Dementia in the Built Environment

THESIS

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Preface

The reason I chose to study Architecture in Delft is because I believe in healing environments and in my opinion architecture has an immense impact on the wellbeing of people, both physical and mental. Unfortunately, there hasn't been a lot of attention for these aspects in the bachelor or in the studios I chose to follow in MSc 1 and Msc2. When I was doing an internship at Vakwerk Architecten, the year before my graduation, I was reminded of my motivation to study architecture. So when I heard about Dr. Birgit Jürgenhake and her graduation studio focussing on creating an inclusive environment for elderly the choice was made.

After a year in this studio, I can say that I have never liked studying so much as in my graduation year. It has been though and emotional researching such a difficult topic as dementia, but being able to talk about healing environments and truly understand your target group was the biggest motivation.

This thesis shows the research that has been conducted this last year, focussing on dementia in the built environment.

Gratitude

First of all, I would like to thank my tutors.

Birgit Jürgenhake, thank you for all the tutoring and insights. Thank you for sharing your experiences with dementia, you are probably one of my biggest sources during this graduation in terms of understanding the effects of having a person with dementia in your daily life.

Frederique van Andel, thank you for being so invested in my research. Thank you for checking up on me, giving me extra guidance when I was extremely stuck with my research and for sending an limitless amount of sources for both my research and design.

Lex van Deudekom, thank you for your directness with every tutoring. Because of you I learned way more about building technology than I could have expected from my graduation year. Thank you for always going one step further and explaining me how the building construction works on site and what that means for my design.

Peter Boerenfijn, thank you for being so invested in our graduation studio. Without your tours in the nursing homes and the opportunity to stay in a nursing home I wouldn't have such a understanding of the needs of the elderly. This has been a great start of this graduation studio.

Furthermore, I would like to thank my friends and family. They have been supporting in every step of my education at the University of Technology in Delft. They were there to celebrate moments and they were there when I needed motivation or someone to talk to. I couldn't have done this without them.

Chapter 1

Introduction

Figure 1: DEMENTIA (AORTA, 2016), edited by author

1.1 BACKGROUND

The amount of people with dementia in the Netherlands has rapidly increased in the span of the past 70 years. While back in 1950 there were only 50.000 registered cases of dementia, today, this number has almost quadrupled to 290.000, setting a trend that projects 620.000 persons suffering the condition by 2050.

Dementia is a general term for the gradual decline in mental ability that is so severe that it affects daily life (van Buuren & Mohammadi, 2022). This disease is set to become the most common affliction of our current young generation, this is because one out of five persons will be diagnosed with it. This means that whether as a patient or through someone in the surroundings, we will all, probably, experience dementia at some point in our lifetime (Toebes & Jong, 2021). This raises the question: Has the Dutch society enough knowledge about dementia to handle this upcoming massive increase?

Research has shown that 98% of the Dutch population knows what dementia is and its symptoms (Francke, 2018). However, in the same group, only 13% of the respondents indicated that they knew how to interact with a person with dementia on a daily basis.

The former means that for people with dementia who could still join the society, some incomprehension or lack of support is still to be expected (Francke, 2018). Additionally, the same research shows that 61% of the participants think that the general population should help people with dementia (Francke, 2018). Thus, while there is not enough awareness in the Netherlands on how to help people with dementia, most of the Dutch population is willing to help where they can.

Even with the intention of integrating patients with dementia and the statistics indicating the illness' growth; still, 81% of people with dementia pass away in a

care facility instead of their own house (Alzheimer Nederland, 2021), even though from an ethical perspective, it is preferred for older adults to die in their homes (Iecovich et al., 2009). This is a surprising percentage especially since institutionalising a demented person often aggravates their symptoms. The transition to a new and unknown place causes them to get scared, oblivious and depressed (Miesen & Kleijnen, 2019). Particularly for people with dementia, it is essential that they can pass away in a familiar environment where they feel safe and comfortable.

1.2 LITERATURE REVIEW

There is extensive research on how architecture impacts people with dementia (e.g., Bowes & Dawson, 2019; Fleming et al., 2016; Nillesen & Opitz, 2014). The majority of studies focus, for instance, on wayfinding or on making people with dementia 'feel at home' and comfortable while they are in a care facility. Despite the awareness that removing a person with dementia from their familiar environment has a negative impact on their health and well-being (Miesen & Kleijnen, 2019); still, the most common approach to deal with the afflicted is to extract them from their own homes and locate them in care facilities. Furthermore, there is extensive evidence proving that it is best for a person with dementia to stay connected to society and be in a neighbourhood setting (e.g., Clark et al., 2020; Wu et al., 2019; Hung et al., 2021; Sheehan et al., 2006).

However, there is an immense gap in research. Despite all the research that has been done, the research on how the built environment can facilitate neighbourhoods to keep people with dementia in their familiar environment is unexplored.

1.3 PROBLEM STATEMENT

Research has shown that it is beneficial for people with dementia to stay in their own house or neighbourhood (Miesen & Kleijnen, 2019). Despite that, in the Netherlands, 81% of those affected with the ailment still pass away in a care facility (Alzheimer Nederland, 2021). It has been observed that one of the main reasons for people with dementia to relocate to a care facility is that their housing situation is not dementia-proof; in other words, not sustainable or safe in the long term. According to a survey, 43% of the informal caregivers expressed that the current housing situation is not future proof, and can lead to dangerous situations (van den Buusse & de Boer, 2021).

The second major reason for home extraction of dementia patients is that the effort required from the informal caregivers is sometimes too demanding or disrupting, which ultimately, compels caretakers to move their loved ones to a nursing home, even in opposition to the advice of Alzheimer Nederland, that outlines this step as too big (2021).

The third major reason for people with dementia having to move to a care facility is that the public healthcare system is not prepared to offer 24/7 care to people with dementia who experience emergencies in the home (Alzheimer Nederland, 2021).

Given the negative effect of such a significant move on the majority of the elders' health, a nursing home tends to be their last station. This aggravates the perception of the elderly and families in the face of moving out of their residence, this is because not only are people afraid to lose their freedom and autonomy when they move to a nursing home; but they also see this step as a last resort and closely associate it with passing away (van den Buusse & de Boer, 2021).

Unsurprisingly, faced with the lack of options, families and patients themselves, usually chose for prolonging their stay at home as long as possible; even when dangerous situations, such as falling off the stairs or accidents in the kitchen, become almost certain since the living environment is not prepared for people with dementia to stay in the home (van den Buusse & de Boer, 2021).

This research proposes that there is a need to envision steps between the home and care facility. As well as setting the notion that moving people with dementia to a care facility should be implemented earlier in the progression of dementia (*Opname in een verpleeghuis regelen | Dementie*, n.d.).

With the increase in the number of people with dementia and the multiple studies that prove that moving to a care facility is not beneficial for them, the housing situation for these people must be reconsidered. Multiple studies have shown that it is best for the person with dementia and their well-being to stay in their familiar surroundings and stay connected to society. Therefore, this study will focus on ways to create a neighbourhood where people can continue living after receiving a dementia diagnosis.

Main research question:
How can a living environment support people with dementia and allow them to stay in their own homes or neighbourhood for as long as possible?

Sub-questions:
1) Who are the people who are affected by dementia?

2) How can the spatial (landscape) architecture create a neighbourhood where people with severe dementia can live?

3) What do existing environments for people with dementia look like?

1.4 GOAL

This research aims to find ways to create a neighbourhood where people with dementia can stay the rest of their lives. One thing is clear, the current housing situation is not future proof and can create dangerous situations for patients. Furthermore, as stated previously, given that the step to move to a nursing home is too large, this research focuses on making this step more manageable while ensuring three things: that people with dementia remain part of our society, and are granted a dignified life and enjoy a living situation that meets their needs.

Depending on how we look at it, it could be said that keeping people with dementia as a part of our society and making sure they live at home for as long as possible is a utopic idea. Nevertheless, from a more realistic perspective, considering that 20% of the young nowadays will eventually face this scenario, it becomes clear that a meaningful paradigm shift and extreme philosophies are not only preferred but essential.

To set a step in the right direction, a change needs to happen within architecture, the healthcare system, and our society. While architecture or one architect cannot single-handedly change everything, the built environment can certainly enable and facilitate a better transition.

1.5 RESEARCH METHOD

The research is divided into three main sections that jointly answer the main research question. Each section addresses one separate sub-question. The following paragraphs outline the different methodologies used to address each supportive question.

Chapter 2, 'Target group', focuses on the definitions, by outlining what dementia is and summarizing its different stages. Additionally, this section also delineates the different target groups of the neighbourhood. In a dementia-friendly neighbourhood. This chapter aims to research which different groups those closely involved with dementia and the needs of these target groups.
Since interviewing people with dementia is not a reliable method to extract accurate answers; to establish a sense of their lives and needs, the researcher in this paper used other sources like existing questionnaires and documentaries instead, such as 'Wei. Zorgen voor pap', a documentary by Ruud Lenssen (2019). Through his film, Lenssen provides both perspectives; his dad's Jac and his struggle with dementia, as a patient, while also following his mother as his caretaker. Another material used was 'Frank & Alzheimer' by Frank van der Lende (2018). Furthermore, the book 'Verpleegthuis' by Teun Toebes was used to better understand what living with dementia means.

Chapter 3, 'Living environment', explores the different architectural layers that can hinder or enhance the living conditions of people with dementia, specifically, by assessing if and how dementia-friendly neighbourhoods affect their inhabitants. In other words, this section will define the main principles [also referred to as guidelines] in architecture and landscape architecture that can influence a person's life with dementia, for instance by helping them to live as independently as possible while ensuring their safety. The methodology used to extract these principles was literature studies. Some examples of the materials used include *Dimensie voor dementie* by Nillesen and Opitz, *Wayfinding design: logic, application, and some thoughts on universality* by Passini and, *Outdoor wayfinding in dementia* by Sheehan, Burton and Mitchell.

Chapter 4, 'Case studies', looks into three different projects. The selected projects were assessed using the guidelines set in the previous chapter 3. The projects analysed are Hogeweyk in Weesp (The Netherlands) by Buro Kade, Carpe Diem in Baerum (Norway) by Nordic and Alzheimer Village in Dax (France) by Nord Architects Copenhagen. The end goal of this chapter is to give a better understanding of how the guidelines from chapter 3 can be implemented, including insightful reflections on each one of the projects.

Ultimately, the development of these chapters and their methodologies will help to find better solutions that create a neighbourhood that supports people with dementia to live there for as long as possible. Unfortunately, not all people with dementia can stay in their familiar environment for the rest of their lives, some patients might need to get moved due to their critical secondary health conditions or the severity of dementia.

1.6 DEFINITIONS

Dementia:
'Dementia is a syndrome – usually of a chronic or progressive nature – that leads to deterioration in cognitive function (i.e. the ability to process thought) beyond what might be expected from the usual consequences of biological ageing. It affects memory, thinking, orientation, comprehension, calculation, learning capacity, language, and judgement. Consciousness is not affected. The impairment in cognitive function is commonly accompanied, and occasionally preceded, by changes in mood, emotional control, behaviour, or motivation.' (Cathy Greenblat, 2021)

Dementia-friendly neighbourhood:
According to Wu (2019), a dementia-friendly neighbourhood can be defined as '*A place or culture where people with dementia can be understood, respected, supported, and confident about contributing to the community. The people in such communities understand dementia. People with dementia feel accepted, able to participate in community activities, make choices, and have control of their daily lives.*'
The idea of these inclusive dementia-friendly communities has the chance to promote social inclusion, change mindsets and behaviours, and help people with dementia to live in their community in meaningful ways (Hung et al., 2021).

Informal Caregivers vs. Formal Caretakers:
This thesis uses the terms 'informal caregivers' and 'formal caretakers' frequently. An informal caregiver is defined as a person that gives care to someone in need; family members, friends, or neighbours often do this. In this case, this is done voluntarily. Formal caretakers are, on the other hand, people who are employed to take care of someone. It is their job to help these people where needed.

Living Environment:
'The living environment is defined as an assembly of the natural and built environment offered to inhabitants of the place who perform various kinds of social, cultural, religious, economic, and political activities that induce peculiarities in the character of the living environment.' (Tiwari et al., 2015)

Neighbourhood:
A neighbourhood is a 'multi-faceted people-environment system where spatial, temporal, and experiential factors intertwine. The neighbourhood emerges as the result of a "walkable zone of experience" that is given form and structure based upon a person's "walking patterns to nodal points from home".' (p.33)

Chapter 2

Target Group

Figure 2: DEMENTIA (AORTA, 2016), edited by author

A first question arises when analysing the system in which dementia patients are immersed: What are the effects of having a relative with dementia on the families and caretakers? People with dementia will experience a progressive decline in cognitive, social and emotional abilities (Marquardt et al., 2014). This will result in the loss of ability to perform daily basic activities such as bathing, toileting or dressing, and also complex instrumental activities like finances, laundry or meal preparation (Giebel et al., 2015).

The loss of ability to perform daily activities can be problematic because it creates dependency and disabilities among older people worldwide; these aspects have the potential to become overwhelming for people with dementia, as well as their families and caretakers (Boltz & Galvin, 2016). The demand for help from informal caregivers (family, friends i.a.) in terms of time, effort and flexibility, increases immensely, which can cause both the caregiver and the person with dementia to have physical, mental, financial and social problems, ultimately leading to institutionalisation of the person with dementia (Smeenk, 2019).

2.1 PEOPLE WITH DEMENTIA

Dementia is not a specific disease, but it is a general term for the impaired ability to remember, think, or make decisions that interfere with everyday activities (Centers for Disease Control and Prevention, 2019). Dementia is a collective name for almost 50 different types. The most widely known and common form of dementia is Alzheimer's disease; other typical representations include vascular dementia, frontotemporal dementia and Lewy body dementia (Alzheimer Nederland, n.d.).

The essential criteria to diagnose dementia is to find an impairment of two or more core mental functions. These functions might include memory, language skills, visual perception, the ability to focus and pay attention and in many cases also accompanied by the diminishment of other cognitive skills such as the ability to reason and solve problems. Important to mention is that the loss of brain function must be severe enough to interfere with everyday functioning (Boltz & Galvin, 2016).

A good source of evidence on the progressive loss of cerebral function is shown in Frank van der Lende's documentary series about Alzheimer's. In his exercise, he follows several cases of dementia, including his father who is in an early stage of dementia. The father is seen as not being able to feel like himself; he is scared and sad and has problems with his daily activities (van der Lende, 2018).

The average time people spend with dementia is seven years (Alzheimer Nederland, 2021). To put this into perspective, it is good to consider that in the Netherlands, an ordinary person reaches the age of 80 years old on average. This means that a person with dementia, who dies at the age of 80 and experienced 7 years of dementia, spent almost 10% of their life with the illness. The most outstanding part of this scenario is that it is not a far-fetched at all, since, as indicated before, 25% of the Dutch current youth will most probably face this reality. It is for this reason that it is important to make these years as dignified and meaningful as possible.

According to Nillesen, the most important aspects that have a significant impact on a person due to dementia are as follows (in no hierarchical order) (Nillesen & Opitz, 2014):

- The cognitive ability declines
- The person is unable to excite or stimulate him- or herself anymore. The person needs external stimuli, like moving images, activity on the street, or noises.
- The person is no longer capable of reflecting on himself
- Orientation and order are becoming problematic
- The person cannot recognise noise and movements anymore; this can lead to a very confusing or annoying feeling for them.
- Previously trusted actions cannot be executed automatically anymore.
- Mirroring behaviour can be observed; they imitate the actions of others, if one starts to eat, the other will also eat.
- One stimulus is enough; if there are more stimuli, the person becomes unable to process anything anymore.
- Objects from the past can be recognised, but modern objects are not familiar to them anymore.
- People with dementia show restlessness or uneasy behaviour; this can be due to boredom, the urge to move or just an uncomfortable chair (Nillesen & Opitz, 2014).

The progression of dementia can be divided into three distinctive stages – early, middle and late (Alzheimer's Society, 2020). These different stages are characterised by the deterioration of various activities of daily life (Giebel et al., 2015). These stages are a guide, and specific steps never happen in the same way for different subjects. It can therefore become challenging to identify a person going from one stage to another. This is because some symptoms may occur in a different order or not at all. Besides, the stages may also overlap. Furthermore, some symptoms could develop at one stage but disappear or reduce later on (Alzheimer's Society, 2020).

Early-stage

The people that are in this stage may function independently. They can drive and take part in social activities. Despite this, the person may forget words or places of objects. They can present memory lapses (Alzheimer's Association, 2018). Orientation can become an issue with the person in the early stage getting lost, even when in a familiar place. Furthermore, people could have visual-perceptual difficulties, causing issues for instance when judging distances. Additionally, there can be changes in mood or emotions. The person can become more anxious, irritable, frustrated, frightened or sad, and is increasingly at risk of depression (Alzheimer's Society, 2020). While the symptoms are not prominent in this phase, in many cases, the family and friends can already notice some changes (Alzheimer's Association, 2018).

Middle stage

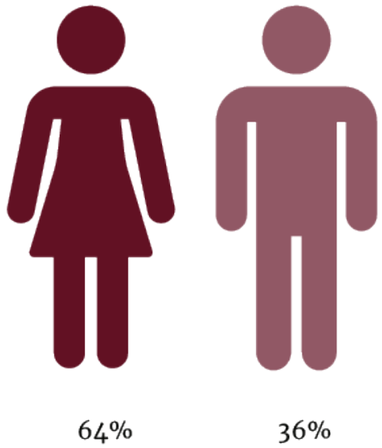
The middle stage is typically the longest phase (Alzheimer's Society, 2020). In this stage, the symptoms become more recognisable and noticeable. The person will need more assistance with managing their daily life. They need frequent reminders to wash, eat and dress. They can experience hallucinations and have delusions. (Alzheimer's Association, 2018). Furthermore, the person may forget or confuse words and get frustrated or angry. Symptoms can be being forgetful of events or personal history, feeling moody, or being unable to recall information about themselves. Furthermore, they can experience confusion about where they are or what day it is. They can experience trouble controlling their bladders and bowels, experience changes in sleep patterns, an increased tendency to wander and get lost and demonstrate personality and behavioural changes. In this phase, the person with dementia can still participate in daily activities, but with assistance. At this point, for both the person with dementia and the caregiver, it could be a solution to go to an adult day care (Alzheimer's Association, 2018).

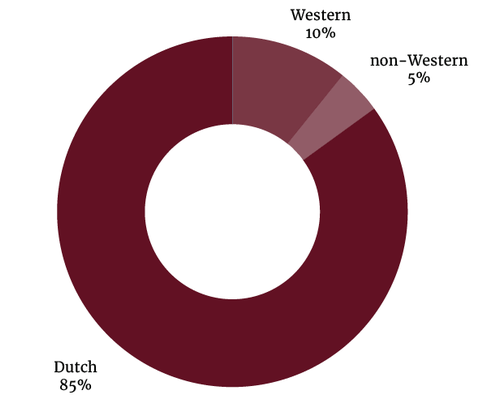
Late-stage

In this stage, it is almost impossible for the person living with dementia to respond to their environment and carry out a conversation and, eventually, control movement. Since their memory and cognitive skills decline, their personality may change even more (Alzheimer's Association, 2018). They will need full-time care and support with daily life and personal care. This stage was veraciously illustrated in the film '*Wei. Zorgen voor pap*' (Lenssen, 2019). It can be observed how the father starts to be confused and the effects on the family realizing that they do not recognize the father and that similarly, the father, does not recognize them back.

While this care can be offered at home, it often occurs in a care facility. This stage is usually the shortest and lasts from one to two years. During the late stage, depression and apathy are very common, and many people will get aggressive and feel scared, threatened, or confused. It is important to note that, at this point, they often respond more to senses than words (Alzheimer's Society, 2020).

As it has been shown, there is not one specific way people experience dementia and its symptoms; nobody goes through the same process. It is believed that every person experiences dementia differently due to differences in their socioeconomic status, ethnicity, gender and culture (J. Dean et al., 2015). Therefore, there are no "one-size-fits-all solutions"; in other words, there are no standard methods to help people with dementia. Nevertheless, there are tools and design methods available that can help an extensive range of people with dementia to improve the quality of their lives. This will be further elaborated on in chapter 3.





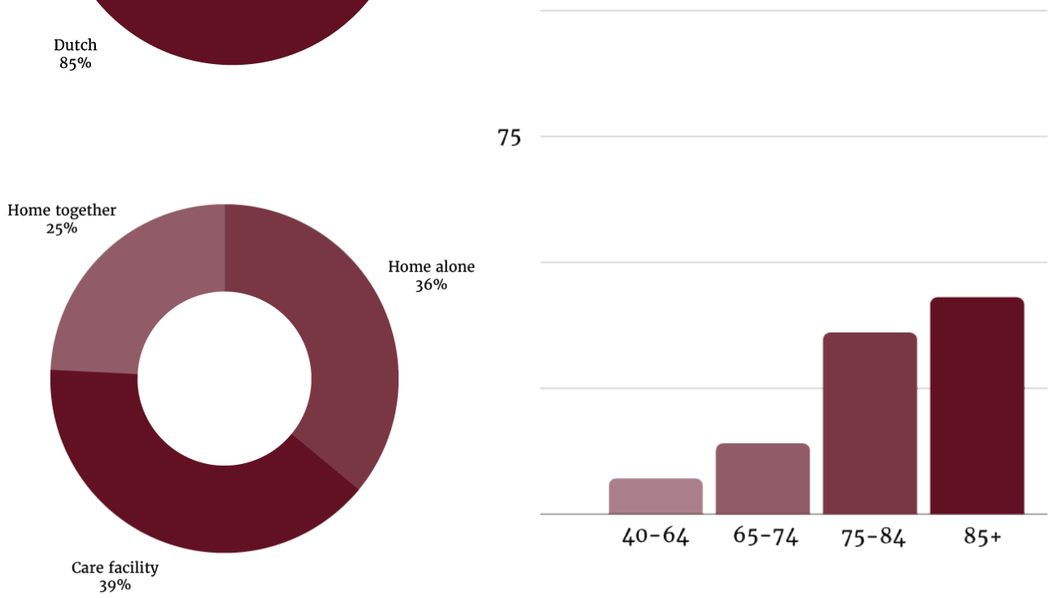


Figure 3: Demographics of people with dementia (own image based on Register Dementiezorg en Ondersteuning (2021))

Demographic

Given that there is not one type of person with dementia, it is essential to understand the range of people affected. To do this, research has been conducted on the demographics of people with dementia. According to Register Dementiezorg en Ondersteuning (2021), the biggest group of people with dementia is 85 years and older, and 64% are female. Additionally, 85% of the entire group does not have a migration background and a total of 39% live in a care facility. While it is registered that 25% live at home individually, still 81% of people with dementia pass away in a care facility (see figure 3).

While one of the most devastating consequences of dementia is a person's loss of memory, the illness involves so much more. Living with dementia makes it increasingly difficult to go outdoors and consequently interact with the social and physical environment, which is essential to maintain wellbeing (Dröes et al., 2017). It has been shown that dementia can make it difficult to make social connections and join the society (Vernooij-Dassen et al., 2011). From the research conducted among 230 subjects with dementia and 320 carers in the Netherlands on community-dwelling and their informal caregivers, we can learn that people with dementia need assistance with food (i.e., groceries and preparing meals,), household activities, and memory and finance. The participants said they felt like their needs weren't met in the case of memory and company (van der Roest et al., 2009). Like our general population, social relationships have a high impact on the quality of life and mortality of people with dementia (Dröes et al., 2017). It is for this reason that this research proposes that social difficulties must receive at least the same attention as cognitive and physical difficulties in the design.

Design guidelines

It has been established that to create a better environment for people with dementia, it is essential to provide them with enough stimuli and social interaction. These are important to avoid people with dementia from wandering in search of stimuli or activities to address their boredom and uncomfortable feeling, which in return could bring significant risks to their safety. While these stimuli and social interactions can entertain them; these activities should not be too complex or demanding of attention to discourage them from engaging. Stimuli can be, for instance, light, sounds, or movement. Incentives that could be used are, for example, daycare or playgrounds. Furthermore, it is essential that the urban plan and architecture are evident and organised. People with dementia have difficulty orientating themselves, so the living environment should help them with this impairment. Additionally, they can only recognise and process movements and sounds right in front of them, for this reason, it is of utmost importance to avoid in the design any sensory information coming from behind them since they can rapidly get confused and uncomfortable.

2.2 INFORMAL CAREGIVERS

Dementia features “one of the major causes of disability and dependency among older people worldwide, it is overwhelming not only for the people who have it but also for their caregivers and families” (Boltz & Galvin, 2016) With the enormous increase in the number of people with dementia comes a rise in the number of informal caregivers required. It has been defined, that in terms of people with dementia, an outstanding 80% of the in-home care is provided by informal caregivers (Etters et al., 2008). Therefore, they are crucial in caring for a person with dementia, especially as long as the person with dementia stays at home and is not institutionalised. Section 2.2 will focus on who these informal caregivers are and the impact of dementia on them (Alzheimer Nederland, 2021).

Informal caregivers are often spouses, partners, adult children, parents, other relatives (siblings, uncles, aunts, nieces/nephews, in-laws, and grandchildren), friends, or neighbours (Whitlatch & Orsulic-Jeras, 2017). Of this group, 68% are female, and 49% are retired, but 40% are still deployed. The average age for this group is 65 years.

Research from Robinson has shown that these informal caregivers face difficulties understanding the disease. They have problems making sense of the changes the individual living with dementia is experiencing (Robinson et al., 2005). According to Alzheimer Nederland, informal caregivers care for their loved ones for an average of 40 hours per week (Alzheimer Nederland, 2021). The uncertainty, enormous amount of time, and high emotional burden might also hinder the health of the informal caregivers at a certain point. The negative effects include higher levels of depression, compromised physical health and decreased quality of life (Etters et al., 2008).

As if it was not enough,
caregiving for a demented relative has also been associated with family conflict, decreased social support, and limitations in social life (Etters et al., 2008).

In some cases, it is inevitable for a person with dementia to move to a nursing home. In the documentary '*Wei. Zorgen voor pap*', the wife of Jac, cannot take care of him anymore, and she is at her breaking point (Lenssen, 2019). This critical point is usually associated with the general strain, isolation, disappointment, and emotional involvement, correlated to the diagnoses, abilities and the symptoms (Annerstedt et al., 2000).

The majority of at-home patients with dementia depend almost exclusively on their informal caregivers for survival. Undoubtedly, the responsibility that falls upon those that decide to aid elders with dementia is quite significant, for instance, it entails permanence in the same spatial plane for long hours, a situation only comparable to a full-time job.

It is therefore important to establish a solution in which not only the patients are considered as main users but also their informal caretakers.

The dynamic between these two stakeholders is crucial when designing dementia-friendly neighbourhoods; this is because the person with dementia and the informal caregiver(s) strongly influence each other. If the community supports people with dementia, it will create more independence and a more extensive social safety net within the neighbourhood. This will improve the quality of life, while also diminishing the burdens for informal caregivers. And vice versa, when the community supports the informal caregivers and cares for their mental health, in exchange, the person with dementia will also be positively influenced. Therefore, it is crucial to keep both in mind when designing dementia proof environments. The resources for a design for dementia proof surroundings will be explored and will be analysed in the next chapter.

Design guidelines
Of the informal caregivers, 40% are still deployed, and thus a study room where they can work is advisable.
Moreover, many of the informal caregivers are relatives who do not necessarily live with the person with dementia. It is therefore also desirable to include a guest room where they can stay over for a couple of nights when necessary. Likewise, it is relevant to consider that in many instances the caregivers are the patient's offspring and that they also might have children of their own, thus a space, where they can play with their kids is indispensable.
While including the previous spatial provisions, will enable informal care providers to balance their private life with the arduous task of aiding their ill relatives; the load on them remains enormous. Therefore, this research also considers as a principle the inclusion of 'buffer' spaces as breathers to provide care providers with the ability to be by themselves and take pauses.

Finally, envisioning situations in which primary informal caretakers cannot safely keep their loved one, it would be helpful to contemplate spaces where they can bring the person with dementia, a day-care, for instance.

2.3 FORMAL CARETAKERS

Due to a decrease in informal care by family members and the demographic development, the workload on geriatric care and their nurses is expected to increase (Nübling et al., 2010). Currently, a total of 454.100 people work in nursing and home care (verpleging, verzorging en thuiszorg). Only 8,5% are male and the remaining 91,5% are female, the average age of this group is 45 (Statline, 2021).

Working in a nursing home is a job that is both fulfilling and demanding (Schmidt et al., 2012). Nonetheless, in the Netherlands, nurses are facing multiple issues such as the psychological effects of the work and challenges related to a diverse array of cultural backgrounds of their patients (Tummers et al., 2003).

It has been shown in the previous chapters that people with dementia tend to show challenging behaviour. They can become aggressive, impatient, and anxious, resulting in self-destructiveness and, or threatening others. This behaviour is exhibited by up to 90% of dementia residents in nursing homes (Schmidt et al., 2014). This challenging demeanour is found to be a significant work stressor that adversely affects the well-being of nurses; carers tend to get anxious and less satisfied with their job (Jenkins et al., 1997). This also has led to an increment in burnout and job turnovers among nurses (Schmidt et al., 2014). The care organisations are worried about the high absenteeism rate (Actiz, 2021). Especially since the increment in workload does not coincide with an increment in staff, and therefore they cannot afford nurses to be absent at any time.

Considering the previous information as context, then it becomes important to question: how can the well-being of formal caretakers be improved? Several strategies can help in this mission: One way to avoid burnout is to exercise, excessive workouts are not required, but instead, a short walk can be sufficient. Secondly, there is evidence that practising good sleeping habits can improve the well-being of nurses (Juli Fraga, 2018).

Another method to improve the well-being of formal care providers is to increase help and support from family members (informal caretakers) and ensure the expressed encouragement and gratitude for the caretakers (Li & Sprague, 2002).

Finally, according to an interview with nurse Clare Dickens, for nurses, it is necessary to have somewhere to go to have a breather and reconnect with their world (‘Mental Health in Nursing’, 2019). To create such safe heaven, a solution could be to create a nurse station where they can have a moment for themselves.

In the Netherlands, the number of care professionals has remained the same since 2012, this number is in stark contrast to the number of incoming clients, which has increased by 23%, during the same period (Actiz, 2021). This has naturally resulted in a steep growth in the demand for formal caretakers in the health sector. And while a load of work and tasks still require the same amount of time as before, each nurse needs to handle a larger number of patients; forcing official caretakers to work more efficiently.

Design guidelines

It has become evident that enabling the staff to work more efficiently is a priority if we aim to tackle the projected growth in dementia cases by 2050 (330,000 more cases than today) (Alzheimer Nederland, 2021). One way to achieve this is to optimize the floorplan by properly considering the workflow and patterns of a nurse during their workday. Different ways to improve the efficiency in nursing homes could include, for instance, having multiple storage spaces throughout the building or site. In this way, the time it takes to get the supplies necessary for a patient could be considerably reduced. Furthermore, this solution could also allow the nurses to have an overview of the patients since they have more time available for administrative tasks. Beyond the analysis of the flow, it is of utmost importance to accurately define the interfaces and hierarchies between circulations, storage spaces, and overview activities/processes. Very decisive is ensuring that the walking pathways for patients do not interfere with the paths used by nurses when they need to speed up for an emergency (Nick Putnam, n.d.).

In a nutshell, a well-thought design, tailored to the needs of formal caretakers, will pay attention to the demographic composition of the nursing personnel in the care facility, which is expected to be around 90% female, this information is important for the design of cleaning and resting spaces (Statline, 2021). Another way to ensure the well-being of the nurses is by creating a pleasant outdoor environment that offers them the opportunity to exercise or walk. And lastly, as previously mentioned, there should be a nurse station where they can relax, get a moment for themselves, and have the chance to sleep.

Chapter 3

Living Environment

Figure 4: DEMENTIA (AORTA, 2016), edited by author

INTRODUCTION

It matters where we age. The space that patients directly inhabit impacts their overall experience of ageing. Nevertheless, beyond the role of the room(s) or house they spend the majority of their time in, the surroundings, such as the neighbourhood, might have considerable, if not more, influence on the social health and well-being of people (Clark et al., 2020).

Neighbourhoods are defined as the locations where daily life is produced through interaction and relationality (Clark et al., 2020). For older people, the dementia fitness of the areas they live in is critical since they spend more time in their locality in comparison to younger adults and thus rely more heavily on the local resources provided (Salvatore & Grundy, 2021). Particularly people with dementia need social interaction because they need, both, help with daily activities and company (chapter 2).

There are many more reasons for which it is essential to keep people with dementia in a neighbourhood setting; one of the primary ones is that the environment has a significant impact on the liveability of people with dementia, for example, their mental health and physical health. This means that enabling the elderly to live in a neighbourhood setting can ultimately influence their general quality of life and possibly the length of the life of the person with dementia.

3.1 OUTDOOR ENVIRONMENT

The quality of life of the elderly is improved when they can go out and use the local outdoor environment (Sheehan et al., 2006), this can be attributed to the fact that access to the outdoor environment enormously increases the perception of independence. However, if the outdoor space is not safe, people with dementia are more likely to become housebound and deprived of the benefits of health, well-being and independence (Richard Fleming et al., 2020). Safety goes beyond a certain limited area, this is because it also encompasses the spatial connections between their own homes, and their friends' homes, retail locations and, for instance, other care environments (Clark et al., 2020). In summary, if the neighbourhood is not clear and safe, people with dementia cannot conduct these visits independently anymore, which ultimately will affect their quality of life and their well-being.

Access to a familiar environment has been associated with reducing anxiety and increasing interest in the surroundings (Fleming et al., 2016). Not surprisingly, people with dementia feel better when the environment is familiar and provides opportunities for engagement. This engagement can be done through objects, activities, and social contacts, while at the same time, it is vital the interactions offer some degree of privacy for patients. This means that the bigger the chances that people with dementia are included in society, the more is their capacity to remain independent for as long as possible. And vice versa, people with dementia remaining independent increases the chance that they stay in a neighbourhood setting.

The reasons enlisted before, make it obvious that there are innumerable benefits for people with dementia when staying in a neighbourhood; however, to sustain such advantages there must be a social network and informal social support for every single patient to succeed (Clark et al., 2020). This demands a neighbourhood with awareness and an active desire to create a safety net for the patients. An option to enable this communal feeling is combining people with dementia with other target groups. Promising combinations are those with children, for instance, a day-care or a petting zoo, (Nillesen & Opitz, 2014).

In conclusion, it is highly beneficial for people with dementia to stay in a neighbourhood. For an area to be considered 'fit for dementia', it is first crucial to ensure that the spaces are optimal (i.e., with safe access to the outdoors) and secondly, that a healthy combination with other target groups enables the creation of social safety net for people with dementia, as well as increases their feeling of independence and connectivity with family and friends.

3.2 LANDSCAPE ARCHITECTURE

According to Fleming, for people with dementia, access to an outside area is associated with reduced sadness and increased pleasure (Fleming et al., 2016). As stated before, the quality of the experience for patients in the outdoors mainly depends on the degree of independence the outside spaces offer to them. Three simultaneous aspects are suspected to determine the degree of self-reliance in the open for people with dementia: familiarity or clarity, safety, and privacy.

Analysing various sources of literature, the researcher of this thesis has determined some overarching principles or good practices that when applied to the landscape architectural design of the neighbourhood, would improve the quality and success rate of outdoor space for people with dementia, the most prominent include:

- Furniture should be heavy and stable (Nillesen & Opitz, 2014).
- It is helpful if there is a circular or loop path. Since wandering people tend to walk forward, they sometimes get stuck and don't realise they can turn around. Therefore it helps to make paths circular or in loops to be guided back to where they came from (Bowes & Dawson, 2019).
- Create lifted areas of the garden; this way, the residents can garden (Nillesen & Opitz, 2014).
- Implement plants and trees that can blossom, giving a sense of time of year (Nillesen & Opitz, 2014).
- A garden accessible for both the residents and neighbours can give the residents more interaction and a feeling of belonging (Nillesen & Opitz, 2014).
- Avoid materials that can create glare or radiate heat (McAdam & Williams, 2017).
- Give options to rest and have social interaction by incorporating sheltered and shaded benches (McAdam & Williams, 2017).
- Create handrails (McAdam & Williams, 2017).
- A path should be wide enough for two wheelchairs to pass (McAdam & Williams, 2017).
- Have accessible public bathrooms along the walking loop (McAdam & Williams, 2017).

3.3 ARCHITECTURE

A good environment can reduce confusion and agitation and improve wayfinding, well-being, and social interaction. When designing a house for people with dementia, some central themes need to be considered: orientation, privacy, autonomy, domestic feeling, sensory intelligibility, room to move, encounters and activities (Nillesen & Opitz, 2014). Encounters and activities are important to improve the feeling of inclusion. In the following paragraphs, ways to provide the right architectural design for people with dementia will be researched. Wayfinding, the most critical factor when designing environments for people with dementia, will be discussed later in this chapter.

The available literature indicates that research has been predominantly conducted in care homes. Unfortunately, there has been no consistent research found on how architecture can influence the well-being of people with dementia within their own homes.

Small-scale

When research is being conducted on how architecture can facilitate people with dementia, one element that is mentioned repeatedly: the use of a small scale. This is especially in the healthcare sector, where several advantages support the idea of small-scale facilities.

First of all, it has been observed that people with dementia seem less agitated and confused in a small care facility (Fleming et al., 2016). The reduction of confusion particularly happens when the care facility is so small that everything becomes simple and straightforward, meaning that people with dementia can navigate it easily. For instance, being able to see the kitchen, dining room, lounge room, and the person's room simultaneously brings much-needed clarity (Fleming et al., 2016).

Moreover, more constant family visits seem to be incentivized when the person with dementia resides in a small-scale form of living and, predominantly if there is a domestic feeling in the home (Nillesen & Opitz, 2014). Unfortunately, having a small-scale care facility in almost all cases implies substantial expenses. To make it financially feasible, an option is to cluster multiple homes to distribute among them, for instance, the service, and/or operation costs, i.a.

According to an interview with van Slooten, a care group needs to consist of at least 6 residents. A care group is a household within a care facility, this is a group of residents living together and sharing some of the facilities. The amount of six residents corresponds with family composition as it used to be when the current people with dementia were in their childhood. Most of the time, six residents is not enough to make a project financially feasible, and it is for this reason that care facilities have at least four separate groups of seven to eight residents (Nillesen & Opitz, 2014).

In the following paragraphs, several design strategies are outlined, according to their applicability to each concept or area in the housing units. The resulting design strategies are used as criteria to evaluate existing projects in the next chapter of this research.

Kitchen and living room

A promising combination is a kitchen together with the living room. This way, the care staff (in the kitchen) can keep oversight and contact the residents while they rest in the living area. In this case, it is nevertheless important to consider that it is hard for people with dementia to process many concurrent impulses. With a kitchen and living room together, there are a lot of stimuli such as diverse activities, people, and noises; therefore, when designing a space like this, special attention is required in reducing or managing a high level of stimulation. Architecturally, this can be done by having as few doors connected to the space as possible, thus reducing the number of unexpected interactions. A second strategy would be to place furniture against the wall, for instance, a couch, in a way that compels the resident to directly face the stimuli, and thus can process them better. Furthermore, in order to enhance the independence of the residents, they need to be able to help the staff in the kitchen in some way; this can be done by creating a kitchen island, for instance (Nillesen & Opitz, 2014).

Corridors

Long corridors have been associated with restlessness, anxiety and more violence (Marquardt et al., 2014; Fleming et al., 2016). Therefore, it is essential to create as few corridors as possible, and it is quite helpful if users can orientate quickly. This can be done by giving as few options as possible and using graphic signage. Furthermore, reducing the number of doors and thus options along their walk is necessary.

View and light

Another critical factor in the living room is its view and the amount of daylight it receives; additionally, like was previously discussed in chapters passing, it is vital to create a connection with the outside world for a person with dementia (Nillesen & Opitz, 2014), and thus, it is advisable to maximize the amount of visual and spatial connections through windows.

Moreover, there is a positive relationship between light and behaviour. Studies have shown that bright light reduces agitation, restlessness, or aggression, making the residents more verbally competent and awake (Marquardt et al., 2014). Light can be designed in such a way that it mimics natural light and helps people with dementia to be aware of the time of day. This can reduce their sense of confusion, avoid them from wandering during the night and last but not least, improve their sleeping patterns (Marquardt et al., 2014; Fleming & Bennett, 2017).

Creating familiarity

The recognisability of personally familiar objects can be used to aid orientation. Displaying carefully picked out items by the family members, for instance, in front of the resident's room could greatly help them locate them (Fleming & Bennett, 2017).

Colour, contrast and patterns

Floor patterns and dark lines or surfaces can disorient people with dementia, to the contrary the use of colours can be of aid to people with dementia when attempting to recognize their room (Passini, 1996). Both colours, and contrast can be used to give doors identity and help residents find their own space. Nevertheless, it is important to be aware that it has been observed that contrast can have adverse effects when it creates an appearance of edges or holes between floor coverings or geometric patterns. These can imply a hole in the ground or wall that can confuse or scare the resident (Fleming & Bennett, 2017).

Visual access

It is beneficial for the well-being of the residents to be able to see where they want to go and go to proceed to start from the point where they are. This visual access helps residents make choices and walk around individually (Fleming & Bennet, 2017; Nillesen & Opitz, 2014). This process will be further investigated in paragraph '4.3 Wayfinding'.

Provide a variety of private and shared spaces

People with dementia need to have the option to choose between being alone or together. In other words, it is essential to create places where patients can be by themselves or interact with others. A house with more gradation between private, semi-private, and public spaces is likely to let the residents experience higher well-being and environmental control than people living in homes with less privacy gradation (Fleming & Bennet, 2017; Nillesen & Opitz, 2014).

In conclusion, since research on how architecture can influence the well-being of people with dementia within their own homes has not been found, the present thesis has derived the main principles to be used in the design of dementia-friendly homes from the existing knowledge in care facilities. The following lines are a summary of the advice found on each criterion:

- The kitchen and living room can be combined instead of creating separate rooms.
- The house can be designed without hallways or at least the square meters dedicated to hallways can be reduced.
- It is advisable to focus on maximizing both, light, and views.
- There needs to be attention put into the use of colours, contrast, and patterns.
- Consider visual access.

3.4 WAYFINDING

As earlier stated, wandering around is one of the most manifested symptoms of dementia. And despite it being so common, when describing this 'roaming', people usually represent it as problematic or attach a negative connotation to it. This is most probably because since the person with dementia cannot often orientate, walking around without direction might lead to them getting lost and, or untraceable for family members, thus causing great stress for caretakers and possibly also for the person suffering this illness.

In these situations, a living environment that is not designed in the correct way might enable or in some cases even directly provoke the wandering. Given that roaming is unavoidable for patients with dementia, the only solution for this hindrance is to prevent people with dementia from getting lost in their neighbourhood, this can be done by enhancing wayfinding.

Wayfinding is defined as the dynamic interaction between the spatial environment and its user. This means that to find their way, people need to understand clearly their current position in space and the position of their destination (van Buuren & Mohammadi, 2022).

3.4.1 Indoor wayfinding

Wayfinding abilities can be supported in two- and three-dimensional ways, such as spatial layout, furnishing, signage, colours, and graphic displays (Passini, 1996).

According to research and case studies that have been conducted by van Buuren & Mohammadi (2022) and Fleming & Bennet (2017), there are several design criteria to stimulate wayfinding indoors, these include:

- The routing should be in the line of the entrance, living room, and individual room.
- The location of the entrance should be alongside a wall, not at the end of a corridor.
- The living room should be placed at an obvious and clear spot, for instance, at the end of a corridor.
- Create visual access between the entrance hall and the living room.
- Provide visual access between the living room and corridor.
- Provide visual access from the bed in the individual room to the bathroom door.
- Create short routes in relation to orientation.
- Decrease the amount of decision making in the corridor.
- Decrease the number of doors in the corridor.
- Place a space or activity at the end of the hallway.
- Make use of natural daylight and view outside.
- Decrease the number of doors in the living room.

3.4.2 Outdoor wayfinding

People with dementia need to be able to navigate without difficulties. When a person with dementia can manoeuvre safely, it directly benefits their quality of life by reducing institutionalisation (Sheehan et al., 2006). According to Alison Bowes and Alison Dawson, there is an inverse relationship between the existence of a 'wander garden' and the levels of psychiatric medication taken by residents in a dementia care setting. This is to say that the people who used the garden more often had reduced medication levels and fewer falls (Bowes & Dawson, 2019).

Wandering is diminished when a path opens opportunities to engage in other activities for the roaming people. A walking path with such characteristics is also associated with lower levels of agitation. According to McAdam and Williams (2017), the following factors can aid when designing outdoor wayfinding (McAdam & Williams, 2017):

- Creating continuous loops with destination points and no dead ends.
- Varying route lengths.
- Integrate direct visual access to relevant landmarks and orientating points.
- Incorporate design features that serve memory triggers (e.g., mailboxes and birdbaths).
- Colour coding on signs and labels.
- Text and icons together on signs.
- Position signs are lower than usual, since elderly start to look more down instead of upwards.
- Create visual barriers like camouflaged doors and murals to reduce unwanted exiting behaviour.
- Create consistent colours on paths and avoid dark lines and patterns.
- Define texture changes on path edges.

3.5 DESIGN GUIDELINES

Landscape architecture

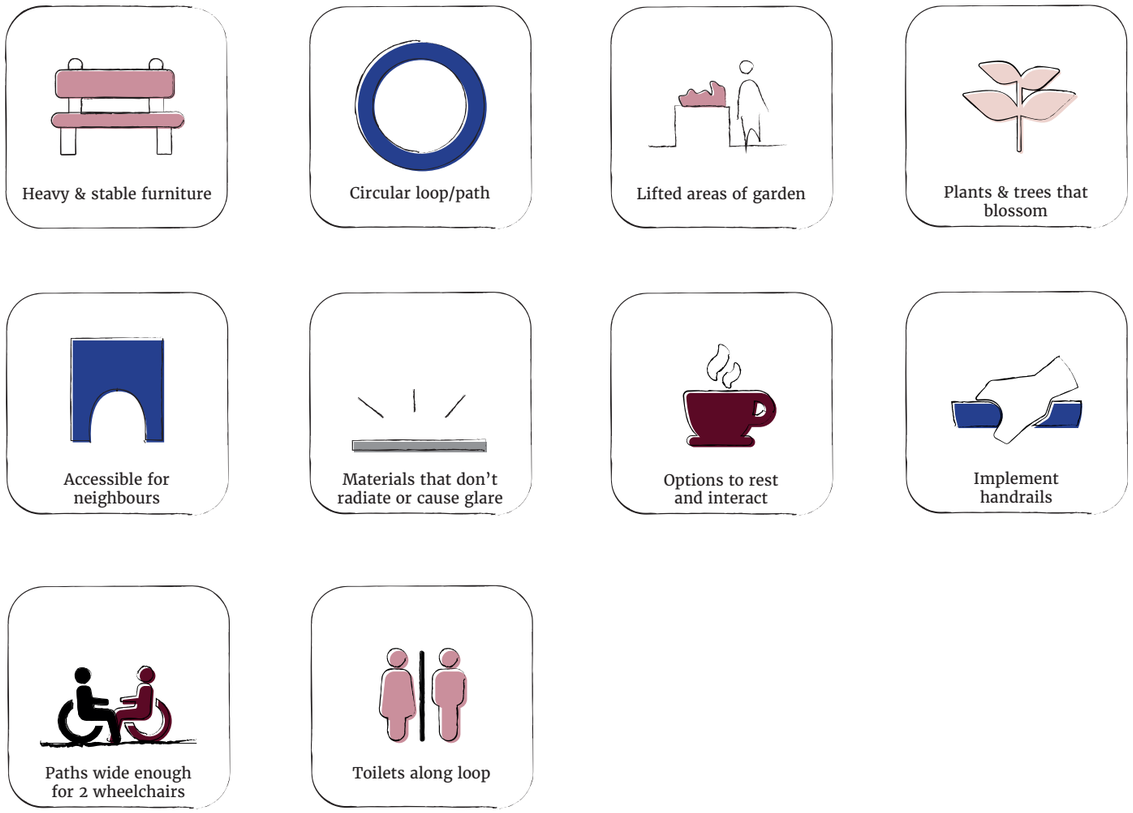


Figure 5: Design guidelines landscape architecture (own image)

Architecture

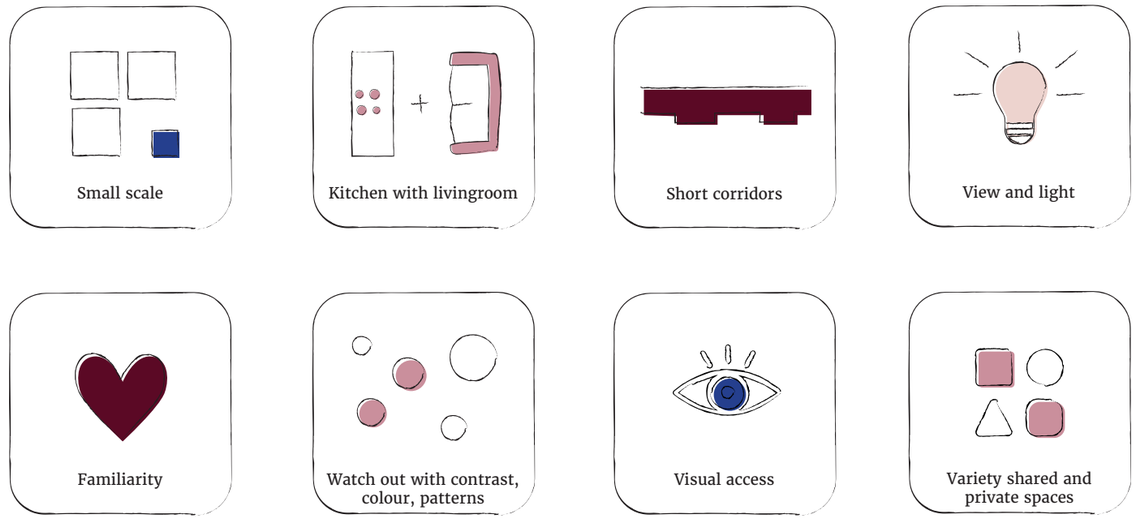


Figure 6: Design guidelines architecture (own image)

Outdoor wayfinding

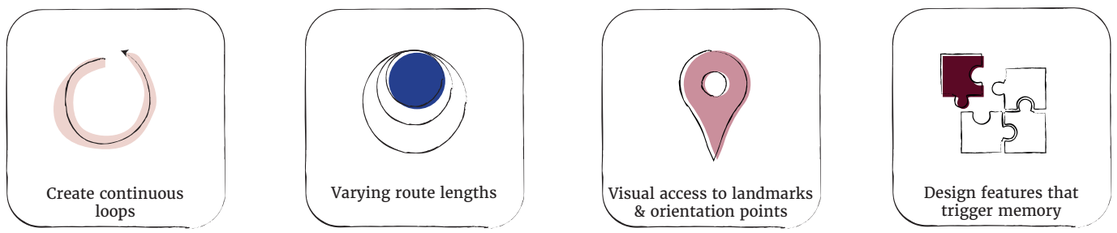


Figure 7: Design guidelines outdoor wayfinding (own image)

Indoor wayfinding

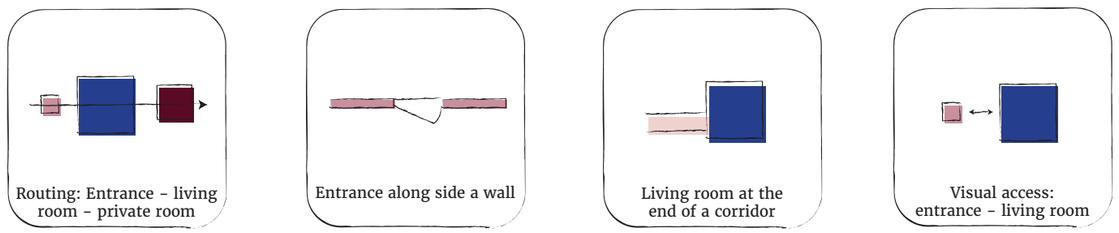


Figure 8: Design guidelines indoor wayfinding (own image)

Chapter 4

Figure 9: DEMENTIA (AORTA, 2016), edited by author

Case studies

4.1 HOGEWEYK

Figure 10: Concept floorplan of Hogeweyk (own image)

The Hogeweyk care facility was designed by the architectural office *Buro Kade*; it was inaugurated in 2009 and is located in Weesp, in the northern part of the Netherlands. This project paved a new way of care and has inspired various projects for people with dementia (Be Advice, n.d.). Hogeweyk has 135 residents who all have severe dementia. The inhabitants live in 23 different households distributed among seven different so-called lifestyles. These lifestyles can be described as overarching themes and include: *Urban, Artisanal, Indian, Domestic, Goois (an area close to Hogeweyk), Cultural and Christian*. The main goal behind the design of this neighbourhood is to give the residents a life that is as normal as possible. The reason behind offering such a variety of ambiences is that it can help approximate what their lives used to look like before the illness. Residents create a household together with eight or nine people taking part in daily activities (Buro Kade, n.d.). They can do groceries, go to a restaurant or a pub, and even a theatre. In these facilities, nurses work in the place of regular cashiers (Vivium Zorggroep, n.d.).

The writer of this thesis has interviewed Iris van Slooten, advisor for Be Advice. This organisation advises on innovative care concepts for older adults living with dementia and supports their creation and implementation worldwide. When Hogeweyk was concluded in 2009, it constituted a revolutionary endeavour and an example for the world, but according to van Slooten, there are a few things that can be improved. For instance, initially, one of the goals of this design was to have a relationship between the dementia complex and the surrounding neighbourhood, but, in reality, there are not enough entrances to access the building from the outside, meaning that there is a barrier for neighbours that want to enter Hogeweyk. Van Slooten thinks that a new concept could be even more open to the external neighbourhood.

Figure 11: Buro Kade (2009). Public space in Hogeweyk

Figure 12: Buro Kade (2009). Facades of Hogeweyk

Figure 13: Buro Kade (2009). Entrance of Hogeweyk

Figure 14: Buro Kade (2009). Interior of one of the homes

Figure 15: Location of Hogeweyk (own image)

Location

The Hogeweyk complex is in Weesp, a region close to Amsterdam. The building is located in a residential area.

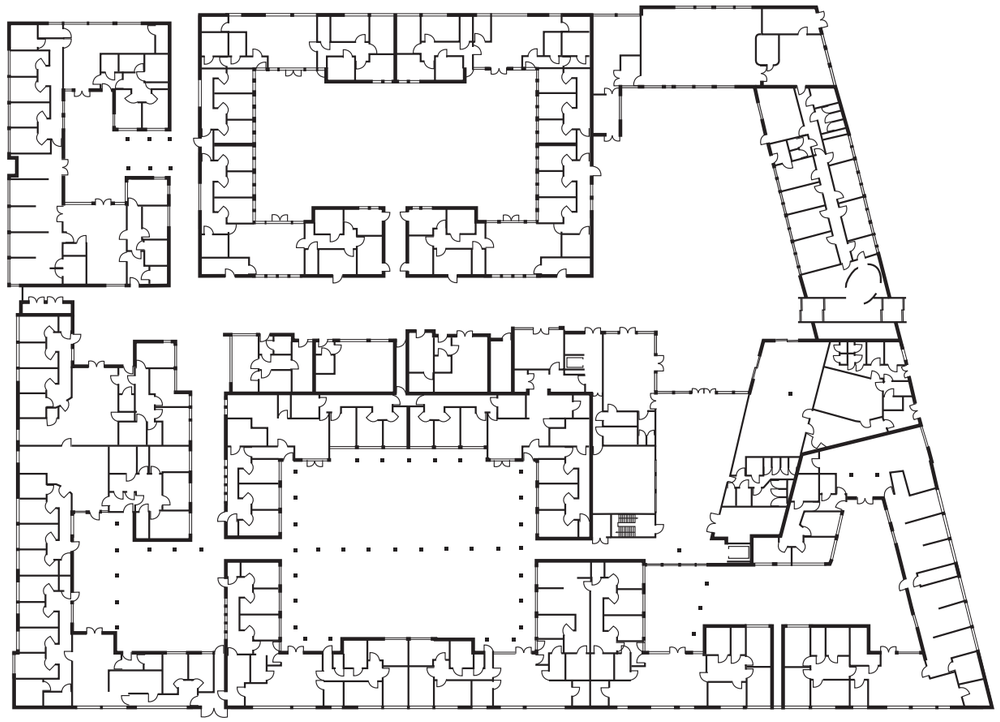


Figure 16: Floorplan of Hogeweyk (own image)

Floorplan

On the right side of the floorplan the more public functions and care facilities can be found; this is also where the entrance to the neighbourhood is placed. On the opposite side there are the care groups (housing unit with 6 residents), each group has their entry from the garden. This enables the residents to wander around in a loop in the green area and cross different activities while doing so, some examples of the activities are a jeu de boules lane or terraces.

Figure 17: Gradation between public and private of Hogeweyk (own image)

Public-private

This figure shows the different gradation of public and private spaces. The public and care functions are indicated in light pink, while the private rooms are highlighted in red.

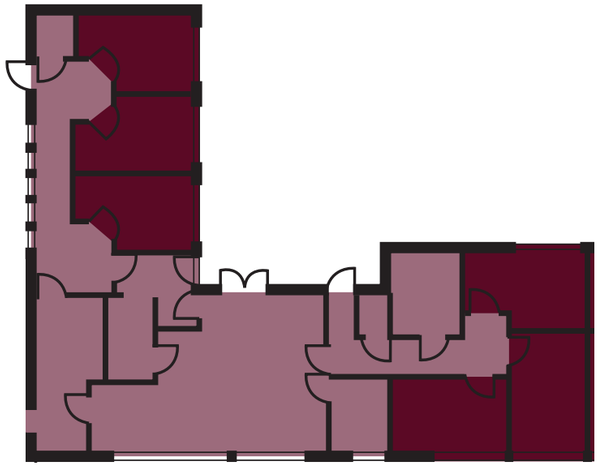


Figure 18: Floorplan of group in Hogeweyk (own image)

Group

Every care group consists of 6 bedrooms, a bathroom, a shared living space with a kitchen and an exit to the garden.

4.2 CARPE DIEM

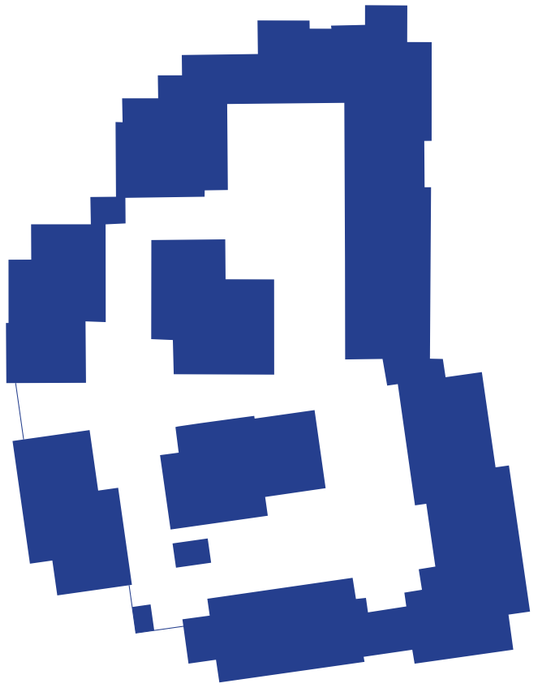


Figure 19: Concept floorplan of Carpe Diem (own image)

Carpe Diem was designed by the office of architecture *Nordic*, the facility opened in 2020 and it is a care- and housing centre for people who have dementia in Norway. The Hogeweyk, previously reviewed, inspired the architects of this project. The complex consists of 136 housing units and 22 high care dementia units. The goal of this project was to create a domestic atmosphere of a small village; this has been achieved by varying building heights and roof typologies (Nordic, n.d.). The buildings and outdoor space have been specially designed to help residents increase their activity and participate in daily life. Furthermore, several markers and easily recognisable elements throughout the neighbourhood help guide the residents. There are multiple shared facilities, like a hairdresser, a shop and health care (ArchDaily, n.d.).

Figure 20: Nordic Office of Architecture (2020). View of supermarket.

Figure 21: Nordic Office of Architecture (2020). Walking loop in greenery.

Figure 22: Nordic Office of Architecture (2020). Public space.

Figure 23: Nordic Office of Architecture (2020). Groupactivity

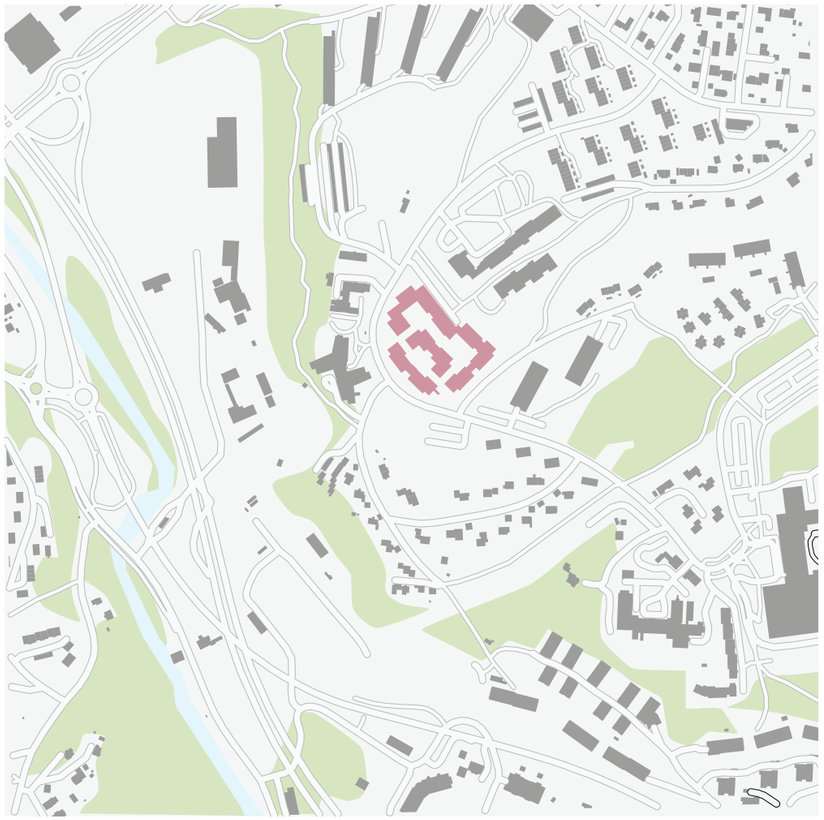


Figure 24: Location of Carpe Diem (own image)

Location

Carpe Diem is in the municipality of Baerum in Norway. The character of the area is defined by low urban density and some greenery around.

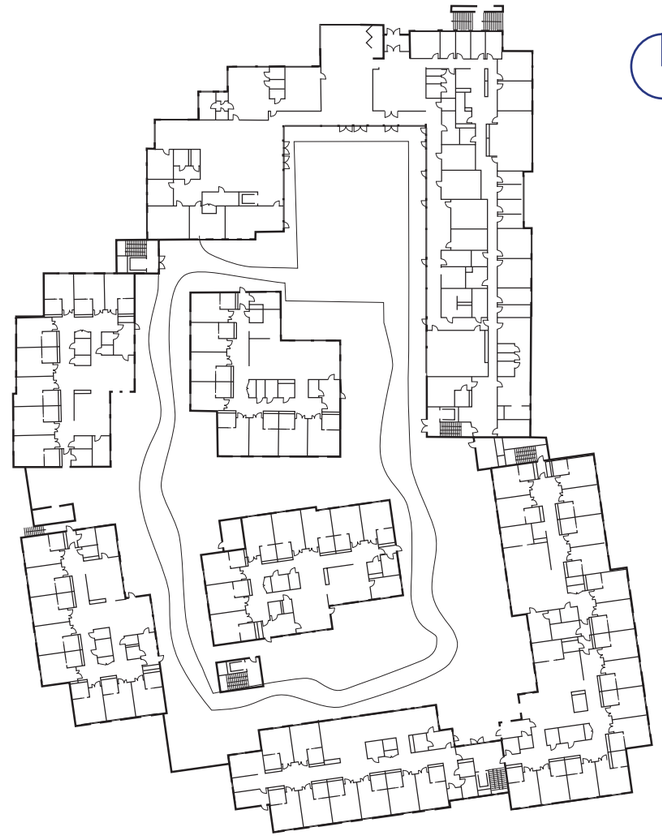


Figure 25: Floorplan of Carpe Diem (own image)

Floorplan

On the floorplan of Carpe Diem, it is evident that a lot of emphasis was put on allowing the residents to wander around freely. All buildings are positioned around a loop that guides and directs the residents along with the different facilities available.

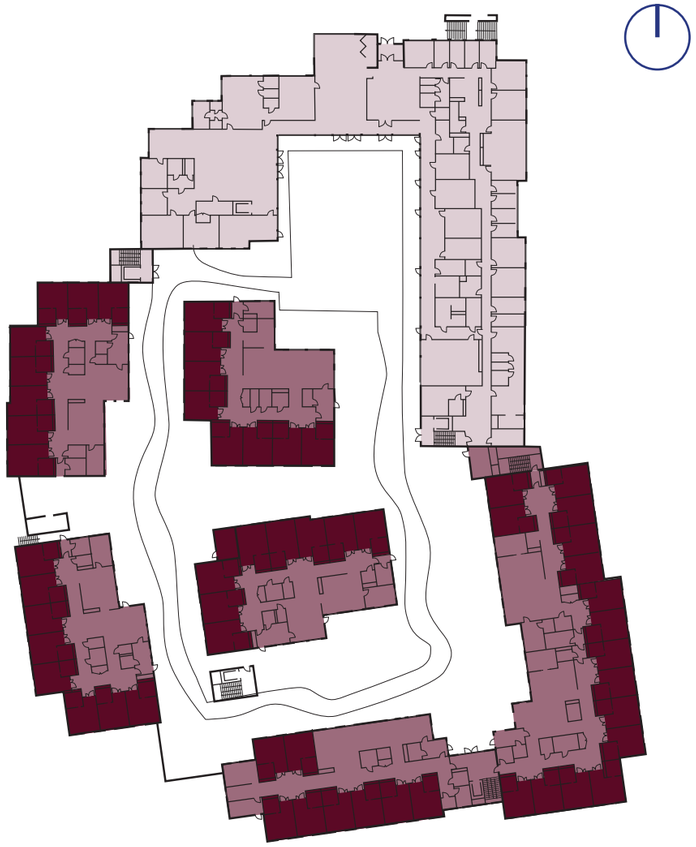


Figure 26: Gradation between public and private of Carpe Diem (own image)

Public-private

The figure below shows the different gradations of public and private spaces. The public and care functions are indicated in light pink, and the private rooms are highlighted in red. Worth noting is that the northern part of the building is considerably more public which makes sense since this area has the entrance to the facility. Following the same principle, the private rooms are on the edge of the facility, and the shared spaces face the garden.

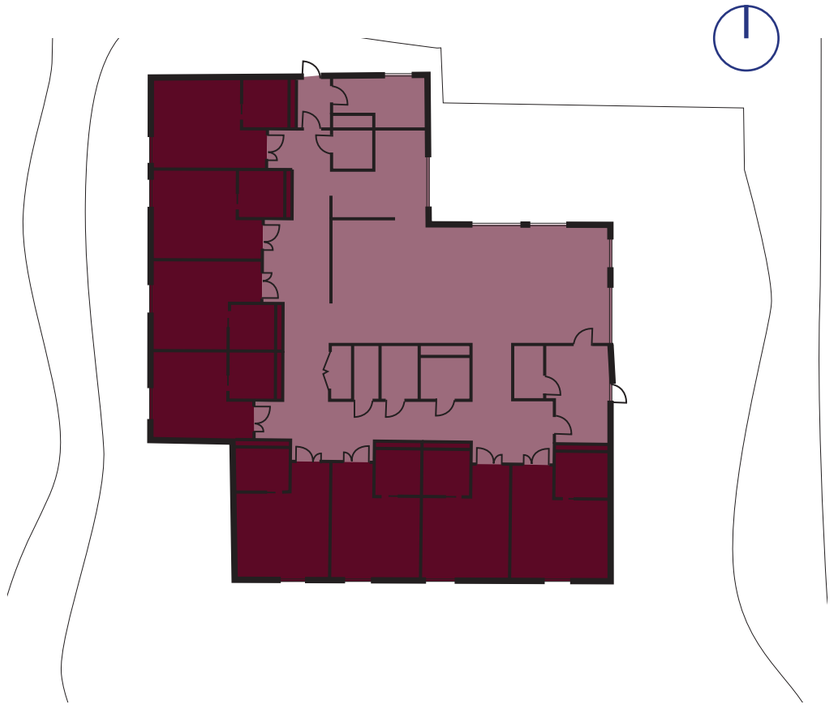


Figure 27: Floorplan of group in Carpe Diem (own image)

Group

Every group consists of 8 bedrooms, each one with its bathroom, and its own living space which faces the garden. There are some small rooms included in the living area for toilets and more storage space.

4.3 ALZHEIMER VILLAGE DAX

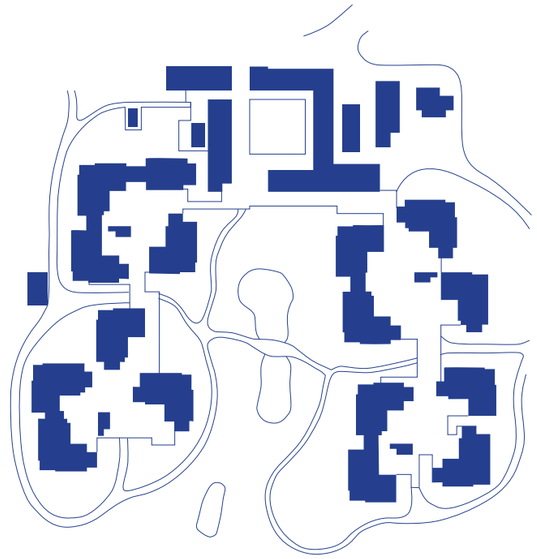


Figure 28: Concept floorplan of Alzheimer Village Dax (own image)

This dementia village was designed by *Nord Architects* and was completed in 2020. This project is located in Dax, in the southwestern region of France. The residents live in smaller houses, additionally, residents are grouped with others to be included in everyday activities such as doing groceries and cooking. The houses are spread out in the landscape, and the residents can move independently, safely, and freely. A cluster of four houses creates a neighbourhood, each one with its own identity and courtyard. There are four different neighbourhoods connected by a street leading to the village centre. The village has a hairdresser, shop, restaurant, cultural centre, and health care facilities. Furthermore, the complex also contains a research centre and housing for researchers and volunteers (Nord Architects Copenhagen, n.d.).

Figure 29: Nord Architects (2020). View of the village centre)

Figure 30: Nord Architects (2020). Greenery with housing in the background

Figure 31: Nord Architects (2020). Architecture of the village centre

Figure 32: Nord Architects (2020). One of the group homes

Figure 33: Location of Alzheimer Village Dax (own image)

Location

Alzheimer Village is in a residential area in Dax, France. It is surrounded by greenery.

Figure 34: Floorplan of Alzheimer Village Dax (own image)

Floorplan

The floorplan of Dax consists of four ‘neighbourhoods’ connected by a path leading to the village centre.

Figure 35: Gradation between public and private of Dax (own image)

Public-private

The following figure shows the different gradation of public and private spaces. The public and care functions are indicated in light pink, and the private rooms are highlighted in red. The north of the building has a more public character and contains the entrance to the facility. The private rooms are on the edge of the facility, and the shared spaces face the garden. Every private room also has a door that leads to the outside greenery.

Figure 36: Floorplan of group in Dax (own image)

Group

There are four ‘neighbourhoods’, each consisting of four grouped homes. Each house has seven bedrooms with its own bathrooms. The living spaces of the homes face each other; this is how the designers created and defined one ‘neighbourhood’. A nursing station is shown in light pink, this location is especially advantageous to help the nurses watch the residents.

4.4 GUIDELINES ASSESSMENT

In chapter 3 the researcher determined the guidelines to design a neighbourhood for people with dementia. These principles were found for the four layers of [1] landscape architecture, [2] architecture, [3] outdoor wayfinding, and finally [4] indoor wayfinding.

In this section, all three different case studies, Hogeweyk, Alzheimer Village – Dax and Carpe Diem were evaluated by the researcher using the previously obtained design guidelines. To standardize the scores for each one of the evaluated dimensions, a three-level scale according to the performance of the project was developed for each layer.

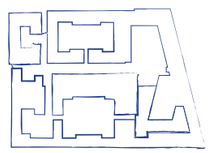
Performance:

[0-33%] poor (-)

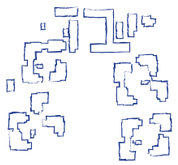
[34-66%] intermediate (+-)

[67-100%] optimal (+)

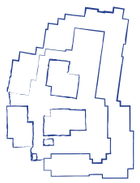
Landscape architecture



Hogeweyk



Alzheimer Village Dax



Carpe Diem

Heavy & stable furniture

Accessible for neighbours

Paths wide enough for 2 wheelchairs

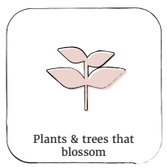
Circular loop/path

Materials that don't radiate or cause glare

Lifted areas of garden

Options to rest and interact

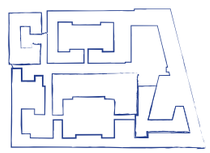
Toilets along loop



Plants & trees that blossom

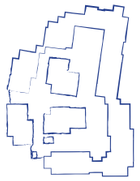
Implement handrails

Architecture

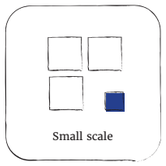


Hogeweyk

Alzheimer Village Dax



Carpe Diem



Small scale

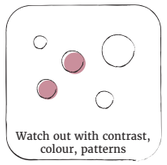
+ + +

Familiarity

+ + – + –

Kitchen with livingroom

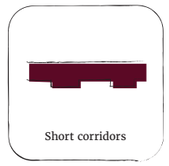
+ + +



Watch out with contrast, colour, patterns

?? ?? ??

– + +



Short corridors

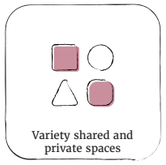
+ + +

Visual access

– + +

View and light

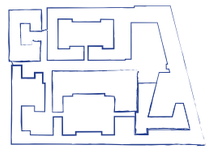
+ – + – + –



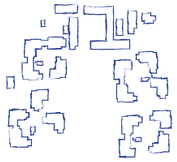
Variety shared and private spaces

+ + – + –

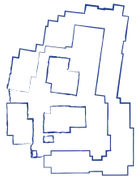
Outdoor wayfinding



Hogeweyk



Alzheimer Village Dax



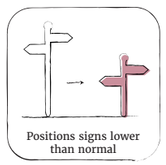
Carpe Diem

Create continuous loops

Colourcoding on signs and labels

Consistents colours on paths

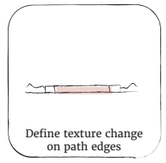
Visual access to landmarks & orientation points



Positions signs lower than normal

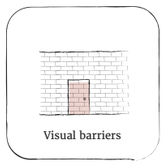
Varying route lengths

Text & signs together



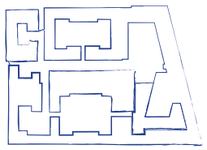
Define texture change on path edges

Design features that trigger memory

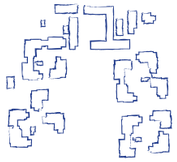


Visual barriers

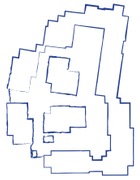
Indoor wayfinding



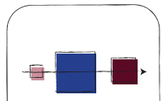
Hogeweyk



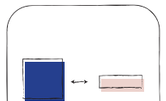
Alzheimer Village Dax



Carpe Diem

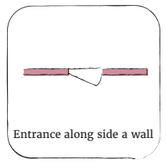


Routing: Entrance – living room – private room

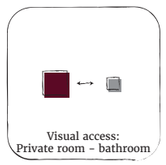


Visual access: corridor – living room

Destination at the end of corridor

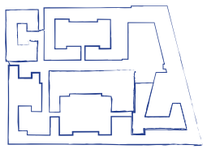


Entrance along side a wall

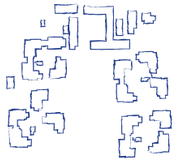


Visual access: Private room – bathroom

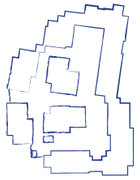
Use daylight and outdoor view



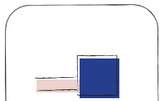
Hogeweyk



Alzheimer Village Dax

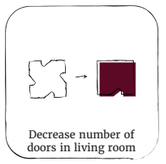


Carpe Diem

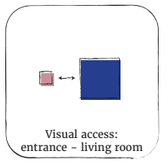


Living room at the end of a corridor

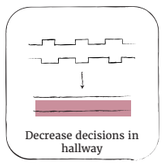
Short routes



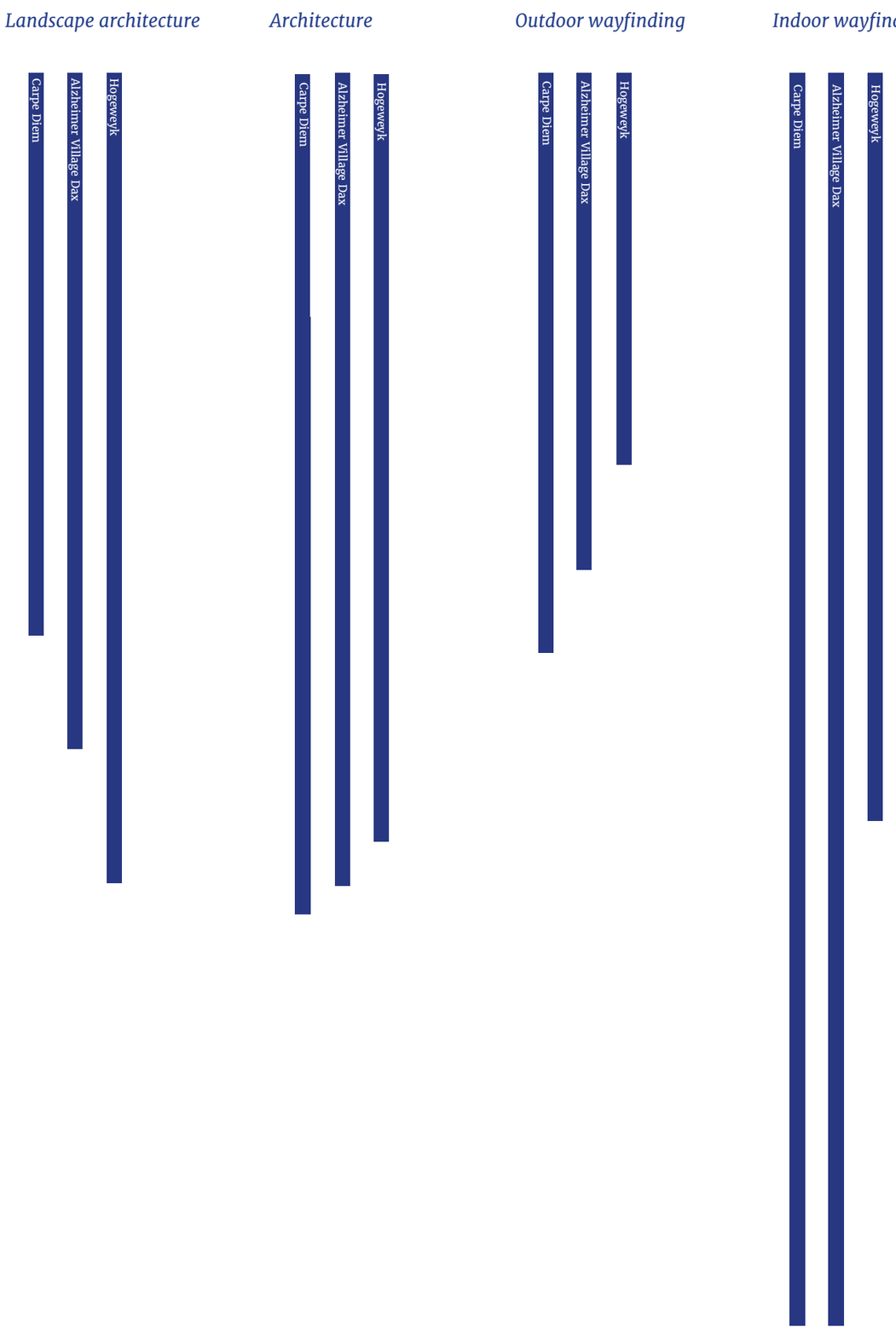
Decrease number of doors in living room



Visual access: entrance – living room



Decrease decisions in hallway



Some highlights of the evaluations are described in the following lines. Within the field of ***landscape architecture***, some guidelines are especially worth mentioning. It was observed that while all the projects are accessible for neighbours, it is quite difficult to get in. The entrance is not intuitive, and therefore, it does not lead to an active interaction between residents and external neighbours. This is because, usually, people need to go through one of the facilities to access the buildings and most of the buildings have only one entrance. All the projects did think about creating a loop to guide the residents through the landscape; unfortunately, there could be more attention invested in understanding the actual physical and mental capabilities of the elderly while in the outdoors. An example of those aspects to improve is that there are no lifted areas in the garden, and neither high enough outdoor furniture to enable the elderly to cultivate things while standing, in other words, the ergonomic features of the garden can be improved to enhance the activities in the outdoors. Another example is the lack of handrails outside to help people to walk around.

When assessing the study cases for the ***architecture layer***, it was observed that most of the guidelines have been successfully implemented. The visual access is particularly positive in the projects of Carpe Diem and Dax, the residents can see their bedrooms from the living room and there is great visual access to the outside as well. However, the visual connection is not optimal in the project of Hogeweyk; this is because when the residents want to move from their bedroom to the living room, they must go through a corridor with a door at the end. To put it differently, there is no visual relation between the living room and the private room cubicles.

Unfortunately, for ***outdoor wayfinding***, it was impossible to assess some of the guidelines, because the amount of information available for remote analysis of the case studies does not include photos or specifics on, for instance, signage, i.a. However, the guidelines that have been reviewed are implemented optimally. There could be more thought gone into the variation in route lengths. Moreover, in the case of Hogeweyk and Carpe Diem, the projects have only one loop where residents can walk.

Lastly, ***indoor wayfinding***, all the three projects scored excellent in this field. Especially, Alzheimer Village Dax and Carpe Diem. For the project Hogeweyk, more effort should have been invested in increasing visual access to help their residents find their way within their homes.

Chapter 5

Conclusion

Figure 37: DEMENTIA (AORTA, 2016), edited by author

In this thesis, the main research question to be addressed was: 'How can the living environment support people with dementia and allow them to stay in their own homes or neighbourhood for as long as possible?'.

First and foremost, it was determined that when designing a neighbourhood for people with dementia, patients with the illness should not be the only stakeholders kept in mind. Additional attention should be directed to their informal and formal caretakers, as well as the people involved in creating a social safety net for people with dementia.

In chapter 2, the different target groups and their needs have been researched and translated into tangible concepts to be implemented in a fit-for-purpose care facility design.

In terms of people with dementia, it was concluded that it is essential to provide them with enough stimuli to entertain themselves. Nevertheless, there are several conditions to avoid in terms of stimuli: the stimulation should never be exaggerated, intolerable or bothersome, and it is best if the source of incitement is in front of the target person, to allow them to recognise, see what it is, and calmly process afterwards.
Furthermore, for this group it is necessary to design the floor plans in a way that they are intuitive and organised; this is because a clear layout helps this group to orientate. Lastly, it is crucial to provide people with dementia, with the options of interacting with others or excluding themselves when desired. In other words, there is a need for distinctive spaces with different degrees of privacy and or public character.

Another group that has been discussed are the informal caregivers. From this group, a lot of them are still employed. When designing a dementia-friendly neighbourhood, namely, their role in this care is crucial and thus their needs must be included in the design. An option to include a study room in the home is specially focused for this target group, this space will enable them to still have a moment for themselves. This is especially important since many informal caregivers do not live with the person they care for, for instance, the adult children of the person with dementia. Furthermore, depending on the degree of involvement and the amount of time the informal caretaker invests, it would be a good choice to include a guestroom and other related spaces where the children of the informal caretaker can play when visiting their grandparents.

For both groups, the people with dementia and their informal caregivers, it would be helpful to have an adult day-care. This way, the person with dementia can have a place to interact and fill their days with, and the caregivers can have a break.

The last group to consider are the formal caretakers. It has been discovered that the workload on this group is immense and is growing with the pace of time. Therefore, it is essential to think about interventions that focus on making the layout and blueprint distribution efficient. Think about, for instance, more storage space, overview, and an efficient circulation scheme. Furthermore, it would be helpful to have spaces destined for the nurses to sleep and exercise so they can take a break and improve their physical and psychological well-being.

In chapter 3, the importance for people with dementia to stay in a neighbourhood was explained. Aspects such as the importance of having some degree of independence, their ability to go outside and the capacity to interact with daily life were defined as the minimal requirements when inhabiting a neighbourhood. Multiple distinctive design guidelines have been named for the four layers: [1] architecture, [2] landscape architecture and [3] [4] wayfinding. These design strategies can be found in the conclusion of chapter 3.

All the different layers mentioned before have conceptual overlaps in terms of what is preferred for their design in terms of specific guidelines. An example of a principle that is constantly repeated is visual access, which is crucial since, when included, people can guide themselves and understand where they are going.

Another concept that is constantly repeated throughout literature, that strongly determines the success of a dementia-friendly design is the *understanding of time* and the techniques that aid people with dementia to do so. Some innovative ideas on how to attain time-awareness are to have trees and plants that can blossom and thus hint at the time of year, or for instance, including numerous architectural elements such as windows and skylights that could signal the time of day.

The quality of the *routing*, another constant principle in literature, has been discovered to be impactful on the independence and safety of its inhabitants. The preferred strategy among all cases used for this research was to create a loop so people can wander around freely.

Related to the former principle is the *signage and labels system* that was found to be essential, especially in terms of properly using colour-coding. It is important to not forget that the main target group of routing and signage is composed of older people that are less able-bodied and that struggle with accessibility and with seeing letters and symbols from afar. There should be as few barriers as possible, especially speaking about flooring, steps, or doors. Additionally, there should be enough handrails, public toilets, and adapted furniture to avoid inconveniences.

Conclusively, it is indeed possible to design a neighbourhood where people with dementia can stay for as long as possible, however, the care facility and its surroundings must be equipped in a way that they include all the aforementioned aspects.

While the ultimate goal, of the designs to be developed under this research, will be to keep people for as much time as possible in familiar environments, the researcher recognizes that there are cases of extremely severe dementia in which patients have unmanageable difficulties in terms of mobility, awareness or agreeability. In these cases, it is still advisable to re-locate somewhere outside their home and perhaps into a specialized care facility.

The results of this thesis are in line with the hypothesis that it is possible to create a living environment that supports people with dementia and where they can stay for as long as possible.

Earlier literature focused on how architecture within care facilities can facilitate people with dementia and how landscape architecture impacts them. There has not been any research on how the living environment can make sure that people with dementia can stay in their familiar environment. This thesis addresses that gap in research.

The reliability of this research has been impacted by the lack of interviews with caretakers, caregivers, and people with dementia. Unfortunately, due to restrictions risen from the Covid-19 pandemic, for example, travel limitations and the short available time to develop the research, the writer was not able to conduct vis-à-vis interactions.

It is the recommendation of the researcher of this thesis to invest more time in registering the experiences and feedback from people within the target groups. Furthermore, it is advisable to physically visit care homes, to be able to understand how the existing buildings function and to talk in real-time with the residents and staff. Further research is needed to establish the feasibility of the conclusions reached thus far.

Chapter 6

Reflection

Figure 38: DEMENTIA (AORTA, 2016), edited by author

6.1
ASPECT 1 -THE RELATIONSHIP BETWEEN RESEARCH AND DESIGN

The MSc3 Studio 'Design for Care – towards and Inclusive Living Environment' focuses on finding new concepts for architecture for elderly. When starting this studio, we had the chance to experience some aspects of the life of an elderly. This was done for example by sitting in a wheelchair in the centre of Delft or walk around with a pair of glasses that impair your sight. The biggest source of information was our one-week-stay in a nursing home. We had the opportunity to talk to elderly, to understand their needs and wishes, and their limitations and strengths.

In this week it became clear that the topic I wanted to focus on was dementia. After one year of researching this topic, I can say that it has not been easy. To learn about all the impacts of dementia on the daily life a person surprised me in every way. More importantly, the effects I discovered not only on the person but also all the people around this person go far beyond what I expected. The more I researched dementia, the more I believed something must change! This gave me a lot of motivation to get through this year.

During my research I focused on different stakeholders; people with dementia, informal caregivers and formal caretakers. I researched these different groups and their different needs, and I found ways to meet these needs by architecture, landscape architecture, indoor wayfinding, and outdoor wayfinding.

I designed a neighbourhood that supports people with dementia and the people around them and gives them the opportunity to experience a normal daily life (as far as possible) and have a dignified life. Every choice that has been made in the design is supported by the research. Whether it's the materiality of the facades or the plants chosen to be implemented.

6.2
ASPECT 2 - THE RELATIONSHIP BETWEEN PROJECT TOPIC, STUDIO TOPIC, MASTER TRACK AND MASTER PROGRAM

As mentioned before, this studio focuses on the topic of the daily environment for the elderly who need care.
[...] Firstly, the elderly homes, built in the 1960s, do not
respond to the desires of the elderly of today, who want
to be self-supportive and not excluded from society.
[...] Secondly, new architectural designs for people with
care demand needs to offer an environment for a mixed
community as care giving needs to undergo a change
of attitude from professional to unprofessional support
by family members and the neighbourhood, and thirdly,
the elderly themselves need to be empowered as much
as possible to gain their place in the society. With
living environment we mean the house AND the living
environment, their neighbourhood, public place and
spaces.“ (Jürgenhake, n.d.).

The studio tries to find ways to support the needs of the elderly of today. This research focuses on a specific group of the elderly, namely people with dementia. The design that was made doesn't only focus on the scale of rooms or houses but tries to implement the research in landscape as well. One thing that I have learned in my time in Delft is that great architecture is only achieved when the designer works on different scales. Everything between the scale of the context till the scale of the user needs to be considered. That is why in my design, I tried to use my research within every scale, for example when designing the connection to the existing neighbourhood but also when choosing the materiality of the houses.

6.3
ASPECT 3 - ELABORATION ON RESEARCH METHOD AND APPROACH

The aim of my research has been to show ways to create a 'normal' environment for people with dementia. When doing research, I discovered that there hasn't been any research on how to create a neighbourhood that is dementia friendly. To gather enough information for this research the methodology I chose was doing case studies on different projects designed for people with dementia, use literature, watch documentaries and interviews. A lot of this research has been about sociology and a bit on architecture. These methods helped me gain a deeper understanding of the needs of the target groups and establish guidelines for a design.

6.4
ASPECT 4 - RELATIONSHIP BETWEEN GRADUATION PROJECT AND THE WIDER SOCIAL, PROFESSIONAL, AND SCIENTIFIC FRAMEWORK

This research goes beyond the field of architecture. It proves in many ways that the current situation for people with dementia is no longer acceptable. As shown in the research everyone we will, probably, all experience dementia, whether as a patient or because of someone in our surrounding. For this reason, it is evident that it is beneficial for everyone to chance the current situation. This can be done partly by creating the right design, but also in the care system and the scientific field there needs to be a change. More research should be conducted on how to adapt the care for a person with dementia and there should be more research on how to make the built environment dementia-friendly and not only care facilities.

6.5
ASPECT 5 - ETHICAL ISSUES AND DILEMMAS ENCOUNTERED IN RESEARCH, DESIGN, AND POTENTIAL APPLICATIONS

One of the biggest ethical issues or dilemmas of this research is the fact that I am designing a neighbourhood for a target group that I haven't been able to interview. Unfortunately, it is really hard to interview a person with dementia and it would be helpful to do this when researching how to design a neighbourhood that is dementia friendly. When this research would be further developed it would be helpful to follow multiple people with dementia. This should be done from the point that they get diagnosed with dementia, and there should be different types of people in terms of socioeconomic status, religion, ethnicity, gender or culture.

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Figure 39: DEMENTIA (AORTA, 2016), edited by author

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