waalre	24
4.1.4 Greening low socioeconomic neighborhoods - Nijmegen & Arnhem	25
4.1.5 Comparison and reflection	26
4.2 Implementing design thinking	26
4.2.1 Paddepoel shopping mall - Groningen	26
4.2.2 The Blauwe Loper - Maastricht	27
4.2.3 Elderly home - Waalre	28
4.2.4 Greening low socioeconomic neighborhoods - Nijmegen & Arnhem	28
4.2.5 Comparison and reflection	29
4.3 Experiencing design thinking	31
4.3.1 Paddepoel shopping mall - Groningen	31

4.3.2 The Blauwe Loper - Maastricht	32
4.3.3 Elderly home - Waalre	34
4.3.4 Greening of low SES neighborhoods - Arnhem and Nijmegen	36
4.3.5 Comparison and reflection	37
5 Conclusion and discussion	38
5.1 Outcomes of this study	38
5.2 Policy implications	39
5.3 Methodological considerations	40
5.4 Limitations	40
5.5 Future research directions	41
References	41
Appendix 1: Overview of documents used for the document analysis	47
Appendix 2: Codebook	50
Appendix 3: Interview guides	52
3.1 Interview guide project managers	52
3.2 Interview guide policy makers	53
3.3 Interview guide citizens	54
Appendix 4: Impression of cases	56
4.1 Paddepoel shopping mall - Groningen	56
4.2 De Blauwe Loper - Maastricht	57
4.3 Elderly home - Waalre	59
4.4 Greening of low SES neighborhoods - Arnhem and Nijmegen	59

List of figures and tables

List of figures

<i>Figure 1: The Health Settlement Map as developed by Barton and Grant (2006)</i>	11
<i>Figure 2: IDEO's model of design thinking as visualized in Bender (2020)</i>	13
<i>Figure 3: The five steps of design thinking as defined by the d.school</i>	14
<i>Figure 4: Conceptual model</i>	16

List of tables

<i>Table 1: Overview of conducted interviews</i>	21
<i>Table 2: The design thinking phases as identified in the four cases</i>	29
<i>Table 3: Division of roles</i>	30

1 Introduction

The world's population is getting older and the average number of years that people can expect to spend in good health is increasing (European Commission, 2021; WHO, 2018). However, this health increase is often not evenly distributed. For example, in the Netherlands, men and women with lower incomes and lower levels of education live on average 7 years shorter than higher educated people with higher incomes (RIVM, 2018). The gap becomes even wider when looking into the difference in perceived health: people with a low socioeconomic status live 19 years less in good perceived health than people with a high socioeconomic status (RIVM, 2018). Inequality in health is a persistent problem and despite many efforts, the differences between people with a low and high socioeconomic status are not decreasing. Not in the Netherlands, nor in other European countries (Broeders et al., 2018; Mackenbach et al., 2018).

One of the factors that has been identified to influence one's health status is our living environment. According to the World Health Organization (2008), premature loss of life arises in large part because of the conditions in which people are born, grow, live, work, and age. In addition, in their influential 'Settlement Health Map' Barton and Grant (2006) identify both the social and physical environment as determinants of health and wellbeing. As people with a low socioeconomic status are more likely to live in disadvantaged neighborhoods (WHO, 2008), they are also more likely to score lower on health status (Curtis, 2004). As the world is increasingly urbanizing and urban problems are being exacerbated, awareness has been rising that health issues should be given a higher priority on the agenda of urban planners and designers (Barton & Grant, 2006).

The current dominant collaborative planning approach, with its focus on problems, actors, deliberation, agreement and acceptability, has proven to be helpful in many situations over the last decades. However, with regard to the more complex urban problems, the approach has shown to be ineffective (Innes & Booher, 2018). Van Dijk (2020) identifies conservatism as one of its limitations: "problems are defined and solved within the dominant belief system which caused, or through neglect allowed, the problems to happen in the first place" (p14). Furthermore, Van Dijk (2020) states that within collaborative practices too much focus is placed on the planning process rather than on the planning outcome. In accordance, Innes and Booher (2018) identify suboptimal outcomes because of compromises and Hillier (2003) identifies an inability to genuinely resolve conflict. In addition, Parker and Street (2018) state that collaborative planning practices are prone to powerful actors dominating the planning process, which often results in an unfair distribution of power between actors in planning processes and even exclusion of the weaker groups of society. This is especially true for vulnerable groups, such as young people, the elderly, people with immigrant backgrounds, and those with a low socioeconomic status (De Leeuw & Clavier, 2011). As a result of these limitations, many gaps exist between the services policymakers deliver and what citizens actually need (Mintrom & Luetjens, 2016). Well-intended interventions, therefore, often have unintended consequences (Shergold, 2015). It is because of these limitations that the dominant system produces the familiar built environment and trends and keeps urban issues, like health inequality, in place (Van Dijk, 2020).

Today's urban challenges, however, call for planning practices which strive for creative governance. Van Dijk (2020), therefore, identifies that the essence of choosing how to respond in the face of the increasing complexity of urban problems should focus on a thorough analysis of the situation, generation of a wide array of possible solutions, and arriving at decisions which demonstrate vision and leadership. This resembles design thinking, which, according to Van Dijk (2020), can enrich the collaborative model. Design thinking is an innovative approach to problem-solving that uses insights from

the end-users of new products, services, and experiences in order to develop best-fit solutions that are rapidly prototyped and iteratively refined so they can be deployed quickly and cost-effectively (Ku & Lupton, 2020; Luchs, 2015). The main difference between design thinking and current collaborative approaches in planning is an increased emphasis on the user-perspective (Mintrom & Luetjens, 2016). The inclusion of citizen or ‘end-user’ perspectives in the design process is said to enable a richer understanding of the problem and direct attention to more nuanced solutions (Chambers 2003; Fung 2006). Similarly, design thinking encourages end-users, planners, and policymakers to work in a collaborative and iterative manner (Ku & Lupton, 2020). The design thinker is stimulated to imagine the world from multiple perspectives (Brown, 2008). Through this human-centered design approach, design thinking holds the promise of bridging the common gap in public administration between the goals of policymaking and the experiences of citizens (Mintrom & Luetjens, 2016).

Design thinking, therefore, offers an alternative view of how governments might interact with and include citizens in spatial decision-making processes (Mintrom & Luetjens, 2016). The search into what works is found in the creative cycle of people in dialogue with the object. Neither of the two should be omitted. According to Van Dijk (2020), agreement without understanding the place will lead to ineffective outcomes, but models of places without social interpretation are equally meaningless. As a result, design thinking has the ability to creatively enrich collaborative practices with a focus on content exploration (Mintrom & Luetjens, 2016). Given its promising innovative and inclusive nature, it follows that design thinking would prove a beneficial addition to the planner’s toolbox. Nevertheless, design thinking remains largely separated from mainstream spatial policy making efforts. Mintrom and Luetjens (2016) relate this separation to the lack of clarity in the definition and approaches of design thinking, which leaves policymakers without guidance.

This study, therefore, looks into the added value of design thinking for creating healthier neighborhoods to reduce health inequality, particularly when working with people with a low socioeconomic status. The main research question is: *what is the added value of design thinking to current collaborative planning practices that focus on creating healthy neighborhoods to reduce health inequality?* To be able to answer this question, four sub-questions have been developed: (1) how is health inequality formulated? (2) how is design thinking used in planning projects that focus on reducing health inequality?; (3) which roles can be identified for which stakeholder?; and (4) how is the design thinking process experienced by the different stakeholders? Answers to these questions will be sought by conducting a comparative case study analysis of four existing spatial projects implementing design thinking to tackle health inequality.

The societal purpose of this research is to give recommendations to policymakers on whether design thinking is an appreciated way to improve collaborative spatial decision-making on creating healthy neighborhoods. This will help urban professionals to improve the inclusiveness of spatial decision-making processes, while stimulating a more effective dialogue on possible solutions for complex urban problems. In addition, the scientific purpose of this study is to add to the academic discourse on design thinking, particularly with regard to the concept in the planning literature, and to develop knowledge on whether design thinking is an effective approach to include the most vulnerable in collaborative spatial decision-making processes.

2 Theoretical framework

2.1 Defining health inequality

According to the World Health Organization (2018), all countries, whether low, middle or high-income, have to deal with health inequality. Health inequality is defined as the difference in health status between individuals or different social groups in the population (Gakidou et al., 2000). Health inequality is generally measured based on a comparison of life expectancy, healthy life expectancy and rate of disease. Usually, groups are identified based on gender, ethnicity, socioeconomic status or area deprivation (PHS, 2021). According to Public Health Scotland (2021), the simplest measure of health inequality is to compare the health of those in the lowest socioeconomic group with those in the highest group. This indicates the health inequality gap. According to the WHO (2018), the lower an individual's socioeconomic position, the higher their risk of poor health. This is also shown by Curtis (2004) who found that health outcomes tend to be substantially poorer in areas characterized by high levels of social and economic disadvantage, in comparison to areas characterized by social and economic advantage. The resulting socio-spatial distribution of health inequalities being more present in disadvantaged neighborhoods is apparent for most measures of mortality and morbidity (Curtis, 2004).

The causes and symptoms of health inequality are highly interrelated and its causal pathways complex, passing through many sectors, including housing, transport, crime, health, welfare and education (Wistow et al., 2015). As a result of this complexity, health inequalities have been considered a wicked problem (Wistow et al., 2015). Wicked problems are problems for which there are “no solutions in the sense of definitive and objective answers” (Rittel & Webber, 1973, p155). They are, therefore, defined as the most complex, multifaceted, and intractable problems with systemic impact (Roberts, 2000; Rittel & Webber, 1973; Churchman, 1967). Unlike “tame” problems in mathematics and chess, wicked problems lack clarity in both their aims and solutions (Bender, 2020). Rittel and Webber (1973), object strongly to the idea that with enough information, a correct or best solution to this kind of problems can be calculated. Therefore, wicked problems, like health inequality, pose challenges to traditional approaches of policy making and program implementation (Wistow et al., 2015).

2.2 The relation between health and the living environment

As health inequality is the difference in health between two individuals or groups (Gakidou et al., 2000) it is important to also define the broader concept of health. The definition of health has changed over time from the sole absence of illness and disease towards a much broader view on the concept. Most scholars follow the definition of health as given by the World Health Organization. The WHO (1946) defines health as “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity”. Based on this definition a combination of many factors have been identified as to affect individuals' and communities' health.

According to the WHO (2018), there is ample evidence that social factors, including education, employment status, income level, gender and ethnicity have a marked influence on how healthy a person is. In addition to social factors, the World Health Organization (2008) has identified that premature loss of life arises in large part because of the conditions in which people are born, grow, live, work, and age. The environment in which people live is thus a significant determinant of their health (WHO, 2003). As the

world is increasingly urbanizing, the WHO has stimulated a Healthy Cities movement. Healthy Cities is a global movement working to put health high on the social, economic and political agenda of city governments. The WHO (1998) defines a healthy city as:

“A healthy city is one that is continually creating and improving those physical and social environments and expanding those community resources which enable people to mutually support each other in performing all the functions of life and developing to their maximum potential.”

A healthy city is a process, not a status (De Leeuw & Simos, 2017). Hancock and Duhl (1986), the founding fathers of the Healthy City movement, state that a healthy city should strive to provide the following 11 qualities to its people and infrastructure:

1. A clean, safe, high quality physical environment (including housing quality)
2. An ecosystem which is stable now and sustainable in the long term
3. A strong, mutually supportive and non-exploitative community
4. A high degree of public participation in and control over the decisions affecting one's life, health and well-being
5. The meeting of basic needs (food, water, shelter, income, safety, work) for all the city's people
6. Access to a wide variety of experiences and resources with the possibility of multiple contacts, interaction and communication
7. A diverse, vital and innovative city economy
8. Encouragement of connectedness with the past, with the cultural and biological heritage and with other groups and individuals
9. A city form that is compatible with and enhances the above parameters and behaviour
10. An optimum level of appropriate public health and sick care services accessible to all
11. High health status (both high positive health status and low disease status)

The Healthy Cities movement has health equality as its core value (De Leeuw & Simos, 2017) and community participation as its cornerstone (Dooris & Heritage, 2013). Moral questions behind the spatial organization of the city have, therefore, become more important (Reinders, 2013): being intentional about whom spatial decision-making will benefit will result in opportunities for better health and well-being for everyone. As a result, the WHO Healthy Cities Programme has been acting as a catalyst for “healthy urban planning”. Healthy urban planning aims to refocus urban planners on the implications of their work for human health and well-being, especially for those who need it most (Barton & Tsourou, 2000). There is now a growing recognition amongst professional planners that the health–environment link is important (Barton, 2005). It has, therefore, been recognized that health and well-being of communities can not be an afterthought. It must begin with spatial decision-making (Chang et al., 2010). As a result, awareness has been raised that health issues should be given a higher priority on the agenda of urban planners (Barton & Grant, 2006; Flynn, 1996).

2.3 Planning to reduce health inequality

Even though the awareness that health issues should become a higher priority on the agenda of urban planners has been rising, Barton (2005) states that in some ways planners are still literally building unhealthy conditions in the fabric of our cities. Barton (2005) criticizes the lack of activity in the planning discipline when it comes to improving health and reducing health inequality. Irony can be found in the fact that the fields of public health and urban planning share a long history of collaboration: the initial task of urban planning was to improve the health of the people living in industrializing cities when sanitary facilities were rare and a lack of hygiene led to poor living conditions, diseases and epidemics in cities (Baumeister et al., 2016, p.34). By restructuring cities systematically, planners have improved the living conditions and public health in cities (Gediehn, 2020). The subsequent divorce between health and planning has, however, helped to undermine the social credentials of the planning discipline. As a result, urban planners are currently being accused of exacerbating social and environmental conditions, such as social exclusion, poor accessibility and car dependence, which have been identified as having a negative influence on urban dwellers' health status (Wilkinsons & Marmot, 2003). The problem has been made particularly intractable by the institutional separation of planning and health, as health authorities focus on providing health services while planning authorities have the prime concern for local economic development and environmental protection. Conscious strategies for achieving health-promoting urban environments can, therefore, easily get lost between the two (Barton, 2005).

Based on the idea that planners can improve urban residents' health status, Barton and Grant (2006) have developed the Settlement Health Map (figure 1), showing the various determinants in social and economic life and the physical and global environment which all impact public health. Since it first appeared, the map has been widely adopted by health agencies, researchers and the WHO Healthy Cities programme across the world. It is inspired by three sources: theories of the social determinants of health, principles of human ecology, and understanding of the constituent disciplines of planning. The Settlement Health Map's value is a dynamic tool that provides a basis for dialogue and provokes enquiry. People are at its heart, emphasising that the purpose of a settlement – and of settlement planning – is to provide a healthy human habitat. The sequence of spheres moves through the social, economic and environmental variables of a settlement, linked to broader social, political and economic forces, placed within the all-encompassing sphere of the earth. Each sphere also relates to a constituent discipline of spatial planning: public health, behavioural sciences, sociology, economics, geography, environmental sciences and ecology. Equivalently, professionals can locate their sphere of influence (Barton and Grant, 2006). Planning professionals have their most direct influence on the 'built environment' sphere, through the planning, design, construction and management of 'spaces and channels' (McLoughlin, 1969). Working inwards on the diagram, the purpose of the spaces and channels is to provide for human activities and movement, to support the economy, to facilitate social interaction and healthy lifestyles. Changes in the built environment stem from demands placed on it by the inner spheres, and investment provided by economic activity. The lifestyles, social networks, employment opportunities, activities and built environment are all determinants of mental and physical well-being (Barton and Grant, 2006). Working outwards on the diagram, the built environment sphere (and the human activities within it) profoundly affect the natural environment, and vice versa: settlements are dependent on the ecological processes of nature, at both local and global scales. Good health depends on clean air, pure water, effective drainage, fresh food, access to nature, freedom from climatic extremes and floods. The outer parts of the map and

the inner are, thus, directly related: when people walk rather than rely on the car they reduce greenhouse emissions, and thus help to moderate the threat of climate change (Barton and Grant, 2006).

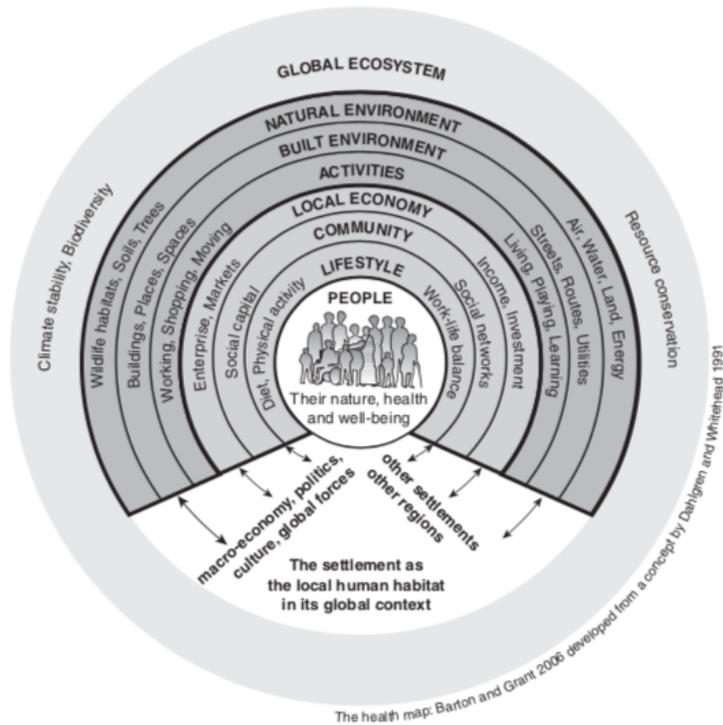


Figure 1: The Health Settlement Map as developed by Barton and Grant (2006)

The Settlement Health Map thus shows that planners can indirectly influence people’s health status by changing the built environment through spatial decision-making.

As stated in the introduction, the current dominant collaborative planning approach towards spatial decision-making, with its focus on problems, actors, deliberation, agreement and acceptability, has, however, shown to not be able to effectively address the complex challenges confronting our cities today (Innes & Booher, 2018). By deliberative and inclusive practices becoming key characteristics of collaborative planning, the collaborative approach has made planners strive for the perfect planning process rather than the perfect planning outcome (Van Dijk, 2020). As a result, it is assumed that the actions agreed upon at the discussion table are by definition good outcomes (Talen & Ellis, 2002). A popular example is Arnstein’s (1969) ladder of citizens’ participation, which visually suggests that co-creation, collaboration between governments and citizens, is the ultimate ideal. In addition, the collaborative approach suggests that multiple truths can be found and no single claim can be superior. According to Talen and Ellis (2002), this leaves planners without guidance when making many critical decisions in their daily work. Defining the key elements of a healthy city has become a result of mutual understanding rather than expertise. However, as Parker and Street (2018) identify, collaborative planning practices are prone to powerful actors dominating the planning process. This often results in an unfair

distribution of power between actors in planning processes and even exclusion of the weaker groups of society. This is especially true for vulnerable groups, such as those with a low socioeconomic status (De Leeuw & Clavier, 2011), the group most affected by health inequality (Curtis, 2004; WHO, 2018). As a result, the collaborative approach may lead to suboptimal outcomes because of compromises (Innes & Booher, 2018) and may be unable to genuinely resolve conflict (Hillier, 2003). Planners may, therefore, not be able to effectively address complex urban problems (Van Dijk, 2020), like health inequality. A more creative and innovative approach is needed. Van Dijk (2020), Bender (2020) and Brown (2008, 2009) propose to look at design thinking.

2.4 Design thinking in the social sciences

Long before the term 'design thinking' existed, there already was 'design'. Since the industrial revolution, designers have ensured that products meet people's needs and that they look attractive (Brown, 2008). However, in the second half of the 20th century, the realization arose that design could also be used for the development of activities and processes and as a way to tackle societal issues. One of the first scholars to use design thinking as a method to solve problems outside the creative domain was Simon (1969). Simon applied design methodologies to science and the field of artificial intelligence in order to tackle "ill-structured problems," which he described as problems with undefined characteristics. Simon described his approach to design as a means of "devising artifacts to attain goals" (p.114), which continued a trend of describing design as a solution-making and transformative process (Bender, 2020). This interpretation of design thinking continued to gain popularity amongst theorists and practitioners throughout the 20th century, which resulted in design thinking as a methodology becoming synonymous with problem-solving, especially as a multidisciplinary practice for framing wicked problems (Buchanan, 1992; Lawson, 2006).

Since Simon's work in 1969, design thinking has evolved from a process used only by designers in traditionally creative fields to being used by governments, social policy researchers, non-governmental organizations, and many more professionals to tackle complex societal problems (Bender, 2020). However, despite its increasing popularity, "there is no agreed view on what is meant by design thinking" (Hassi & Laakso, 2011, p52). The difference in opinion about design thinking's definition often comes down to the debate about whether it is a creative process, used only by designers, or if it is characterized as a separate discipline outside of design (Archer, 1979). In the first definition, design thinking is confined to a creative practice such as product design or architecture, whereas in the latter, it is an interdisciplinary, creative and innovative problem-solving approach that could be used in the design industry *and* beyond (Cross, 1990). Central to this debate stands the question whether design thought should remain only in the hands of expert designers or belongs to the broader, societal, problem-solving landscape (Bender, 2020).

Since the 1990s, the definition of design thinking as an interdisciplinary, creative and innovative problem-solving approach has been popularized by design consultancy IDEO (Brown 2008, 2009; Brown & Wyatt, 2010) and The Hasso Plattner Institute of Design at Stanford (commonly known as the *d.school*). The IDEO has developed a product development process known as human-centered design or HCD that includes the three elements of inspiration, ideation, and implementation (see figure 2)(Brown, 2008; IDEO, 2011). The first key element, inspiration, includes the creation of ideas with participation from and empathy on the part of the designer for relevant stakeholders. This empathetic process can help reveal what stakeholders are relevant, which are not mentioned, and what system dynamics are involved.

This element is similar to a needfinding exercise (as described by Faste, 1987), in which the designer learns the wishes and needs of the client and creates a customized solution that addresses these requests (Bender, 2020). The second key element is ideation and includes a period of rapid, incremental experimentation of ideas that can be quickly tested and analyzed. It includes prototyping, iteration, and validation with a clear emphasis on turning ideas into concrete products, services, or systems. The ideation step can be repeated indefinitely, as ideas are repeatedly thought of and made physical in order to test and evaluate them (Brown, 2009). The final key element of the IDEO's model is implementation, which is also reflective and iterative. Implementation is an element of learning from each idea, experimenting, and validating the idea's success or failure in order to build on and create a better, more refined product or service. This process of learning from past experiences can be described as a reflective practice and is the driver of the design thinking process (Bender, 2020). Reflective practice connects the inspiration, ideation, and implementation elements (Brown, 2009) of design thinking within the context of the needs of the stakeholder, with an emphasis on reflection, improvement, and empathy (Bender, 2020).

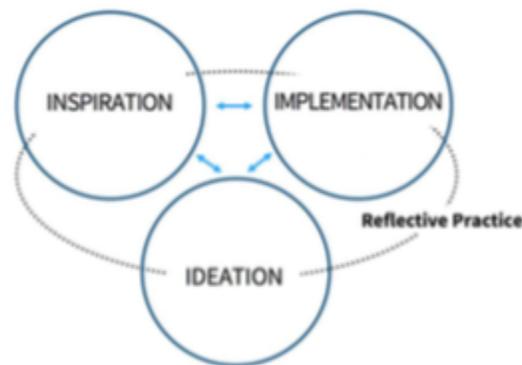


Figure 2: IDEO's model of design thinking as visualized in Bender (2020)

In addition to the IDEO model, the *d.school* has attempted to develop a more practical understanding of the design thinking approach by analytically separating five steps in the design thinking process (see figure 3), existing out of: (1) Empathize with the users, identifying the end-users and their needs and wishes; (2) Define a problem brief, gaining a deeper understanding of how specific urban challenges impact upon different stakeholders and end-users. This can result in new ways of looking at the problem (Onieal et al., 2017); (3) Ideate on solutions, developing as many viable solutions as possible to address the identified problem; (4) Rapidly prototype the most viable solutions; and (5) Test the prototypes. Just like IDEO's model, this process is iterative, meaning that if the design thinking process does not yield the wanted outcome, the process can be repeated until the wanted result is reached (Kumar et al., 2016).

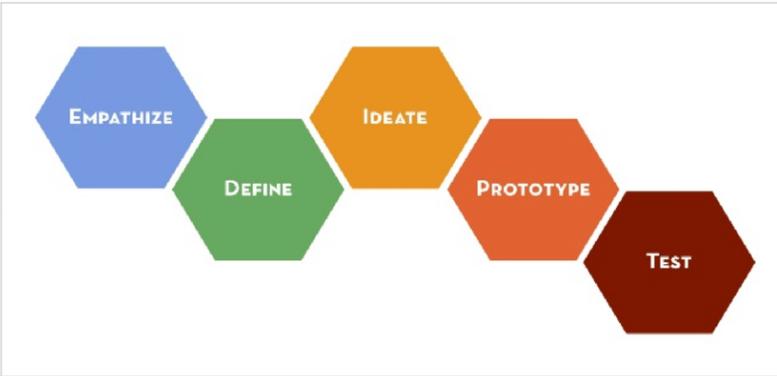


Figure 3: The five steps of design thinking as defined by the d.school, source: school.stanford.edu/resources

Even though the above-mentioned approaches are only two ways of defining design thinking, though influential, it becomes clear that there are differences as well as similarities between the models. For example, the degree of stakeholder or end-user participation and the times at which stages of the process occur may vary. They, however, both agree on a key area of design thinking: that the stakeholder or end-user is the primary focus (Bender, 2020). In addition, both approaches bring together what is desirable from a human point of view with what is technologically feasible and economically viable (Brown, 2008). As a result, when compared to traditional problem-solving methods, design thinking has demonstrated greater empathy for the needs of consumers, a clearer understanding of the problem, more cost-effective and resource-efficient processes, and solutions with greater end-user satisfaction (Scholten & Granic, 2019). Furthermore, it becomes clear that the design thinking process can be considered an innovative process (Brown & Wyatt, 2010) with a social learning component (Beckman & Barry, 2007).

Despite varying definitions, there are enough similarities that describe the key elements of design thinking, bringing it in line with other design and social science research methodologies (Kimbell, 2011; Brown, 2008; Dorst, 2006, 2010). In a recent work, Bender (2020) connects the concept of design thinking to systems theory, organizational learning, and action research. With regard to systems theory, Bender connects design thinking to work of biologist Ludwig von Bertalanffy (1968), which expands the understanding of systems beyond science and analyzes all systems in an intricate, open, and holistic manner. It is that by understanding the inner workings of social, technological, ecological, and political systems and collaborating with relevant stakeholders, a designer can create a more effective product or service that acts as a targeted intervention to improve the system overall. According to Bender (2020), understanding the inner workings of systems allows the designer to see a more expansive view of the problem. In addition, though design thinking processes are human-centered, they are not exclusively focused on social systems because the ecological and built environment influence the social environment (Bender, 2020).

With regard to organizational learning, Bender (2020) connects design thinking to the double-loop theory, as described by Argyris & Schön (1978), which informs how reflective practice foundationally builds on learning. Double-loop learning involves repeated attempts to address the same issue with the same method while additionally engaging in reflective practice to learn from past performance and emphasize repeat attempts to refine approaches (Argyris & Schön, 1978). Reflective learning often occurs in the prototype and test phase of the design thinking process, by using the insight collected through reflective learning (Bender, 2020).

Finally, Bender (2020) connects design thinking to action research as described by Owen (1998). In action research, the participant and researchers are all participants and collaborators in the change process and it is essential for the researcher to understand their needs in this context, which parallels the collaborative and solution-creating work of a designer. The change desired in the design thinking process becomes an output in the form of a product or service made in collaboration with the end-user (Bender, 2020).

2.5 Design thinking in planning

Although design thinking has been identified as an exciting new paradigm for enhancing creativity and dealing with problems innovatively in urban planning, it remains largely separated from mainstream spatial policy making efforts (Mintrom & Luetjens, 2016). In the planning literature, design thinking is described as an human-centered design approach that focuses on stakeholder engagement and decision-making in complex situations. It especially focuses on creating the capacity needed to be applied for urban planning processes that require multiple stakeholders and the balancing of conflicting interests and ideas (Raynor et al., 2017). Underlying this approach is a belief that the best approaches to planning so far will not be sufficient to enable cities to face modern challenges. According to Mintrom and Luetjens (2016, p.399), design thinking's human-centered focus "holds the promise of assisting policymakers to create interventions and services that improve user experience and enhance public value". This can encourage governments to design systems that are more engaged and responsive to citizens' needs (Raynor et al., 2017).

Design thinking is thus an approach that allows urban planners to identify major challenges that truly matter to the target group and work with stakeholders to collaboratively create solutions which can be rapidly tested and iterated, while incorporating the latest available technology to develop innovative solutions to address modern, complex urban problems (Onieal et al., 2017). This approach has, however, been criticized in the planning literature. According to Raynor et al. (2017), design thinking is characterized by limited timeframes and project scales. It is likely to refer to a specific bike path, public space or single technological problem. In this way, it represents a focused and rapid response to a discrete problem, but can be less conducive to long-term strategizing. Furthermore, design thinking has received limited consideration of power and representativeness in its conceptual framing (Raynor et al., 2017). Design thinking is often celebrated for eschewing the notion of the "omnipresent designer" in favor of design as a "collaborative effort where the design process is spread among diverse participating stakeholders and competencies" (Bjögvinsson et al., 2012, p.101). However, the decision-making power ultimately remains with the design thinker. Participants can provide their perspectives and give feedback but are rarely given direct power to build their own ideas, participate directly in decision-making and implementation and to lead the process (Raynor et al., 2017). Design thinking, therefore, raises questions regarding legitimacy. Design thinking promotes input-oriented legitimacy and democratic participation. However, there is a question regarding the representativeness of the input as it is unclear who actually participates in the design thinking process. Although some such as Fung (2006) and Habermas (1984) articulate the value of citizen participation, a legitimate outcome is contingent on the knowledge and willingness of an active citizenry (Mintrom & Luetjens, 2016). In addition, the focus on the design thinker as the final decision-makers in the design thinking process contrasts with the 'mediator' or 'knowledge broker' role often assigned to planners (Raynor et al., 2017). Van Dijk (2020) identifies the omnipresent designer role for planners as a positive element of design thinking, as the planner often has expertise in

the field, compared to participants, and can therefore help effectively steer the process. This may help overcome focusing too much on the planning process and rather focus more on possible solutions. Taking everything into account, Raynor et al. (2017) state that the optimism, innovation and creativity embedded in design thinking has much to offer planning as a way of generating new creative ideas on how to deal with complex urban problems.

2.6 Conceptual model

In this research, design thinking is reframed as the dialogue between the design thinker, the end-user and the object to study what the added value of design thinking for collaboratively creating healthier neighborhoods is. In this way, this research copes with current critique regarding the collaborative planning approach for being unable to deal with complex urban problems (Innes & Booher, 2018), like health inequality, and for being prone to powerful actors dominating the planning process (Parker & Street, 2018). This leads to the following conceptual model (figure 4). This model considers the living environment, which has been identified as the responsibility of planners, as partly influencing people's health status (Barton & Grant, 2006). The difference in health status leads to health inequality (PHS, 2021). As design thinking has been identified as a possible more effective way to collaboratively tackle complex urban problems (Van Dijk, 2020; Bender, 2020; Brown, 2008, 2009), the resulting dialogue is likely to result in the identification of more creative solutions that are more aligned with the needs and wishes of the end-user, which in this study are people with a low socioeconomic status who are most affected by health inequality. The dialogue will likely result in physical interventions in the living environment that are more effective in increasing the health status of people with a low socioeconomic status and will therefore iteratively reduce health inequality.

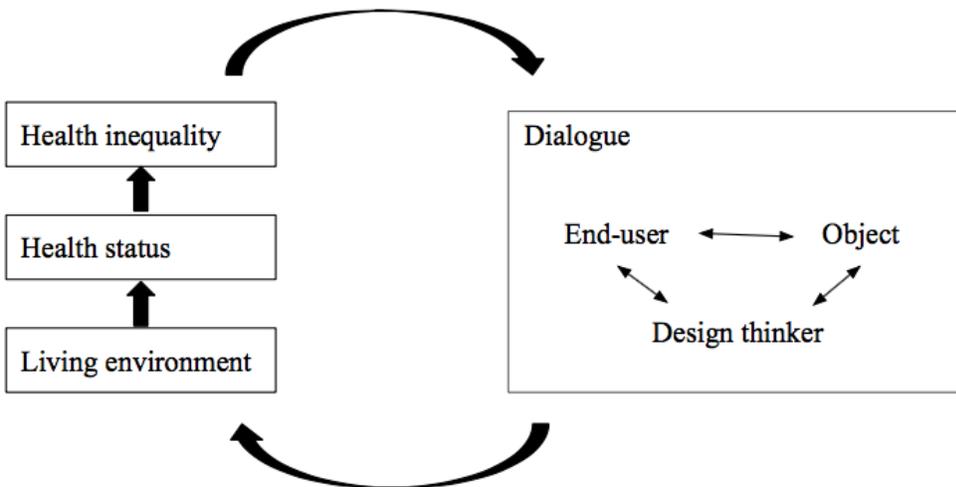


Figure 4: Conceptual model

3 Methodology

As stated by Mintrom & Luetjens (2016), so far, design thinking remains largely separated from mainstream spatial policy making efforts. Therefore, this research has been explorative of nature.

Exploratory research tends to tackle issues on which little or no previous research has been done. This study therefore never intended to offer final and conclusive solutions to existing problems, but merely to explore the research question with varying levels of depth (Given, 2008).

3.1 A comparative case study analysis

To study how design thinking is used in planning projects and whether this improves the spatial decision-making process on how to tackle health inequality, a comparative case study approach is used. The comparative case study approach involves the analysis and synthesis of the similarities, differences and patterns across two or more cases that share a common focus or goal (Goodrick, 2014). By comparing multiple cases it is possible to generalize similarities and attribute differences between cases to differences in context (Yin, 2009), which is a big advantage compared to a single case study. Therefore, it promotes the development of theory building (Bryman, 2012). In addition, comparative case study research is an appropriate approach to evaluate a phenomenon when it is not feasible to undertake an experimental design (Goodrick, 2014) as was initially intended in this study, but has been excluded for circumstantial reasons of time and the Covid-19 pandemic.

3.1.1 Case criteria

In this study four cases are being compared. Four has been considered to be a feasible number within this research, while providing sufficient data to reach conclusions for the main and sub-questions. The four cases have been chosen based on criteria based on the research questions, the theoretical framework, and the conceptual model. The criteria are the following:

- Projects must include (elements of) the design thinking approach
- Projects must have the aim to tackle health inequality through planning practices
- Projects must specifically focus on (neighborhoods with) people with a low socioeconomic status, as this group has been identified as being most affected by health inequality (RIVM, 2018) and has been identified as often being excluded from the spatial decision-making process (De Leeuw & Clavier, 2011)
- Projects must have produced products that are publicly available, to be able to conduct the document analysis

Based on the above criteria, a search was made for projects that fitted within this study. Use was made of the internet and the researcher's network to come up with fitting projects.

3.1.2 Case description

Four projects were chosen as the focus of this study. The chosen cases are the following:

Paddepoel shopping mall, Groningen

In the project *Urban Design for Improving Health in Groningen* (UDiHiG) a consortium led by the University of Groningen is investigating how urban design can contribute to healthier lifestyles for people living in post-war expansion neighborhoods. Post-war expansion neighborhoods are identified as residential areas that have been built right after the second World War, between 1945 and 1970. According to the consortium, these neighborhoods are characterized by a low health status and a relatively high number of people with a low socioeconomic status. The Paddepoel Neighborhood in

Groningen is chosen as a case study. In the first phase of the project a new and health improving design for the area around the shopping mall was created using a design thinking approach. The consortium is also working on three other locations that have been identified as being in need of a healthy redesign. However, since these three other sub-projects have not yielded much results yet, the analysis will focus on the redesign process of the shopping mall only.

The Blauwe Loper, Maastricht

The Blauwe Loper (Blue Route) project is a spatial project that includes the redesign of the oldest working-class neighborhood of Maastricht, called Mariaberg. The neighborhood originates from 1935. However, the area was bombed in the second World War and therefore most houses are post-war. Most of the houses in the neighborhood are public housing and the neighborhood is, therefore, known to house a lot of people with a low socioeconomic status. The Blauwe Loper project includes a new park, the Blauwe Loper itself, as well as the demolition and renovation of existing houses and three new-built apartment buildings. The Blauwe Loper is part of the *Ruimte maken voor Gezondheid In De Stad* (RuimteGIDS) project in which a consortium led by Maastricht University is focusing on generating useful and applicable knowledge about creating and maintaining a healthy living environment with the aim to translate this knowledge into an interactive online tool that can be used by municipalities and professionals to make better urban design decisions. This is done by analyzing four neighborhood projects, two in Maastricht and two in Kerkrade. Of these four subprojects only the Blauwe Loper has been identified to use a design thinking approach and the analysis will, therefore, focus on this sub-project.

Redevelopment of an elderly home, Waalre

In the project *GEzonde sLimme wIJKen* (GELIJK) a consortium led by the Technical University Eindhoven intended to develop a design for a new, still to be built neighborhood in Helmond using smart technology with the aim to improve people's health status. However, due to bureaucratic reasons and the pressure of time the consortium decided to focus on a small-scale project in Waalre instead. In Waalre, a Dutch town in the province of North Brabant, the consortium is now developing a redesign of a sub-neighborhood specifically for vulnerable elderly. The area consists of three large buildings with public outside space that has run down over the last decades. With a design thinking approach the consortium aims to create a redesign of the sub-neighborhood that serves as a model for future smart and healthy living in which participation, self-help and self-management are preconditions. The intended result of the consortium is to develop a set of spatial design guidelines and practical solutions for housing, facilities and meeting spaces for a socially healthy neighborhood for people with a low socioeconomic status in which smart technology plays a prominent role. In addition to spatial guidelines and practical solutions, the consortium of GELIJK also wants to develop tools for inclusive collaboration around the creation of an urban design. The project acts as a living lab, in which lessons are learned that will be used for the bigger project in Helmond.

Greening of low socioeconomic neighborhoods, Arnhem and Nijmegen

In the project *Participatie in het groen van Arnhem en Nijmegen* (PARTIGAN) a consortium led by Wageningen University studies how neighborhoods that house a lot of people with a low socioeconomic status and score low on health status can become greener and how the use of the (new) urban green

infrastructure (UGI) can be stimulated. By doing so, the consortium tries to get a better understanding of the relationship between (urban) green space and wellbeing and to translate this knowledge into urban design interventions. Aim of the study is to reduce health inequalities between neighborhoods in the two cities. The consortium looks into the value of green citizen initiatives for people's subjective health and uses a design thinking approach to green low socioeconomic neighborhoods. The focus of the analysis of this study will therefore be on the sub-project that greens low socioeconomic neighborhoods. Examples of neighborhoods that are being studied are De Kamp and Nijmegen-Zuid in Nijmegen and Spijkerkwartier in Arnhem.

3.1.3 Case justification

The above mentioned (sub-)projects are all part of a four year (2018-2022) subsidy program of ZonMw¹ called 'Maak Ruimte voor Gezondheid' (make space for health). In the 'Maak Ruimte voor Gezondheid' program seven consortia work on the question: *what are the effects of the living environment on health, sustainable (un)healthy behavior, and participation in society?* Of these seven projects four (the above mentioned projects: UDIHiG, RuimteGIDS, GELIJK, and PARTIGAN) were identified to focus on reducing health inequality while working with design thinking. It is therefore that these (sub-)projects have become the focus of the analysis.

ZonMw finances health research and stimulates the use of developed knowledge to improve healthcare and health in general. ZonMw does this together with the Ministry of Health, Welfare and Sport (VWS) and the Dutch Research Council (NWO). As a result, the main aim of the research projects included in the 'Maak Ruimte voor Gezondheid' program is to retrieve knowledge about the influence of the living environment on health. The consortia involved are, therefore, all led by project managers from different universities throughout the Netherlands. Despite this focus on developing knowledge, the (sub-)projects also focus on stimulating true action to tackle health inequality. It is for that reason that local municipalities as well as other (societal) stakeholders are represented in the consortia.

In addition, while the research (sub-)projects purely focus on the design aspect of a healthy living environment and how this may contribute to improving the health status of people with a low socioeconomic status, this study focuses more on the implementation of design thinking in the decision-making process of deciding on how this healthy living environment should look like. The purpose of this study is, therefore, different from the purposes of the existing cases but is able to use the information that is collected in the process of the existing research (sub-)projects. In addition, because design thinking is still largely separated from mainstream spatial policy making efforts (Mintrom & Luetjens 2016) it is hard to find planning projects that do include design thinking approaches but are not linked to research, let alone projects that use design thinking and focus on tackling health inequality. It was therefore that these four (sub-)projects have become the focus of this current study.

3.2 A triangulation of methods

The four cases were studied using a triangulation of methods - the combination of multiple methodologies in the study of the same phenomenon (Denzin, 1970, p.291). By triangulating data, the researcher attempts to provide "a confluence of evidence that breeds credibility" (Eisner, 1991, p.110). By examining information collected through different methods, the researcher can corroborate findings across data sets

¹ <https://www.zonmw.nl/nl/over-zonmw/>

and thus reduce the impact of potential biases that can exist in a single study (Bowen, 2009). According to Patton (1990), triangulation helps the researcher guard against the accusation that the study’s findings are simply an artifact of a single method, a single source, or a single researcher’s bias. The methods that were used to empirically study the four cases are document analysis and in-depth interviews.

3.2.1 Document analysis

Document analysis is a form of qualitative research that uses a systematic procedure to analyze digital and non-digital documents. Documents can contain text and images that have been recorded without the researcher’s intervention. Document analysis is therefore based on secondary data - data that is often not collected for the purpose of the current study (Babbie, 2013). Document analysis requires repeated review, examination, and interpretation of the data in order to gain meaning and empirical knowledge of the construct being studied (Corbin & Strauss, 2008; Frey, 2018). It yields data — excerpts, quotations, or entire passages — that are then organized into themes, categories, and case examples (Labuschagne, 2003). It can be used as a stand-alone method, but by combining it with data from other methods the results of the document analysis can corroborate, refute, elucidate, or expand on findings across other data sources, minimizing bias and establishing credibility (Bowen, 2009; Frey, 2018). In this research, publicly available products (such as newspaper articles, policy documents, informational videos and meeting reports) (see appendix 1) about the four cases were retrieved, coded, systematically analyzed and compared. For the coding process, ATLAS.ti 8.4.4 was used. The documents have been deductively coded, in accordance with the different elements of the conceptual model presented, as well as inductively coded, based on new insights gained from the analysis itself (see appendix 2 for an overview of the codebook and an example). The results of the document analysis have been integrated in the result section.

3.2.2 In-depth interviews

The results of the document analysis have been complemented with interview data from in-depth interviews. In-depth interviewing is a qualitative research technique that involves conducting intensive individual interviews with a limited number of respondents to explore their perspectives on a particular idea, project, or situation (Guion et al., 2011). The researcher’s interviewing techniques are motivated by the desire to learn everything the participant can share about the research topic (Milena et al., 2008). In this study, people involved in the four cases were questioned about how design thinking is used and what their experiences are with the approach. This included first and foremost project managers, but also policy makers, representatives of residents and one resident directly. In total, twelve interviews were conducted (see table 1). The interviews were semi-structured: to keep the results comparable between the four cases an interview guide was created in advance (see appendix 3), based on the conceptual model and the results of the document analysis. However, depending on the answers of the interviewee the interviewer was allowed to deviate from this guide to stimulate a more natural course of the conversation or to follow up on given answers (De Goede et al., 2009). The interviews have been recorded, transcribed and systematically coded in the same manner as the documents in the document analysis. Because of COVID-19 restrictions all interviews were held online.

Case	Participant	Position	When	Duration in
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	(as referred to in text)			minutes
Paddepoel shopping mall - Groningen	Project manager A	Project manager UDIHiG	21/04/2021	45
Paddepoel shopping mall - Groningen	Policy maker A	Policy maker at the municipality of Groningen	03/06/2021	35
Paddepoel shopping mall - Groningen	Resident representative A	Process supervisor at co-creation Paddepoel	01/06/2021	40
The Blauwe Loper - Maastricht	Project manager B	Project manager RuimteGIDS	08/06/2021	40
The Blauwe Loper - Maastricht	Policy maker B	Policy maker at the municipality of Maastricht	27/07/2021	50
The Blauwe Loper - Maastricht	Resident B	Resident of Mariaberg	29/07/2021	40
Elderly home - Waalre	Project manager C	Project manager GELIJK	05/06/2021	30
Elderly home - Waalre	Policy maker C1	Policy maker at the municipality of Helmond	28/05/2021	30
Elderly home - Waalre	Policy maker C2	Policy maker at the municipality of Waalre	21/04/2021	30
Elderly home - Waalre	Resident representative C	Manager at elderly care center Oktober	20/07/2021	40
Greening of low SES neighborhoods - Arnhem and Nijmegen	Project manager D	Project manager PARTIGAN	31/05/2021	45
Greening of low SES neighborhoods - Arnhem and Nijmegen	Policy maker D	Policy maker at the municipality of Nijmegen	16/07/2021	35

Table 1: Overview of conducted interviews

3.3 Ethical considerations

Several ethical considerations have been addressed while designing and conducting this study. First of all, before the interviews started, the researcher thoroughly explained the consequences of being involved in

the study together with a brief explanation of the topic. At the same time, permission to record the interviews was obtained. In this way, informed consent was realized. Secondly, participants have been explained that (partial) withdrawal of answers is possible until submission of this thesis. Thirdly, data of the participants have been stored in a safe environment that is password-protected and only accessible by the researcher and participants if requested. Furthermore, the data has been treated confidential using pseudonyms for each participant.

3.4 Positionality

Dowling (2016) states that researchers involved in subjective research should be reflexive, meaning that researchers have to consider their own position, the social relationships they engage with, whether they influence the data, and how they position themselves within the research process. It should therefore be noted that the researcher can not be identified as being someone with a low socioeconomic status nor living in a neighborhood that can be characterized as such. The researcher, however, holds a strong positive attitude towards health equity and citizen participation in spatial decision-making processes. This meant that the researcher sometimes experienced a tension between her objective stance as an academic and her more subjective position as an individual during the interviews. Being aware of this tension helped the researcher to maintain her objective position, but contradicting thoughts were sometimes present. These thoughts, however, were never translated into subsequent questions posed to the participants. The researcher always posed open questions to prevent steering of answers in any way.

4 Results

In order to effectively demonstrate the outcomes of this study, the results presented here are first described per case and then followed by a subsequent paragraph that compares the similarities and differences between the cases and relates the findings to the scientific literature. The sections are aligned with the sub-questions. Quotes have been translated from Dutch to English by the researcher.

4.1 Defining health

4.1.1 Paddepoel shopping mall - Groningen

The UDIHiG consortium focuses on transforming Paddepoel from a vulnerable neighborhood into a future-proof one. Improving the health status of its residents is seen as a requirement to reach this wanted result. However, cause for action in Paddepoel is not only identified by the project manager.

“Health has always been a bit neglected... but it is an important topic as not everyone is so healthy here”
(resident representative A)

Policy maker A too sees a clear cause to conduct this project in Paddepoel, as the ideology of the municipality is to allocate resources to areas in the city where they are needed most. In addition, the municipality hopes to get a better understanding of “how to incorporate health within all policy areas,

large physical projects and urban development” through being a part of this project, as they are “not quite there yet” (policy maker A).

Within the UDIHiG project health is described as a “broad concept” (project manager A) that “transcends domains” (policy maker A). The consortium has endorsed the definition of health as described by Barton (2010). According to Barton (2010), a healthy lifestyle is dependent on enough exercise, healthy food, social interaction and enough accessible green space. As a result, the UDIHiG project focuses on improving these aspects in the Paddepoel neighborhood to stimulate healthier lifestyles and to combat health inequality. It does so by identifying physical interventions that have a positive health effect on people's behavior. There, however, seems to be awareness that not all health issues can be solved with this approach.

“Of course you can't do everything with urban design, but you can, for example, focus on exercise behavior and on social encounters. These are things that are known to lead to positive health outcomes” (project manager A)

In the Paddepoel shopping mall (sub-)project, the consortium has been focusing mainly on physical mobility, by stimulating walking and cycling around the mall, to contribute to healthier lifestyles for people living in the neighborhood.

“The main idea behind this is that better accessibility entices more people to make walking and cycling part of their daily behavior” (project manager A)

The consortium expects this to have a greater health effect than by simply ‘adding’ sport facilities and fitness clubs. By focusing on accessibility and physical mobility “a healthy lifestyle is related to feelings of traffic safety” (project manager A). Other aspects that are, therefore, taken into account in the redesign process of the area around the shopping mall are safe and accessible green space, active use of this green space, increasing the number of social hubs, and the quality, availability, and accessibility of public transport to limit car use.

4.1.2 The Blauwe Loper - Maastricht

The RuimteGIDS consortium operates with the idea that by creating an inclusive neighborhood the health status of vulnerable groups can be improved and, therefore, health inequalities can be reduced. The consortium specifically looks into the relationship between (urban) green space and health. In the documents written about this project, research results are discussed that focus on the relationship between (urban) greenery and mortality, mental well-being, heat reduction, birth weight, mood and cognitive development of children. The RuimteGIDS project embraces the concept of ‘positive health’ as described by Huber et al. (2011): “Health is not only the absence or presence of disease, but the ability to cope with the physical, emotional and social challenges of life and to be able to take control over one's life as much as possible”. The conceptualization of positive health, however, has not gone unchallenged within the project:

“Speaking for myself, as a researcher, I find that positive health is a difficult concept to operationalize. However, I think it does help, the concept, to also put health as an important theme on the political agenda” (project manager B)

The Blauwe Loper sub-project focuses specifically on creating more green public space to stimulate people to go outside more and to increase physical activity in the Mariaberg neighborhood. According to policy maker B, Mariaberg has been slowly turning into a problem area because of a spiraling effect that started with disinvestment, an aging housing stock, people who can moving out of the area, falling rents and the placement of certain groups that have been identified as problematic, like immigrants and former detainees. This accumulation of problematic events has led to the neighborhood becoming an unattractive living environment which houses a lot of people with low incomes and unhealthy lifestyles.

“In addition, the public space that is available does not stimulate people to undertake any health improving activities” (policy maker B)

Project manager B acknowledges the positive effect of (urban) greenery to serve as meeting places, reduce loneliness and increase social cohesion in addition to physical activity. Therefore, both physical and social health is taken into account in the redesign of the neighborhood.

“It is an intervention, an urban development intervention, that not only relates to the physical structure but also to the social structure and, hopefully, to the economic structure of the neighborhood” (policy maker B)

4.1.3 Elderly home - Waalre

The GELIJK consortium looks mainly into the social aspects of health. Project manager C describes social health as:

“increasing the chances of informal but also formal encounters...This makes it [encounters] one of the variables we look at when it comes to measuring social health. Whether more encounters have been established, what is the nature of the encounter, but also what is the quality of it” (project manager C)

By stimulating social health with their design, the consortium expects that people will have more social interaction and will, therefore, meet people more often (outside), which will simultaneously lead to more physical activity. The neighborhood is seen as a space in which this socially healthy living environment can be created. The neighborhood, however, is not seen as an outcome but as a process. According to the consortium, there are four characteristics of a socially healthy neighborhood: green, active, clean and safe. Especially safety has been highlighted in the interviews:

“People need to be able to go for a walk and get lost in their own neighborhood...get lost while being safe. Therefore, social health also translates into the word safety” (project manager C)

To be able to create this socially healthy and safe neighborhood, the consortium focuses on smart technology to improve future smart and healthy living in which participation, self-help and self-management are preconditions and health inequality is reduced to a minimum. In relation to this, the municipality of Helmond speaks of “positive health” as defined by Machteld Huber. “Health is not only reflected in lifestyle, but also in being happier and being less lonely” (policy maker C). Policy maker C,

therefore, speaks of both spatial and social elements, of both the soft and the hard side of health coming together.

“The soft, social side of health is often not taken into account explicitly, or at least is not consciously thought of... Normally we only look at the physical aspects” (policy maker C)

As a result, in the redesign of the elderly home and the public space surrounding it the soft and hard sides of health are combined with the aim to increase the health status of people living in the sub-neighborhood.

4.1.4 Greening low socioeconomic neighborhoods - Nijmegen & Arnhem

The PARTIGAN consortium focuses on the relationship between (urban) green and health, on “how greenery may contribute to health promotion” (project manager D). The consortium describes that contact with nature leads to more happiness and less stress, enhances vitality and creativity and stimulates social interactions. It is also stated that active use and an active experience of greenery have the greatest effect on health. Urban green is, therefore, considered to be an important element in tackling health inequality, but has also been less available in the most vulnerable neighborhoods (project manager D). In addition, the ability to control one's own living environment is identified as having an enhancing effect on one's health status and “self-perceived health is also an important indicator” (project manager D). The project therefore looks into:

“Physical, mental and social health... we measure the stress level, but we also ask, for example, whether people have started to eat healthier because they are involved in a green initiative... We also ask a lot about the social outcomes. So, we also measure loneliness and social cohesion in the neighborhood” (project manager D)

The project manager also emphasizes that more attention should be given to how health is formulated in public policy:

“What we still notice is that there is still quite a separation between that physical domain at the municipality, that includes green space, and the social domain, that actually includes the health part” (project manager D)

With regard to the greening strategy of low socioeconomic neighborhoods in the two cities, the project uses the Environment For Health Impact Assessment (the E4HIA-model) developed by Wageningen Environmental Research as a starting point. This model exists out of four steps: (1) the type of greenery which is present ("Existence"); (2) the degree of exposure to the green, the contact with or the time spent in the green ("Exposure"); (3) the experience that is gained during that contact or visit ("Experience"); and eventually (4) the effect of the foregoing factors on health and well-being, and which health aspect this concerns in particular ("Effect"). Not all aspects are considered to be equally important for every mechanism:

“For improving air quality, existence of greenery may be sufficient, while in restoring the ability to concentrate, the quality of the experience is more important” (project manager D)

4.1.5 Comparison and reflection

When comparing what the four cases identify as elements influencing residents' health status, it becomes clear that all four projects focus on the living environment as a cause of health inequality. This is in accordance with the WHO (2003), who states that our health status is to a great extent dependent on our living environment. A distinction is made between the spatial or physical living environment and the social living environment (as also identified by Barton and Grant, 2006). Both are identified as currently having a negative impact on the health status of the residents living in the focus areas and are thus in need of action. Physical interventions are, therefore, expected to not only stimulate physical health, but also social health. In the cases the two concepts are described to be related to each other. For example, by creating more meeting places, people are expected to go out more and have more physical activity in addition to social interaction. Feelings of safety have also particularly been addressed as an influential factor.

Based on the comparison between the four cases, it becomes clear that greening urban public space is identified as an important strategy to stimulate the health status of people living in low socioeconomic neighborhoods. However, it can also be stated that there is a great variety to which elements of health inequality is looked at. Health inequality, therefore, is a difficult to define concept and its solutions can not be considered true or false. It is, therefore, unclear whether interventions identified and implemented in these projects will actually solve, or even decrease, health inequalities. It has also become clear that the health inequalities described in the cases are often symptoms of other problems. This corresponds to the definition of wicked problems by Rittel and Webber (1973) and is thus in line with Wistow et al. (2015) who identify health inequality as such. Furthermore, it becomes clear that this uncertainty in definition and approach on how to tackle health inequality becomes also visible in policy where more attention could be given to connecting the physical and social domains of health. A possible explanation of why this is mentioned specifically in this study might be the upcoming 'Omgevingswet' (the Environment and Planning Act), as explained by project manager A: "In the Environment and Planning Act participation and health are important pillars". The new Environment and Planning Act shows that awareness has been raised that health (inequality) should be given a higher priority on the agenda of planners, underlining the value of the projects.

4.2 Implementing design thinking

4.2.1 Paddepoel shopping mall - Groningen

The first phase of the UDIHiG project included a literature review into scientifically proven positively health stimulating urban elements, an urban layout analysis of the current situation, and an evaluation of the current health status of the residents living in the Paddepoel neighborhood based on data such as population composition, demographic data, data on socio-economic status and crime statistics. In addition, a subjective evaluation of factors, such as walkability and safety, was retrieved by conducting a survey among the residents. Based on all this data, four problematic locations in the neighborhood of Paddepoel were identified by the consortium to focus on. These four locations were converted into 3D. Then, a workshop was held with residents in which a general introductory presentation covering the project, aims and setup was given, a personal questionnaire investigating the health and well-being status of the participants was conducted, and an evaluation of the four selected locations in VR plus an

evaluation of the VR method itself was performed. Based on the feedback of the first workshop, the consortium prioritized the Paddepoel shopping mall area as the location of primary interest.

The project then moved on to a second phase in which three design scenarios for the Paddepoel shopping mall area were developed by a design team from Atelier Stadsbouwmeester. The three designs included a scenario with only minor changes, a scenario with bigger change but still feasible, and a scenario with drastic changes that was described as an “utopian design” by the designers (project manager A). The scenarios were then evaluated using VR by the same residents that participated in the first workshop during a second workshop. Questions were asked regarding the design, feelings of physical safety and social security of all three design scenarios. Feedback from this second session was then used to create a final design. The final design was communicated to the residents in a third workshop, again using VR. The final design has also been shared with the municipality. Based on the same approach as this first project, the other three identified problematic locations in Paddepoel are being addressed.

4.2.2 The Blauwe Loper - Maastricht

In the first phase of the RuimteGIDS project five overarching research questions were formulated to which answers were to be sought in the rest of the project. These questions were:

1. How do you facilitate the creation and use of healthy meeting places for residents?
2. How can exercise and sport be promoted among residents through spatial interventions?
3. How can the living environment be designed to be socially inclusive, with opportunities for interaction between different (social) groups?
4. How can residents and professionals from various disciplines work together on a healthy living environment?
5. And how can the design of public space be approached in an integrated way?

Various methods were used to develop these questions, such as field days with stakeholders in the consortium, conversations with health professionals, and by studying the behavior of residents of low socioeconomic neighborhoods by living three months among them.

In the second phase four existing spatial planning projects in Maastricht and Kerkrade are being analyzed to form answers to these formulated research questions. The Blauwe Loper is one of these sub-projects. In the Blauwe Loper sub-project, residents of the Mariaberg neighborhood have been included by use of theme sessions, walk-in meetings and interviews to get to know their wishes and needs. In a next step, the municipality has actively searched for active residents that were willing to participate in the design process. Eventually twelve active residents were included in the design process (policy maker B). Through the use of a specifically designed card game, spatial elements that had to be included in the design of the Blauwe Loper have been discussed. Based on the discussion output and sessions between residents and designers, in which residents were actively involved in creating drawings, a design team created a design. This design has then been visualized and discussed with the active residents and finalized according to their input.

4.2.3 Elderly home - Waalre

The project in Waalre focuses on a smart renovation plan for (part of) a neighborhood to make it future-proof for elderly with a low socioeconomic status. In the first phase of the project the consortium studied the question: what makes a neighborhood smart and healthy? A 'knowledge agenda' was drawn up

based on the spatial context and the needs and priorities of the stakeholders involved to be able to answer this question. The second phase of the project focuses more on the design and how to include the wishes and needs of (future) residents in the design process. Firstly, this was done by conducting a literature review into suitable housing typologies, facilities and meeting places that should be available in a socially healthy neighborhood. Secondly, interviews have been conducted with (future) residents and representative organisations, like the care center Oktober. Based on this input a design team is creating a redesign that will be evaluated by the residents in a later stadium, using 3D pictures or VR. According to project manager C, this is an iterative process in which feedback on the design is used to create an improved design, which can be done multiple times until the end-users, the elderly and care center, are satisfied with the result.

4.2.4 Greening low socioeconomic neighborhoods - Nijmegen & Arnhem

The PARTIGAN project exists out of three sub-projects. The first sub-project included a study into the use of five small parks in the municipality of Nijmegen, which were constructed using different forms of citizen participation. The analysis looked at the experiences of residents, the participation process, the perceived quality and current use. In the second sub-project, the project team looks into existing citizen initiatives that focus on green in the neighborhood. How do they involve residents? What is their interaction with the municipality? And what determines success? And above all: What is the significance of being involved in the creation of green initiatives for participants, including in terms of health status? The methods used are interviews with initiators and participants, in combination with an extensive questionnaire among participants about their health status, time spent in the initiatives, and feelings of ownership. With the knowledge gathered in the first two sub-projects, a third sub-project that studies how participatory design processes can improve municipal greening strategies in vulnerable neighborhoods was started. In this project, the two municipalities, Arnhem and Nijmegen, work together with residents with a low socioeconomic status to green the public spaces in their neighborhoods. The idea behind this approach is that by including residents in this process this will be more effective than when green is simply added using a top-down approach:

“If you participate in such a process, it will be more positive for your well-being than if you only look at a placed tree in your street” (project manager D).

Residents have been questioned about their needs and wishes regarding the updated public spaces. The municipality has then incorporated their feedback in their greening strategy. To evaluate whether this has been done sufficiently, the consortium studies the evaluation of the newly implemented green by the residents. Methods used include a pre- and post-measurement of the use and appreciation of greenery among the residents, in combination with monitoring and evaluating the participation process.

4.2.5 Comparison and reflection

From the above descriptions it becomes clear that, even though the methods used differ between the cases, the process that is gone through is more or less consistent. In three of the cases residents are included in the design process before actual interventions are implemented. This observation is interesting because Mintrom and Luetjens (2016) state that a reason why design thinking is lacking in spatial policy making is because of a lack of clarity in definition and approaches, yet in three of the four cases similar

steps seem to have been taken. Only in the case of greening of low socioeconomic neighborhoods in Arnhem and Nijmegen, residents are not directly included in the design process. However, their wishes and needs are translated into the greening strategy of the municipality. Because this project often includes only small scale interventions, like roadside vegetation, a negative evaluation of the implementation can still be improved quite easily. The case, therefore, shows a clear willingness to learn from the end-users in a practical environment (Beckman & Barry, 2007).

Based on the above description of the approaches taken, the five steps of design thinking as described by the *d.school* can be identified in the four cases. This is shown in table 2.

	Inspiration	Ideation		Implementation	
	Empathize	Define	Ideate	Prototype	Test
Paddepoel shopping mall - Groningen	Urban layout analysis, evaluation of the current health status, and subjective evaluation	Identification of 4 problematic locations based on input of analyses, which was then reduced to 1	Three design scenarios defined by designers	Making solutions visible in VR	Evaluation by residents
The Blauwe Loper - Maastricht	Theme sessions, walk-in meetings and interviews Card game to stimulate debate with 12 active residents	Identification of needs and wishes of residents	Design of the Blauwe Loper created by designers, residents active involved	Visualized design (unclear how)	Evaluation by residents
Elderly home - Waalre	Literature review into suitable housing typologies, facilities and meeting places and Interviews with (future) residents and care center	Identification of needs and wishes of target group	One urban design defined by designers	3D pictures or VR	Evaluation by residents
Greening of low SES neighborhoods - Arnhem and Nijmegen	Interviews with residents	Identification of needs and wishes residents and identification of best practices based on first two sub-projects	Greening strategy by municipality	Implementation of public green	Pre- and post-evaluation of public green interventions by residents

Table 2: The design thinking phases as identified in the four cases

What is missing from this table is the iterative and reflective elements of the design thinking process, as identified by Bender (2020) and Brown (2009). However, this iterative process does become explicitly clear in the descriptions of the first three cases, and less explicitly clear in the last case, and is indeed represented in the planning projects.

Within the description of the cases, it also becomes clear that there are different roles allocated to different stakeholders. This division of roles is shown in table 3. Because the consortia are in the lead, the “omnipresent designer” role, as identified and criticized by Bjögvinnsson et al. (2012), does not become that visible in the four analyzed cases. The designers were, however, stimulated to come up with creative solutions, for example by the utopian design scenario in the Paddepoel shopping mall project (project manager A). The expertise of the designer in the design thinking process has thus been identified and optimized in most of the cases, which is in line with Van Dijk’s (2020) reasoning in favor of this leading expert role.

For an impression of (the outcomes of) the cases see appendix 4.

	Inspiration	Ideation	Implementation	
	Who defines the problem?	Who generates alternative responses/solutions?	Who evaluates?	Who decides?
Paddepoel shopping mall - Groningen	Consortium defines problem locations with input of residents	Designers of Atelier Stadsbouwmeester	Residents	Municipality
The Blauwe Loper - Maastricht	Municipality together with consortium with input of residents	Designers hired by municipality with input residents	Residents	Consortium on what to include in the interactive digital guide, municipalities on implementation of redesign Mariaberg
Elderly home - Waalre	Municipality and care institution with input of (future) residents	Designers in project team	Residents	Municipality on public space and care institution on private space
Greening of low SES neighborhoods - Arnhem and Nijmegen	Municipality together with consortium	Municipality	Consortium based on evaluation of residents	Municipality

Table 3: Division of roles

4.3 Experiencing design thinking

4.3.1 Paddepoel shopping mall - Groningen

When asked about using and experiencing the design thinking approach, it became clear that within the Paddepoel shopping mall sub-project, and the UDIHiG project in general, design thinking has never been identified as a top priority in the project.

“Yes, we use a lot of design elements in our project...but it's not that we really said in advance, this [design thinking] is going to be our method and that's how we're going to set it up. That really has come along the way. Like, we're going to discover what works well for us, or at least what do we think is interesting, what do we want to get out of it and what do we need to make that happen” (project manager A)

The project manager even stated: “design thinking, it's still not quite clear to me”. The reason why the consortium still took this approach was to identify health improving spatial elements that work in practice, not only in theory. To be able to accomplish this, working together with residents in the design process was identified as being very important and design thinking offered this by including working with end-users and emphasizing their needs and wishes in the process. The approach was thus more implicitly than explicitly chosen.

“We want to work very closely with residents because eventually we can come up with something, but if those residents wouldn't use it in that way at all, it wouldn't work. So we really have to work with residents to arrive at certain outcomes that would actually work for them” (project manager A)

Including residents in the design process has, however, led to some tension between the expertise of designers and the capabilities of residents within the project.

“When it comes to participation there is always the discussion about who has the most knowledge” (policy maker A)

Even though the design thinking approach emphasizes the needs and wishes of the end-users to come to more effective and inclusive solutions (Brown, 2008), the project manager stated that she noticed that people without an urban design background sometimes did not understand urban design and how it relates to health. For example, the project manager stated that when she once asked someone what would make their neighborhood healthier someone said “I don't know. That the Dominos also sells a salad...” It becomes clear that the expertise of urban designers is still needed to translate the needs and wishes of the end-users into spatial interventions. However, project manager A also acknowledges that the designers should not get complete freedom and need to work with the feedback they are getting from the residents. This is why the consortium introduced the iterative process to stimulate the discussion between the design team and the end-users.

With regard to complete freedom of the designer, it also became clear that even though a designer can come up with the most valued solutions, the only way solutions are being implemented is when they are also technically and economically feasible to execute. Because the municipality is the executing

stakeholder in the project, convincing them is just as important as convincing the end-users. If the residents would have chosen the utopian design scenario, the chance that the design would have actually been implemented would have been slim (project manager A). Expectation management is, therefore, identified as a key element in this project.

“Residents know, of course, that it is an investigation and that not everything that comes from the investigation can be realized one-on-one, but...you trigger things, you do make people think” (project manager A)

Being transparent about what will be done with the input of residents and the final design is therefore important to not disappoint everyone involved in the participative process.

Furthermore, the Paddepoel project showed that even when certain barriers to participation are conquered (like language), representativity of the neighborhood is often hard to reach. According to resident representative A, for example, most people participating in collaborative processes are retirees who are proactive and social, because they simply have time to participate.

“Of course you always want a representative reflection of the neighborhood that participates in the process, but it is of course also voluntary. So the people who are already curious and active will participate, but others might not...Therefore, we can't say well this is what the neighborhood wanted while you only talked to sixty people. But...you can get something out of that, and certainly if you relate that to what the designers say” (policy maker A)

In addition, it became clear that some people are asked quite often to participate in collaborative projects. According to resident representative A, this has led to “mental fatigue and a negative attitude towards co-creation projects...especially against the formal meeting culture”. According to representative A, “the big meetings with soup and bread on Thursday afternoons don’t work anymore.” A more creative way of engaging people in the spatial decision-making process of their neighborhood is needed. Letting people design their own neighborhood, or at least involving them more in the identification of needs and wishes and in the evaluation process of possible designs, may increase the feeling of active involvement. Design thinking may offer this alternative view of how governments might interact with and include citizens in spatial decision-making processes (Mintrom & Luetjens, 2016).

4.3.2 The Blauwe Loper - Maastricht

When asked about his experience with working with design thinking, project manager B states that using the design thinking approach has had the advantage “that the design is able to take into account developments in the living environment... and to better understand the needs and wishes of the people who live there”. Policy maker B seems to agree and defines the design thinking approach as an open heart surgery.

“You are not operating on a deceased patient that you then bring to life, no the patient is alive and must continue to live, even after the operation” (policy maker B)

By taking into account the end-user’s needs and wishes the implementation of spatial interventions can be done in an effective way. Policy maker B also sees the approach as a way to restore trust in the

organization itself. Due to deferred maintenance in the area, residents have become suspicious of any action that is taken (resident B). Policy maker B identified a strange contradiction:

“If you simply asked people what they wanted, they always said that nothing had to change. However, on the other hand, nothing is evaluated as good in the current situation...And that's just primarily because people can't imagine that things could change for the better because they have become used to the fact that in the last 100 years or so, things have only changed in a negative sense. Change is by definition seen as a threat” (policy maker B)

This is underlined by a resident of the neighborhood who states that:

“I am afraid that the adjustments will lead to changes in the neighborhood that will not necessarily be positive... I am happy that residents are being involved in the project, but I am also skeptical at the same time” (resident B)

Including people in the design process is therefore seen, by the municipality and by the project manager, as a way to restore the trust and show people that their participation in the process can truly lead to positive change. Interestingly though, policy maker B seems to be a bit skeptical about including residents in the design process:

“We then chose to say ‘you can make the design’, with the knowledge of course that you cannot say such a thing because it is a profession, you need an education and certain skills and that really takes many years to to build and you also need certain talents such as spatial thinking, you need certain skills. So it's an illusion to say ‘here, have a pencil, just draw a park’” (policy maker B)

The role of the designer to lead the project based on expertise is thus acknowledged in the project. The policy maker, however, also states that he has been impressed by the quality of the outcome of the design process.

“The unexpected side is that the quality of the design and input so far has been so incredibly high, while you would not expect that from the demographics, I mean they are not highly educated people, not that only highly educated people can make a valuable contribution, but more highly educated people are more likely to open their mouths” (policy maker B)

With regard to representativity, this project worked closely with 12 active residents to create a design for the Blauwe Loper. Half of the participants were identified as being new in the neighborhood, having the intention to update their living environment, while the other half were ‘original’ residents who had lived most of their lives in the neighborhood and were more focused on maintaining the identity of the area (resident B).

“Partly due to the arrival of the Blauwe Loper, a piece of the history of the neighborhood is getting lost. A large number of houses are being demolished, including the house where I was born and the house where I have lived most of my life. That's rough” (resident B)

Even though this has led to some tension between the two groups, policy maker B identifies the willingness of both groups to go into the process openly and just see what it would bring and to contribute. This led to “a very nice interaction between those different people”. Policy maker B does, however, identify language as a problem. While the ‘original’ residents were very much focused on speaking in the local dialect, the newer people were often not able to do so. This problem was easily overcome by using plain Dutch, but showed the difference in social identity.

The project has helped to get a better understanding of the problems in the area and into the fact that there is not one absolute solution. But most importantly it has shown the social value of the process.

“And by that I mean that if we hadn't involved the citizens, a different design would have come out. If we had involved other citizens, a different design would have come out. If we had chosen a different designer, a different team or at a different time, ditto. It's not about the design of course, it's about the quality of it and I think... without wanting to dismiss the design as weak...I think the real added value is that there are now at least 12 people who feel the design is theirs. And those are what we have called ambassadors in the neighborhood and I think that is the greatest added value. So I think if we hadn't done it this way, if we had made our own design, it might have been a good design, but then there wouldn't have been 12 ambassadors in the neighborhood.” (policy maker B)

According to policy maker B, this project has ensured that people see the design as their design, making them take personal responsibility for it and be proud of it. It has, therefore, stimulated a more positive attitude towards the needed spatial interventions.

“I am happy that our wishes and needs are represented in the design...I see that as a positive development” (resident B)

In addition, the approach has helped to build a bridge between the physical and social policy domains, which, according to project manager B, is needed to adequately tackle health inequality.

4.3.3 Elderly home - Waalre

Project manager C states that the design thinking approach has the big advantage to “work on real life projects...and to gain practical knowledge rather than only theoretical knowledge”. The project manager also sees added value in that the approach might help to involve people who might not have the capabilities to participate in formal citizen participation processes or might not have an urban design background. By using a design thinking approach barriers in decision-making processes, like language or a lack of spatial awareness, can be limited.

“By using techniques such as digital tools, we also try to make it understandable for them [residents] by making it [spatial interventions] visual....so we try to remove that barrier by making 3D pictures or doing VR so that they can imagine it better” (project manager C)

Project manager C, however, acknowledges that not all voices will be heard. Representativity is still an issue when working with the design thinking approach. Policy maker C2 identifies a lack of trust as an important reason why people did not want to participate in the project. This has led to the fact that even when residents get the full right to come up with their own plans, they do not do so because they are too

skeptical that something will be done with their ideas (policy maker C2). Taking this into account, the residents' input is not the only input that is considered when making decisions, expert knowledge is also processed (policy maker C1). This does, however, lead to contradictions.

“Sometimes we struggle with that. Yes, the residents are the most important but, on the other hand, we would like to see that the neighborhood becomes a bit healthier and their input is not enough to solve the problem” (policy maker C1)

Policy maker C1 acknowledges that it really has to be considered when to involve citizens in the participation process.

“Those are complicated things which we are not always completely sure of. Like, who does what and when” (policy maker C1)

In addition, policy maker C2 states that the added value of working with the residents is not always as big as stated and that the results of such a process does not always yield different results than when a designer would have created it without input from residents.

“The added value can be found in support...and in some small details...but will the plans be completely different? No, not at all” (policy maker C2)

Policy maker C2 relates this to the expertise designers have to study a neighborhood and the problems and processes that are happening there. Policy maker C2 does, however, see the added value of creating a support base for the interventions that are needed when working with a design thinking approach.

Project manager C acknowledges that expectation management is needed. According to her, the target to improve the health status of people is a long term goal. This is also acknowledged by policy maker C2. It is therefore unrealistic to expect any significant results after a four year project.

“You probably can only see the effects of it in ten years. It is a seed and before the plant is big enough to see, you have to be patient. So I don't know whether we can make statements at all with this collaboration in such a short period of time...But we can say that things are set in motion.” (project manager C)

It is, therefore, important to create this awareness, by residents but also by other stakeholders. The project manager hopes that with this project people will become more aware of the action they can take by working together.

4.3.4 Greening of low SES neighborhoods - Arnhem and Nijmegen

Project manager D states that by working with residents in a (re)design process you get a better understanding of “what is going on in such a neighborhood, who should we contact, who should we pay attention to, what has already happened”. According to the project manager, it is also important to not over-ask residents, but also states that more could be done in the field of working with residents in the design process, especially with regard to gaining knowledge:

“I think there's still a gap there. Within this arena we are researchers, we collect information and we share that too, but it's not like we are really designing together with residents” (project manager D)

Project manager D states, from experience, that in the data collection process people who are more familiar with filling in questionnaires and people who are higher educated are more inclined to participate and that, for example, people who are less proficient in Dutch or do not feel familiar with participating do not. However, policy maker D states that it is not simply a result of a low education or low incomes, but also a result of what people are used to. Project manager D also states that the municipality likes to connect findings of the participatory process with existing municipal tasks. Identified spatial interventions can be implemented as long as they fall within time, schedule and budget limits (policy maker D).

“We need a different method to break through the stigma that municipalities are purely bureaucratic and do not care about the feelings and ideas of its population” (policy maker D)

Therefore, a question has been raised about which people are not reached and what the barriers are for them to participate.

“We all think that is a very important question, but it is very difficult to answer because yes, you have to talk to those people to find out” (project manager D)

The project manager states that the people that get involved are mostly proactive, social people, but there are also people who get involved out of self-interest. In addition, the approach to get people to participate is not a standardized one. Every location, every context may need its own approach to get people involved.

Policy maker D states that the most important reason to get people involved in the design process is not the design outcome but rather the support base it creates.

“Look if we do it ourselves then we carefully think about what is going on in the neighborhood and we talk to the people who are working on that neighborhood and then we make a nice design in half the time and half the money, and we implement it and then everyone is happy with it in the end. But then you get a completely different process in the neighborhood and you simply miss the support base. So in part, that participation process is also purely aimed at gaining support” (policy maker D)

In addition, policy maker D also identifies the participation process as an argument that, when people are with or against you, that it is the outcome of a participatory process.

“It is not a municipal idea, no, we came up with this together and made it together. If you don't like it, you should have participated” (policy maker D)

In addition, project manager D explains that participation in the design process is not only beneficial for research or spatial decision-making processes but also leads to personal development by residents. According to her, people learn new skills, get to know their neighbors, experience what it is like to take responsibility and learn how to communicate better. Participation, therefore, also leads to a stronger connection with the neighborhood residents live in.

4.3.5 Comparison and reflection

Based on the experiences with the design thinking approach, as described above, it can be concluded that feelings towards the approach are mixed. The project managers see the process as a way to better understand the context in which they are working and, as a result, to develop solutions that are more effective, as has been identified as a characteristic of design thinking by Brown (2008). They also all state, however, that representativity in the process is hard to reach and that even when applied in low socioeconomic neighborhoods, generally the more higher educated and chatty people are more likely to participate, even when barriers, such as language or lack of spatial awareness are conquered through the use of visual applications. This question about representativity and, therefore, legitimacy has also been acknowledged by Mintrom and Luetjens (2016), who state that a legitimate outcome is contingent on the knowledge and willingness of an active citizenry (Mintrom & Luetjens, 2016). The project managers seem to rather want to work with a smaller group of active residents than to work with a bigger group of passive residents, just to reach representativity. With regard to knowledge, or a lack thereof, the project managers identify a clear role for the design thinker to lead the design process and translate the needs and wishes into a spatial design. This demonstrates the need for vision and leadership (Van Dijk, 2020) which is able to imagine the world from multiple perspectives (Brown, 2008).

The policy makers identify design thinking as a way to more effectively include the needs and wishes of residents in the design process (in accordance with Mintrom & Luetjens, 2016) and as a way to restore lost trust. However, to be able to do so expectation management is needed to not disappoint any stakeholders again, as it is likely that ambitious solutions might not be implemented because of lack of financial funds, because they need to be connected to existing plans, or simply because they take a lot of time to be implemented. This shows that design thinking brings together what is desirable from a human point of view with what is technologically feasible and economically viable, as has been identified by both IDEO's and d.school's model (Brown, 2008). Furthermore, in contrast to Brown & Wyatt (2010) who state that the design thinking process can be considered an innovative process, two of the policymakers indicate that by including residents in the design process the design may not become that different than when an independent design team would create a design. In these two cases, only minor unknown details have been identified using the participatory design process. However, the support base the design thinking approach creates is seen as an important added value of the process. This corresponds to Raynor et al. (2017) who state that design thinking contributes to creating the capacity needed to be applied for urban planning processes that require multiple stakeholders and the balancing of conflicting interests and ideas.

The residents (as represented) indicate they seem to be glad to be included in the process and also seem to feel more proud and responsible after the designs are finished. However, because they have been disappointed by earlier projects, they also seem to stay a bit skeptical about the final implementation and to what extent their participation truly leads to action.

Overall, however, the results show that design thinking is seen as an innovative way to link scientific findings with practical knowledge, to overcome barriers of citizen participation, especially for people who do not have the capacities to participate in more formal spatial decision-making processes, and to create a bridge between social and physical public policy domains.

5 Conclusion and discussion

5.1 Outcomes of this study

The aim of this master thesis was to explore the added value of design thinking for collaboratively creating healthier neighborhoods. This research, therefore, looked into the question: *what is the added value of design thinking to current collaborative planning practices that focus on creating healthy neighborhoods to reduce health inequality?* A comparative case study analysis of four spatial projects that focus on reducing health inequality and implement design thinking was conducted to find an answer to this main question. In alignment with other studies, such as Brown (2008, 2009) and Bender (2020), design thinking has been identified as an approach to navigate and make sense of complexity in this thesis. As health inequalities have been identified as complex urban problems by both theory (Wistow et al., 2015) and within the cases (see section 4.1), it appears that design thinking may be a more suitable approach to create healthier neighborhoods and reduce health inequality than current collaborative practices.

First of all, the results show that even though there is no agreed view on what is meant by design thinking (Hassi & Laakso, 2011), the way design thinking is implemented in the cases seems to be consistent with the phases as identified by the IDEO and *d.school*. In addition, the data shows that the use of design thinking has helped to shift from a problem-oriented approach to a more solution-oriented approach. The resulting dialogue between designer, residents and object has shown to be focusing more on possible health improving interventions, rather than on what is currently wrong in the focus areas. This is shown within the cases as more attention is given to the spatial and social context in which health inequalities occur and a deeper understanding of the wishes and needs of people with a low socioeconomic status. Design thinking's iterative character has within the cases, moreover, helped to develop a number of creative design scenarios with greater resident satisfaction, as residents were asked multiple times to give feedback or were even asked to co-design together with the design team. The findings, therefore, seem to largely agree with Scholten and Granic (2019), who state that when compared to traditional problem-solving methods, design thinking has demonstrated greater empathy for the needs of consumers, a clearer understanding of the problem, and solutions with greater end-user satisfaction. Scholten and Granic (2019), however, also state that the process of design thinking is likely to be more cost-effective and resource-efficient. These characteristics of design thinking have not been identified in the analyzed cases.

In contrast to existing studies, this research poses questions regarding the increased inclusivity of the spatial decision-making process that has been identified as an advantage of using the design thinking approach (Brown, 2008, 2009). Even though the design thinking application in the cases showed that barriers to collaboration for people with a low socioeconomic status, like language or a lack of spatial awareness, were overcome through the use of innovative and creative participatory tools, such as VR and 3D visualizations, all cases showed to have an issue with representativity. Identified causes for residents to not get involved include a lack of trust in institutions due to disappointment in earlier projects and a lack of time. As a result, only a limited number of residents were actively involved in the cases. In addition, these people were identified as not always being representative for their neighborhood, including people who just moved into the neighborhood, higher educated people, elderly and the most chatty people, but have in the cases been described as being ambassadors of their neighborhood. Furthermore,

residents are rarely given direct design power, which has been identified as a characteristic of design thinking by Raynor et al. (2017); only in one of the four cases, residents were co-designing with a team of designers. In all other cases, designs were made by the designer independently, though with input of the residents collected in the earlier stages, and then evaluated by the residents after the design was finished or even after implementation, like in the case of the greening strategy of low socioeconomic neighborhoods in Arnhem and Nijmegen. The residents that were actively involved seemed to be happy to be included in the design process, but remained skeptical about the importance of their input. It seems like reaching representativity is not the main priority in the design thinking process, which contrasts traditional collaborative approaches. Questions remain regarding the legitimacy of the design thinking process, as information about this element of design thinking is still lacking in the literature (Mintrom & Luetjens, 2016).

Based on the outcomes of this study, it can be stated that the design thinking process has the possibility to enrich collaborative planning practices, specifically when focusing on complex urban problems like reducing health inequality. Compared to the current collaborative approaches, design thinking is considered to be more innovative, creative, and solution-focused. However, questions remain regarding representativity, and therefore legitimacy, in the process. In addition, as health inequality has been considered a wicked problem, with many causes, and therefore as a problem that might not even have a definitive solution (Rittel & Webber, 1973), the design thinking approach might help to make a more effective decision on how to create healthier neighborhoods but might not ultimately solve health inequality.

5.2 Policy implications

This study has emphasized the diversity and complexity of the design thinking process with regard to reducing health inequality through spatial decision-making processes. In doing so, this research shows that a golden rule on how to use design thinking does not exist yet. With regard to policy-making practices this study shows that it is hard to actively involve people with a low socioeconomic status and that even when the participatory tools may help to overcome some obstacles, barriers will keep existing. Trust is especially mentioned in this study. The lack of trust by residents in institutions leads to an apparent paradox. On the one hand, the lack of trust leads to a lower willingness to participate. On the other hand, participating in the design thinking process seems to restore some of the lost trust. To not disappoint participants again, expectation management is identified as a key element. In addition, constraints like the lack of time to get involved as well as negative feelings towards the formal meeting culture are identified. Multiple small-scale activities may therefore be a more successful policy strategy to include people with a low socioeconomic status in future design thinking process applications. In addition, it has been identified by several interviewees, project managers and policy makers, that the physical and social domains need to be more integrated in public policy to be able to adequately tackle health inequity via spatial policies. Overall, however, the design thinking approach seems to be able to get a better understanding of the context, to develop a more solution-focused dialogue and to come up with more creative and innovative solutions.

5.3 Methodological considerations

The comparative case study analysis using the triangulation of document analysis and in-depth interviews appears to be a valuable tool in gaining information about the cases' approaches and gaining in-depth knowledge about experiences with the design thinking process. By combining the two methods the researcher was able to corroborate, refute, elucidate, and expand on findings and to minimize bias and to establish credibility (Bowen, 2009; Frey, 2018). The combination of the document analysis and in-depth interviews has helped to identify patterns in the data. The comparative case study analysis was particularly successful in showing the diversity of elements being considered with regard to health inequality, revealing the consistency in the process of the application of design thinking, and in revealing the positive attitude towards participation in the design process to deal with health inequality. The methodology was, however, not able to truly measure whether the design thinking approach used in the four cases has actually led to health improvement by people with a low socioeconomic status. More in-depth interviews or quantitative analyses are needed to measure this over a longer period of time.

5.4 Limitations

This study faces some limitations. First of all, data collection was carried out during the Covid-19 pandemic. This forced the researcher to conduct the interviews online via Microsoft Teams. While this meant that verbal information was still collectable, non-verbal information such as body language could only be collected to a limited extent. Secondly, the Covid-19 pandemic may have provided participants with time to reflect on their health status and spend more time in their own living environment, as a result of working from home. This may have influenced their attitude towards health and urban design research. Line et al. (2010) for example, showed that the societal context in which data is collected (in their study just before the Kyoto Protocol came into force) might influence the results. In this study a similar effect has become visible as various interviewees related their answers to the Covid-19 pandemic during the interviews. Thirdly, results are based on four Dutch cases, meaning that generalizations can only be made to a limited extent. The small sample rather invites future research to investigate experiences with design thinking and its contribution to tackling health inequality through planning practices in other contexts, such as in other countries, to see to what extent the outcomes of this study yield similar insights. Fourthly, as already indicated in the methodological considerations section, the methodology used in this study was not able to truly measure any increases or decreases in the health status of people with a low socioeconomic status. Furthermore, as the projects taken as case studies were still in progress during the execution of this study, it was not possible to comment in depth on the results of these different cases as the results were still being gathered.

5.5 Future research directions

Various recommendations for future research can be identified. First of all, while this study already shows the diverse experiences with design thinking, more analyses of projects using design thinking is needed. This may yield additional insights into how design thinking is experienced and to be able to relate different outcomes to contextual differences. Secondly, extensive research into the best ways of including people with a low socioeconomic status into the design thinking process is needed to increase

representativity in the participative processes. Thirdly, as has been identified above, questions remain regarding the legitimacy of the design thinking process, as knowledge about the need for representativity in the design thinking process is still lacking in the literature. Finally, more research is necessary to further understand the experiences of participants in the design thinking process as only one resident and two resident representatives have been interviewed in this study.

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Appendix 1: Overview of documents used for the document analysis

Case	Name document	Kind of document	Published by
Paddepoel shopping mall - Groningen	VR/AR in Urban Design Education and Research	Congress paper	Project team
	Abstract World Congress on Public Health – Rome October 2020	Congress paper	Project team
	Bewoners Paddepoel zetten zich in voor toekomstbestendige wijk	Article in weekly paper	Municipality of Groningen
	In 3D door ‘toegankelijk en leefbaar’ Winkelcentrum Paddepoel	Online article	Omroep Organisatie Groningen
	Kennisagenda UDIHiG	Official publication	Consortium UDIHiG
	Urban Design for Improving Health in Groningen (UDIHiG)	Online information	ZonMw
	UDIHiG PILOTFASE: Impressies van stedenbouwkundige ontwerpen, Gebied rondom Winkelcentrum Paddepoel	Report of pilot phase	Project team
	UDIHiG: Urban Design for Improving Health in Groningen	Poster	Consortium UDIHiG
	Speeddates en een spannende expeditie door Paddepoel	Progress report	ZonMw
	VR research project Paddepoel, Groningen	Information video	Consortium UDIHiG
The Blauwe Loper - Maastricht	Ontwikkelingen in Paddepoel	Neighborhood newspaper article	Wijkraad Paddepoel
	UDiHiG: het resultaat van een jaar onderzoek	Neighborhood newspaper article	Wijkraad Paddepoel
	Ruimte maken voor gezondheid in de stad: een Zuid-Limburgse kennisagenda	Official publication	Consortium RuimteGIDS
	Ruimte maken voor gezondheid in de stad	Online information	ZonMw
	Leren van de gezonde én ongezonde plekken aan de Groene Loper	Online information	mijngroeneloper.nl
	Subsidie toegekend aan RuimteGIDS: naar een omgeving die gezond gedrag stimuleert	Online article	Academische Werkplaats Publieke Gezondheid

			Limburg
	Ruimte maken voor Gezondheid In De stad (RuimteGIDS)	Online article	GGD Zuid Limburg
	Over RuimteGIDS	Online information	Consortium RuimteGIDS
	Maastricht Oost: de Groene Loper leeragenda	Online information	Consortium RuimteGIDS
	Maastricht West: de Blauwe Loper leeragenda	Online information	Consortium RuimteGIDS
Elderly home - Waalre	Een slimme woonwijk voor gezonder leven	Published article	M. Mohammadi in Gerón
	Aalst-Waalre krijgt de eerste slimme wijk voor ouderen: 'Lantaarn- palen sturen een signaal naar de zuster'	Online article	Cobouw.nl
	Aalst-Waalre krijgt de eerste slimme wijk voor ouderen	Online article	dearchitect.nl
	Het kompas van GEzonde sLimme wIJKen (GELIJK): een framework voor de ontwikkeling van een nieuwe gezonde en inclusieve wijk	Online information	ZonMw
	ONDERZOEK ZONMW NAAR GEZONDHEID	Online article	Brainport Smart District
	Het project GELIJK	Online information	Consortium GELIJK
	GEzonde sLimme wIJKen GELIJK	Poster	Consortium GELIJK
	1. HET KOMPAS VAN GEZONDE SLIMME WIJKEN: een framework voor de ontwikkeling van een nieuwe gezonde en inclusieve wijk	Official publication	Consortium GELIJK
	Aalst-Waalre krijgt slimme wijk voor ouderen aan Malvalaan	Online article	ed.nl
Greening of low SES neighborhoods - Arnhem and Nijmegen	Participatie in het groen van Arnhem en Nijmegen: Samen werken aan groen voor gezondheid (PARTIGAN)	Online information	ZonMw
	Groen: goed voor de gezondheid	Online longread	M. Stuiver et al. - Wageningen University
	PARTIGAN: Participatory Greening of Arnhem and Nijmegen	Online information	H.W. Vaandrager - Wageningen University

	Green participation as a strategy to tackle health inequities	Master thesis	L. Veltman - Wageningen University
	PARTIGAN in de zomer	Newsletter	Consortium PARTIGAN
	Introduction Video PARTIGAN	Information video	Consortium PARTIGAN
	PARTIGAN en Covid-19	Newsletter	Consortium PARTIGAN
	PARTIGAN participatie in het groen Arnhem & Nijmegen	Poster	Consortium PARTIGAN
	De rol van bewonersparticipatie voor kleine parkjes van hoge kwaliteit	Powerpoint presentation master thesis	M. Otter
	Kennisagenda PARTIGAN	Official publication	Consortium PARTIGAN
	Consortiumbijeenkomst 7 oktober 2020	Powerpoint presentation	Consortium PARTIGAN
	Consortiumbijeenkomst 7 oktober 2020 pitch	Poster	Consortium PARTIGAN
	Met dank aan de tuin	Newsletter	Consortium PARTIGAN
	Een nieuw jaar	Newsletter	Consortium PARTIGAN
All encompassing	Acht consortia in de startblokken voor een gezonde leefomgeving	Progress report	ZonMw
	World Café en wandelexcursie naar Spijkerkwartier en Coberco-terrein	Progress report	ZonMw
	Bewegen, ontmoeten en innoveren in wijk van de toekomst	Progress report	ZonMw
	Consortia halverwege zoektocht naar gezonde leefomgeving	Progress report	ZonMw

Appendix 2: Codebook

Main codes	Sub-codes	
Preventieprogramma ‘maak ruimte voor gezondheid’	Aim of research	
	Requirements	Subsidy rules
	Joint meetings	Outcomes of joint meetings
Research projects	Aim of research	Societal aim
		Scientific aim
	Research design	
	Target group	
	Focus area	
	Findings so far	
Design thinking	Identified added value	
	Methods and tools	
	Role division	Role designer
		Role project manager
		Role municipality
		Role residents
	Experiences	Experiences project managers
		Experiences policy makers
Experiences residents		
Defining health	Healthy cities	Healthy neighborhood
	Social aspects	
	Physical aspects/built environment	
Consortium stakeholders	Municipality	Role municipality
	Other stakeholders	

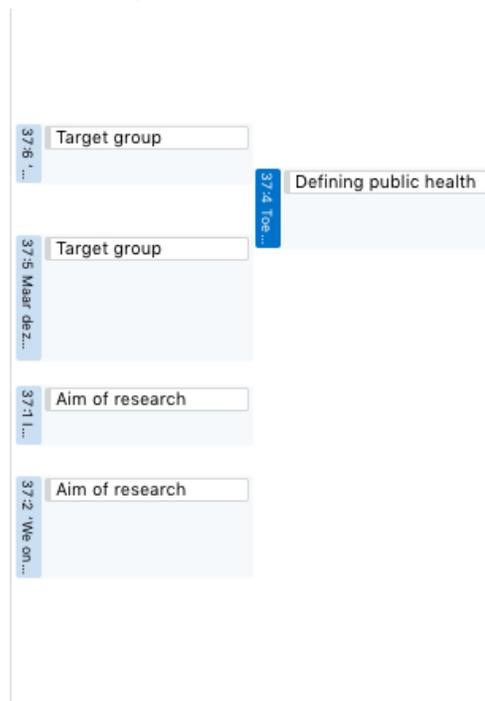
Citizen participation	Co-creation	
	Information about participants	
	Including vulnerable groups	
	Local knowledge	

Example in ATLAS.ti in: Groen: goed voor de gezondheid (PARTIGAN)

Groen in de woonomgeving

Niet iedereen heeft gemakkelijk toegang tot een tuin, een park of straatgroen. Onderzoeker [Jan Hassink](https://www.youtube.com/watch?v=Bo6strPPKKI) (<https://www.youtube.com/watch?v=Bo6strPPKKI>): 'Voor kwetsbare groepen, zoals ouderen en mensen met een lage sociaaleconomische status, is het gebruik van groen belangrijk. Het verbetert hun gezondheid en welzijn. Toegang tot groen kan bijdragen aan het verkleinen van sociaaleconomische gezondheidsverschillen. Dat zijn verschillen in gezondheid en sterfte tussen mensen met een hoge en mensen met een lagere (sociaaleconomische) positie in de maatschappij. Maar deze laatste groep heeft vaak minder groen in de woonomgeving. En de kwaliteit en het onderhoudsniveau van het groen dat er is, is vaak lager, waardoor het effect van groen dat waarschijnlijk ook minder is. Daarbovenop komt dat deze groep ook een kleinere actieradius heeft en bijvoorbeeld minder vaak naar een verder weg gelegen bos gaat.'

In Arnhem en Nijmegen bekijken de onderzoekers daarom hoe ze, samen met inwoners, kwetsbare buurten zo kunnen vergroenen dat alle inwoners meer met groen in contact komen en het actief gebruiken. Onderzoeker [Lenneke Vaandrager](https://www.youtube.com/watch?v=Bo6strPPKKI) (<https://www.youtube.com/watch?v=Bo6strPPKKI>) is projectleider van het consortium [PARTIGAN](https://www.youtube.com/watch?v=Bo6strPPKKI) (<https://www.youtube.com/watch?v=Bo6strPPKKI>): 'We onderzoeken hoe inwoners parken gebruiken en waarderen. We volgen herinrichtingsprojecten waarbij straten worden vergroend. En we willen weten hoe inwoners groene burgerinitiatieven ervaren: we meten het effect op gezondheid en welzijn. Denk bijvoorbeeld aan een buurtmoestuin, opgezet door inwoners zelf, waar ze samen de handen uit de mouwen steken en met groenten en kruiden uit eigen tuin maaltijden bereiden. Wat we verwachten? Dat als mensen in de moestuin werken, ze meer sociale contacten krijgen, minder stress ervaren en zich gezonder voelen. Ze zullen ook gezonder leven omdat ze actiever bezig zijn en gezonder gaan eten.'



Appendix 3: Interview guides

3.1 Interview guide project managers

Theme	Questions
Introduction interviewee and research project	<p>Kunt u uw rol binnen project X toelichten?</p> <p>Hoe is het project tot stand gekomen?</p> <p>Kunt u het doel van het project kort toelichten?</p>
Design thinking	<p>Hoe wordt Design Thinking/ontwerpend denken binnen dit project toegepast?</p> <p>Wat is volgens u, tot dusver, de meerwaarde van DT binnen dit project?</p>
Methodology	<p>Hoe zijn de gezondheidsproblemen en mogelijk veroorzakende stedenbouwkundige elementen binnen de wijk geïdentificeerd?</p> <ul style="list-style-type: none"> - Hebben inwoners hier een rol ingespeeld? <p>Waarom is er binnen dit project voor methode X (VR, 3D visuals, interventies) gekozen?</p>
Stakeholders	<p>Hoe zijn stakeholders geïdentificeerd?</p> <p>Hoe zijn stakeholders benaderd om mee te werken aan dit project?</p> <p>Hoe dragen de verschillende stakeholders bij aan dit project?</p>
Citizen participation	<p>In welke fase van het project zijn inwoners actief benaderd om bij te dragen aan het onderzoek?</p> <p>Hoe worden inwoners betrokken bij dit project?</p> <p>Wat is hun rol binnen het onderzoek?</p> <p>In welke mate zijn de inwoners betrokken geweest bij het bedenken van mogelijke oplossingen? Hoe?</p> <p>Wat is de meerwaarde van deze aanpak voor de target groep (mensen met een lage socio-economische status)?</p>
Expert/designer	<p>Wat is de rol van de ontwerper binnen dit project?</p> <p>In hoeverre zijn de oplossingen door een expert/designer ontworpen?</p> <p>In hoeverre had de designer vrijheid om met eigen</p>

	creatieve oplossingen te komen? Zijn de oplossingen binnen een vooropgesteld kader ontwikkeld?
Evaluation project	<p>Wie bepaalt uiteindelijk of het project geslaagd is? De gemeente, bewoners, het consortium?</p> <p>Wiens evaluatie is het belangrijkst?</p> <p>Zijn er aan het begin van dit project evaluatiecriteria opgesteld?</p>

3.2 Interview guide policy makers

Theme	Questions
Introduction interviewee and relation to research project	<p>Wat is de rol van de gemeente binnen project X? Binnen het consortium?</p> <p>Wat is uw rol binnen project X? Waar houdt u zich zoal mee bezig?</p> <p>Waarom werkt de gemeente mee aan dit project? Wat zijn de beweegredenen?</p> <p>Wat hoopt de gemeente uit dit project te kunnen halen?</p>
Citizen participation	<p>Waarom werkt de gemeente mee aan burgerparticipatieprojecten? Wat is de meerwaarde van co-creatie voor de gemeente?</p> <p>Zijn er ook nadelen te benoemen van burgerparticipatie? Hoe gaat de gemeente hiermee om?</p> <p>Wordt burgerparticipatie binnen gemeentelijke projecten vaak/vaker toegepast? Geldt dit ook voor projecten gericht op gezondheid of is dit een nieuwe aanpak?</p>
Target group	<p>Doelgroep van project X is mensen met een lage socio-economische status, waarom deze doelgroep?</p> <p>Is deze groep kenmerkend voor uw gemeente?</p> <p>Nu blijkt uit de literatuur dat juist deze groep soms niet over tijd of capaciteiten beschikt om mee te doen aan</p>

	co-creatie projecten. Wordt er extra moeite gedaan om deze groep bij het project te betrekken?
Design thinking	<p>Wie bepaalt uiteindelijk hoe het design eruit komt te zien?</p> <p>Heeft de gemeente hier invloed op?</p> <p>In hoeverre wordt de gemeente betrokken bij het maken van het ontwerp?</p> <p>Heeft de gemeente bepaalde eisen kunnen stellen?</p> <p>Wie zal uiteindelijk de nodige ruimtelijke aanpassingen uitvoeren?</p>
Evaluation project	<p>Wie bepaalt uiteindelijk of het project geslaagd is? De gemeente, bewoners, het consortium?</p> <p>Wiens evaluatie is het belangrijkste?</p> <p>Zijn er aan het begin van dit project evaluatiecriteria opgesteld?</p>

3.3 Interview guide citizens

Theme	Questions
Introduction interviewee	<p>Kunt u zichzelf voorstellen?</p> <p>Wat is uw relatie tot het project?</p>
Current situation	<p>Wat vindt u van de wijk/locatie waar het project plaatsvindt nu? Hoe ervaart u deze plek?</p> <p>Is er volgens u actie nodig? Wat vindt u ervan dat de wijk aangepakt gaat worden?</p>
Involvement in project	<p>Hoe wordt u/participanten bij het project betrokken?</p> <p>Wat zijn redenen om mee te doen aan dit project?</p> <p>Wat vindt u van het project?</p>
Experiences	<p>Wat vindt u van deze manier van samenwerken met de gemeente?</p>

	<p>Heeft u het gevoel dat er naar u geluisterd wordt?</p> <p>Voelt u zich nu verantwoordelijker over het project?</p> <p>Wat vind u van de duur van zo'n gezamenlijk project?</p>
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Appendix 4: Impression of cases

4.1 Paddepoel shopping mall - Groningen

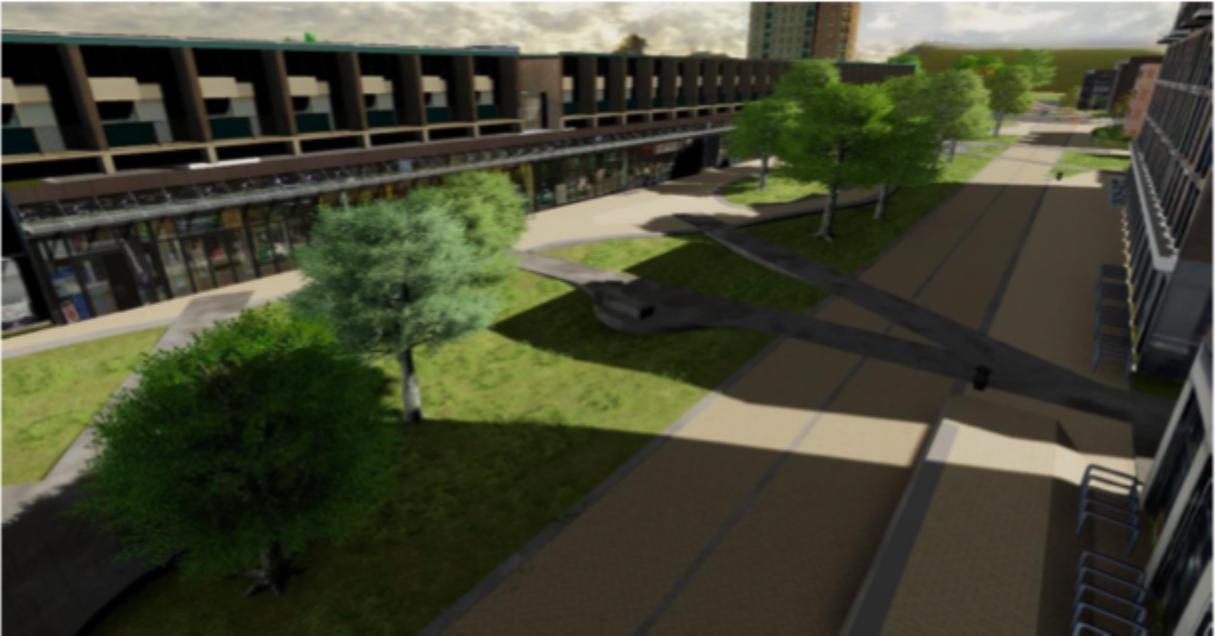
Scenario 1, source: Atelier Stadsbouwmeester



Scenario 2, source: Atelier Stadsbouwmeester



Scenario 3, source: Atelier Stadsbouwmeester



4.2 De Blauwe Loper - Maastricht

Design, source: De Limburger



Impression 1, source: Dreessen Willemse Architecten



Impression 2, source: Dreessen Willemse Architecten



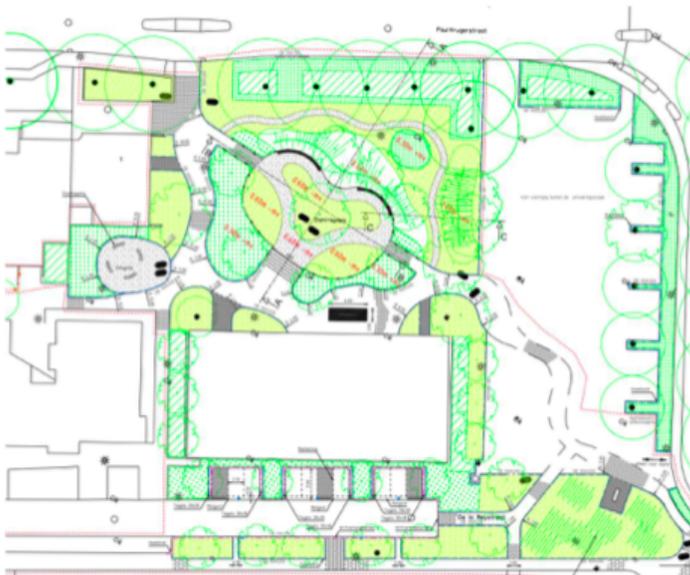
4.3 Elderly home - Waalre

Impression, source: de Architect



4.4 Greening of low SES neighborhoods - Arnhem and Nijmegen

Municipal design, source: PARTIGAN



Example of implemented green, source: PARTIGAN

