Research report
Dwelling graduation studio AR3AD110
Design for care in an inclusive environment 23/24

Happy living environment for university students

Design of mentally supportive residential environment on campus

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Dwelling Graduation Studio_AR3AD110 (2023/2024)
Designing for Care in an Inclusive Environment

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PREFACE

I chose this studio because I was attracted by the keywords 'inclusive environment' and 'human-centred research'. Firstly, I think it is a warm topic. Designing for people who need help or care and building an inclusive environment are warm. As an architecture student, in addition to designing for the majority, I should also pay attention to the needs of minorities. Since I have also experienced depression, I am concerned about topics related to depression. I think it is a good opportunity to research and design for people, and to understrand more about depression prevention. In addition, the human-centered research approach also interests me because I believe it is one of the social responsibilities of architects. Only by truly understanding the needs of the target group can we really design buildings that are helpful to them. Therefore, this is a project worth thinking and practicing.

ABSTRACT

This thesis states the current urgent problem in the global context where the prevalence of depression among university students is increasing. Most of the university students who suffer from depression due to peer competition, high demands on themselves, inability to handle relationships well and other problems leading them to feel helpless, upset and anxious. In the Netherlands, even with a complete psychiatric care system, depressed patients still have to face a lot of problems in terms of treatment, such as long waiting lists and expensive treatment. Therefore, an increasing number of people are motivated to concentrate on depression prevention.

About depression prevention, there have been some research and measures at the social level and psychological level. At the architectural level, most of the mental-related research has focused on medical buildings, with limited research on daily living environments. It is relevant to combine depression prevention measures and architectural design measures for university students to research and design their daily living environment to positively support depression prevention.

The targeted group is healthy university students. For these university students living in student residences on campus, campus and residence are the places that they spend much time. In order to investigate how the design of campus and residential spaces can support depression prevention, the design guidelines are generated through four research methods: literature research, observation, interview and case studies. The design guidelines are categorised into three levels of importance and two scales. Based on the design guidelines, the design (including campus scale and residence scale) will be done.

Overall, through the research process, the design guidelines relate to the three aspects of physical, social and mental health. This research argues that promoting these three aspects of healthy lifestyles among university students can contribute to depression prevention for them.

Key words: depression prevention, university student, campus, living environment, healthy environment

CHAPTER 1
INTRODUCTION

1.1 Background

Depression in University students

More than half of all university students report having emotional problems (Versteeg & Kappe, 2021). In the majority of developed nations, over 50% of young people are enrolled in higher education. The average age of entry into higher education coincides with the peak age of onset of mental health issues, with 75% of cases seeing the first signs of mental and drug use disorders before the age of 24. While many students adjust well to the significant lifestyle adjustments that come with higher education, this is not always the case for certain students (Reavley & Jorm, 2010).

The prevalence of anxiety, depression, ADHD, and substance addiction among university students in the Netherlands has significantly increased; in 2009, 22% of students reported having such issues. In comparison to the working population (21%), this percentage has increased to 44% by the year 2022(Almost Half of Students in the Netherlands Have Mental Health Problems | DUB, n.d.). The Dutch population between the ages of 18 and 25 will have the highest levels of dissatisfaction with their mental health in 2019 and 2020, compared to other age groups. The most common individual mental health problem in the Netherlands is serious depression(Versteeg & Kappe, 2021).

The young college age group (18–24 years), sometimes known as "emerging adulthood," is a developmental stage that sits between late adolescence and adulthood. Stress and anxiety are believed to occur throughout this time due to the requirement to build the independence and self-sufficiency that people learn during adolescence, as well as the ability to manage the brand-new chores connected with creating and maintaining personal relationships (Mahmoud et al., 2012). At the same time, this might be brought on by academic overload, peer competition, pressure to perform, and less time spent with friends and family (Versteeg & Kappe, 2021). The academic performance, productivity, substance usage, and social interactions of college students during this time may

all be significantly impacted by an untreated mental illness (Hunt & Eisenberg, 2010).

Prevention is better than cure

The Dutch government has established a system of primary and secondary mental health treatment as well as frontline support provided by general practitioners to assist those suffering from depression or other mental disorder (Primary or Secondary Mental Health Care, n.d.). The Netherlands Court of Audit found that 1.3 million persons receive mental healthcare annually, with the majority receiving rapid assistance. The waiting lists for mental healthcare maintained by the industry groups GGZ Nederland and MeerGGZ in 2018 were the basis for the estimate that 11,000 people must wait 4 months or longer to receive treatment(Rekenkamer, 2020).

Most young people who suffer from depression and similar disorders either delay seeking professional care or do not seek it at all, despite a significant number of mental problems in the younger population. Instead of seeking professional assistance, they frequently turn to self-help techniques that might be detrimental, such as abusing alcohol or other substances (Reavley & Jorm, 2010). Avoid seeking help because they believe that doing so shows weakness, which will hinder their ability to advance in their careers. High psychological discomfort patients may not be aware of their atypical mental condition. They might not be aware that there are practical strategies to handle stress or know where to turn for assistance (Storrie et al., 2010). In addition, the cost of treating depression is substantial. As a result, there is a strong motivation to prevent depression and its symptoms (Tak et al., 2012).

The idea that proactive awareness and preventative interventions are more effective than remedial efforts has never been more crucial, according to the Dutch humanist scholar Desiderius Erasmus (Psychiatry, 2022). Meanwhile, Nicola Reavley in her study also highlighted that the facilitation of preventive and early intervention in this context has the potential to introduce a new dimension to mental health, with over 50% of 18–20 year old in higher education. has the potential to have significant positive effects on both the individual and the population levels in this situation (Reavley & Jorm, 2010).

1.2 Problem statement

Mental health prevention in the social aspect

According to Colleen S. Conley's research, psychoeducation and skill development are the main components of preventive strategies for students in higher education. a combination of exposing them to probable difficulties and issues, inspiring them to make wise and effective decisions, and educating them on how to employ relaxation techniques, constructive conflict resolution techniques, and other coping mechanisms to relieve stress or sadness (Conley et al., 2015). Josefien J. F. Breedvelt investigated the impact of community cohesion on teenage and young adult depression reduction. and suggested specific measures to improve community harmony going forward (Breedvelt et al., 2022). The Dutch government places a lot of emphasis on mental health prevention and effective therapies, and it suggests tailored interventions and policy support for various age groups. It is reported that interventions for adolescents in the Netherlands are also partially applicable to students in higher education, but there are no effective interventions in the Dutch intervention database that are specifically targeted at university students (Effectieve interventies en beleid mentale gezondheid en preventie, n.d.).

Mental health prevention in the living environment

There are numerous architects who concentrate on the connection between space and mental health in the area of architectural design. According to architect Tonia Householder, "The greatest opportunity for architecture to encourage the prevention and control of mental illness is in residential and work environments, where we spend most of our time." As of now, the focus of health-related architectural design has been on medical buildings, giving architects well-researched and practical experience that can be used to both residential and commercial space (Architecture Concepts Can Boost Mental Health, n.d.). In the study of A. Fernandez, it is mentioned that there has been an increase in interest in studying how the built environment affects psychological well-being in

recent years. However, there is no research evaluating the effects of the built environment on the mental health of the university neighborhood, and little is known about the strategies implemented in universities that follow the environment-based model (Fernandez et al., 2016). In addition, there is limited research on providing students living in student housing with living environments that support health and may reduce symptoms of depression and anxiety (Worsley et al., 2023). In some of the scholars' research on student residential environment and mental health, it was mentioned that: some students claimed that living in their student housing made them feel lonely; someone said that because their apartment block looked a concrete tower, they did not feel particularly inclined to hang out there (Vytniorgu et al., 2023).

Overall problem statement

There is a lack of research that is inspired by combining the prevention strategies in social mental health field and the existing architectural design principles related to mental health to specifically research for university students about how the architectural and built environment can be designed to support depression prevention in their residential environment on campus. Therefore, this research and design is meaningful and can provide some ideas on the relevant field. In addition, it will have a positive impact on preventing other more serious problems, like suicide that depression brings to university students in the aspect of architectural design.

1.3 Research goals

The research aims to combine depression prevention strategies with mental health-related architectural design principles to design living environment on campus that can have a positive impact on depression prevention in university students. It is of concern that depression is a common problem among university students due to stress, competition, social relationships, and so on. Although architecture is not medicine and cannot directly solve the problem of mental illness, it can play a positive role in the mental health or well-being of university students by promoting their daily life environments on campus, including their residential and daily activity networks.

1.4 Theoretical framework

The theoretical framework of is separated into three sections, physical health: walkable city, social health: social cohesion, mental health: mentally supportive environment, corresponding to the research questions by combining existing research and theories in related fields.

Physical health: walkable city

Literature studies on physical health discuss the positive effects of physical activity and exercise for both mental and physical well-being. "Scheduled, organized, and repetitive physical movements undertaken with the aim of enhancing or preserving one or more aspects of physical fitness." (Cooney et al., 2013), is the definition of physical exercise. Some scholars gave a more detailed explanation "When we refer to exercise, we are talking about activities such as walking, skiing, swimming, or participating in sports"(Grasdalsmoen et al., 2019)

Both the World Health Organization and Guidelines from the National Institute for Health and Care Excellence (NICE) recommend physical activity as part of standard treatment for depression. And there are many studies that have demonstrated the positive effects of exercise in fighting or alleviating depression (Kvam et al., 2016). There are many other kinds of exercise practices, such as basketball, volleyball, running, etc. Exercise also includes walking. Walking has been shown to positively affect both physical and mental health, including lowering stress and enhancing creativity and mental alertness (Southworth, 2005). Jenny Roe et al. also conducted ART-based research on the relationship between walking and mental health and suggested the potential of urban walking to promote recovery in adults with poor mental health (Roe & Aspinall, 2011)

In the area of architecture, terms like "walkable city" and "walkability" are used frequently. In 2005, Michael Southworth conducted research and defined walkability as the degree to which the built environment

facilitates and supports walking by offering pedestrians a safe and comfortable environment, facilitating travel times and effort estimates between destinations, and creating visual interest across the network. supplying visual interest across the network and getting users to various locations in an acceptable amount of time and effort. He also highlighted the importance of connection, safety, and good road conditions in creating a walking city (Southworth, 2005). A community-scale walkability model was proposed in a study by Adriana A. Zuniga-Teran et al in 2017. with some factors overlapping with Michael Southworth's study and with the addition of Motivations for Walking, Social Interactions with Neighbors and wellbeing, among other factors (Zuniga-Teran et al., 2017). In 2021, Antonio Zumelzu and Marie Geraldine Herrmann-Lunecke collated a large number of studies on healthy and walkable cities and summarized the criteria that are important at the level of the built environment, including green space, density, spatial design and so on (Zumelzu & Herrmann-Lunecke, 2021).

Combining the findings of these three literatures on walkable city, I will summarize the design guidelines for walkable city in my research based on the standard that it can be achieved through architectural and built environment.

Social health: social cohesion

Literature studies in social health are about social cohesion helping to promote mental health. Social cohesion can be defined as "the extent of connectedness and solidarity among groups in society" by Josefien J. F. Breedvelt et al, while they also collated factors of social cohesion in their study, including social support, social belonging etc (Breedvelt et al., 2022). These terms are also searched during the research process.

Humans are sociable creatures by nature. Humans require closeness, comfort, a sense of value, and frequently, validation of who they are. People may experience a sense of deprivation that shows up as conditions like loneliness, depression, and anxiety when they are in a situation where they consistently struggle to build and maintain satisfying relationships with others and thus struggle to meet their need to belong (Heinrich & Gullone, 2006). Mental and physical health are significantly impacted by social ties. An individual's general health is impacted by the status of their social ties. Individuals who have a sense of closeness and belonging in a social setting are less likely to suffer from depression (Santini et al., 2015). According to a study, social ties can have a favorable impact on mental health while also serving as a protective factor against depression (Williams & Galliher, 2006).

There is also a great amount of research on social cohesion in the field of architecture. Architects can promote human relationships and cohesion by designing or creating built environment that positively affects mental health. According to Jamie Anderson et al.'s 2016 study, public space design can enhance people's social wellbeing through three key design criteria: fostering connections with people, encouraging physical activity,

fostering awareness of one's surroundings (Anderson et al., 2017). In 2022, Josefien J. F. Breedvelt et al. not only included a definition of social cohesion, but also demonstrated that promoting social cohesion is useful in preventing depression in young people. Their study also mentioned some measures that can be taken in the future to improve neighborhood social cohesion, such as participating in volunteer work, engaging in artistic endeavors, fostering creativity and cultural activities, joining sports clubs, utilizing online platforms, and enjoying natural environments. (Breedvelt et al., 2022).

Combining these two theoretical studies, I will summarize the design guidelines for social cohesion in terms of social health in terms of what can be achieved through architectural and built environments.

Mental health: mentally supportive environment

Literature on mental health is about how to create or design mentally supportive environments. Mentally supportive environment can be defined as architectural and built environment that positively influence a user's mood, a definition inspired by the author's definition of a healing environment. A healing environment has been defined by a physical setting where interactions between patients and staff promote good health outcomes (Huisman et al., 2012).

Currently, most of the theories on this topic concern medical environments or psychiatric facilities, where the users are mainly patients and medical staff (Householder, n.d.). In these studies, the terms healing environment or healing architecture are mentioned. There is a theory for the general situation. Happy by design, written by architect Ben Channon. However, Tonia Householder, an architect, points out that healthcare is currently the main emphasis of health-related architectural design. This gives architects a well-rounded and practical experience that they can use to both residential and commercial buildings (Householder, n.d.). Therefore, it is reasonable to combine the results of research on the healing environment and the general environment to construct design criteria that are appropriate for the living environment.

In 2012, E.R.C.M. Huisman et al. studies mentioned a lot of details of healing environment where comfort aspects of factors, materials, view, orientation, and so on, applying to the living environment (Huisman et al., 2012). Stefan Lundin offered seven suggestions for creating inpatient spaces in mental health facilities in his book Healing Architecture, published in 2015. These three suggestions—which apply to both residential settings—are to create an open, free atmosphere, encourage social interaction, and provide views of the outside and unrestricted access to it (Lundin, 2015). The relationship between architectural design and mental health is discussed in Ben Channon's book Happy by Design. The book discusses how light, comfort, control, nature, aesthetics, activity and psychology can influence our emotions and thoughts and how they can be modified and customized to better serve our collective well-being in a variety of ways (Channon, n.d.).

Combining these three theories, I will summarize the design guidelines for mentally supportive environments in this part of my research in terms of what can be achieved and applied to living environments through architectural and built environment.

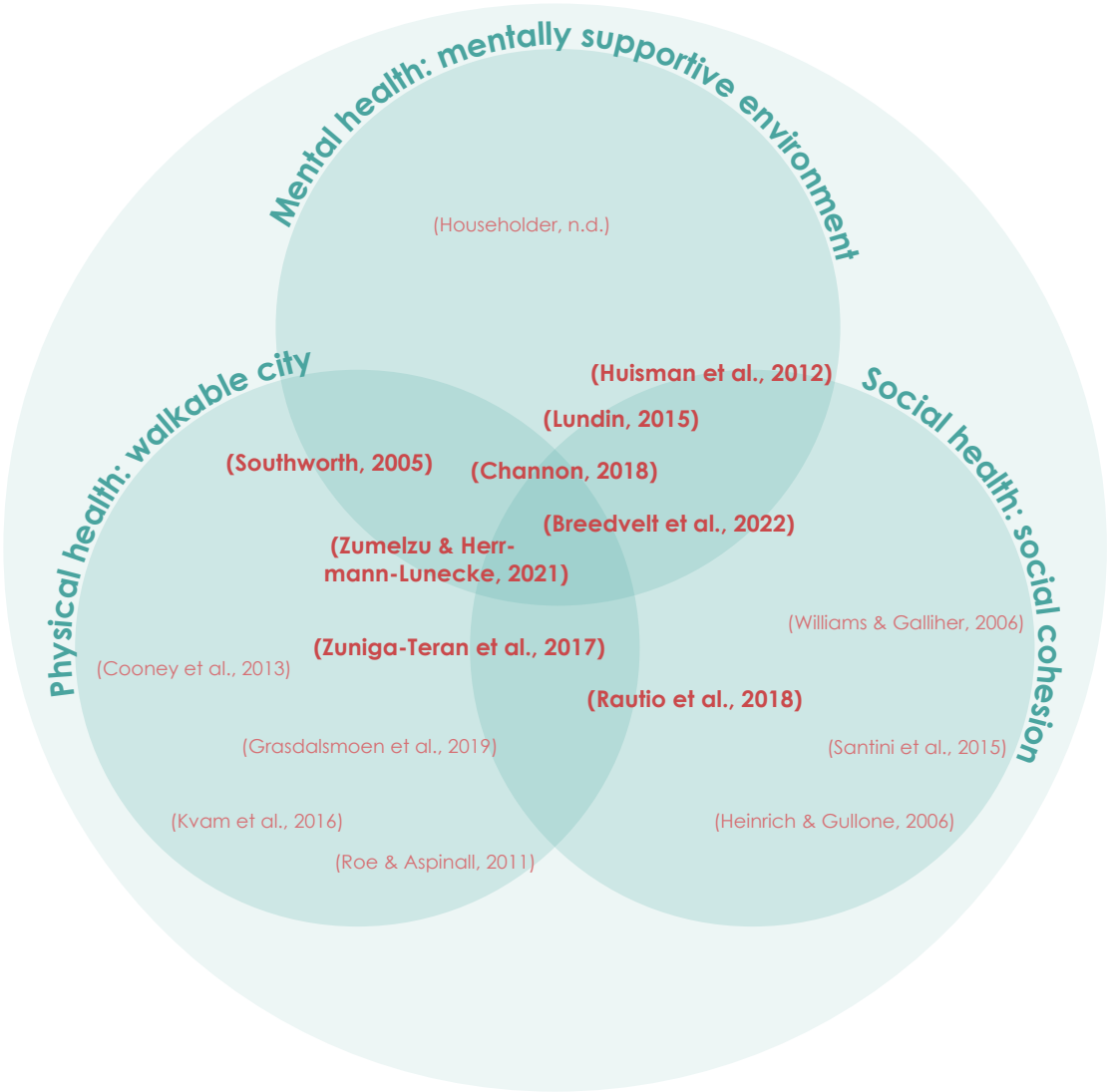


Figure 1: General theoretical framework (illustrated by author)

Reflection

The above theories help to provide a foundation for my research and help me to answer my research questions. Based on the above theories, I will propose the following reflection:

1. In the campus environment, the primary objective of promoting depression prevention is realized by prioritizing students' physical, social, and mental health. By strategically planning and designing public spaces and organizing social activities, it encourages students to engage in walking and other physical exercises while fostering communication and social unity among them

2. In the student residential environment, catering to students' needs while encouraging walking and other physical pursuits is crucial. Equally important is fostering connections between residential areas and campus facilities, as well as within and among student housing clusters, to bolster communication and cohesion. Additionally, establishing a mentally supportive environment informed by relevant theories in this realm is essential

1.5 Hypothesis

University students residing in campus housing typically spend the majority of their time within the residence and its surrounding campus vicinity. Therefore, the design will be from the campus level to the residential level. At the campus level, tAt the campus level, the campus environment serves as the community hub where students engage in daily activities such as studying, recreation, socializing, and utilizing public spaces. Then, it will be zoomed in to the scale of the residential environment, including the public space and the private space of the individual living in the area. It is hypothesized that this design solution will promote students' physical health, social health and mental health to actively support the prevention of depression.

1.6 Research questions

Main question:
What architectural and built environment features of residential environment on a university campus can have a positive impact on depression prevention of university students?

Sub questions:
1. What architectural and built environment features are there?
2. What is the residential environment on a university campus for university students?
3. Which depression prevention strategies can be used to architecture and built environment?
4. What are the design elements of mentally supportive environment that can be learnt from current urban/campus planning and student residence project?

1.7 Definitions

Depression: Depression is a common mental disorder. It is characterized by persistent sadness and a lack of interest or pleasure in previously rewarding or enjoyable activities. It can also disturb sleep and appetite (WHO, n.d.).

Prevention: Three categories of mental health primary prevention strategies have been identified: (1) Universal prevention, targeting the general public or a whole population group; (2) Selective prevention, targeting individuals or subgroups of the population whose risk of developing mental health disorders is significantly higher than the rest of the population; (3) Indicated prevention, targeting persons at high risk for mental disorders (European Commission, 2021).

University students: The students enrolled in a college or university (Vocabulary, n.d.). Most belong to young university students, aged between 18 and 24 years (Mahmoud et al., 2012)

Residential environment: The residential environment provides a place for daily life, which does not exclude other functions. A key criterion is that the residential function prevails (Földi, 2006).

Mentally supportive environment: This includes healing environment and healthy environment (Definition by author). Healing environment is that allows the person experiencing mental problems to recover more quickly, or at least, the physical environment does not make the psychological situation more unpleasant. Healthy environment is that it mainly prevents people from getting sick (Omgevingspsycholoog, 2013). For instance, in an architectural project, there are spaces/ pedestrian that promote people to spend more time on walking or other sport activities, which could prevent people from suffering from diseases caused by physical inactivity (Definition by author).

1.8 Methodology

This research will be carried out through a selection of research methods including literature review, case studies, observation and interview

A. Literature research
According to the theoretical framework, the literature research is divided into three sections samely, physical health: walkable city, social health: social cohesion, mental health: mentally supportive environment. Each section will be examined in detail. theory has been overviewed in the theoretical framework section.

In the formal literature research stage, the theories contained within each of the three sections will be analysed in detail and the design factors that influence design in the research theories will be compared, refined and fully explained. I will remove and merge these factors into design factors that will influence my design, based on what can be realised and applied to the campus space and students' living envrionment through the architectural and built environment. Finally, the design factors in three sections will be organised into design guidelines.

B. Observation
In the fieldwork week, I plan to be observing in and around the student housing on the TU Delft campus. Observation will focus on the fellow aspects:
1. Connection with campus spaces
2. Nature or greenery in building or around building
3. Facilities around building
4. Floor plans (circulation, common room, gallery, and so on in the building)
5. Collision spaces (where do the students meet/ chat/ work together/ with each other in the building, and when do they do usually?)
6. Typology of housing

C. Interview

To support my research, I'll conduct numerous interviews. Prior to these interviews, I'll collaborate with my colleague to discuss and refine the interview questions, given the related nature of our research topics. During the fieldwork week, we'll divide the task of conducting interviews between us and then share the findings. We've devised a set of questions tailored for different interviewees, aiming to keep each interview within a 15-20 minute timeframe. The individuals I'll be interviewing include students at TU Delft, psychologists affiliated with TU Delft, psychologists from Dutch online platforms like openup.nl, psychiatric doctors, and others. The detailed interview plan can be found in the appendix.

D. Case studies

To showcase the efficacy of depression prevention strategies, architectural design related to health will be analyzed, which include residence/ student residence, urban/ campus design.

Residence/ student residence:

- Grand Morillon Student Residence -2021- Kengo Kuma & Associates
- Student Experience Minervahaven -2021- VURB Architects

Urban/ campus design:

- Healthy Tracks - 2018-2019 - Felixx

BACKGROUND

Depression in university students

Mental care for depression

- Avoid seeking help
- Long waiting list
- Expensive therapy cost
- .....

Prevention is better than cure

PROBLEM STATEMENT

Research for depression prevention

in social aspect

- Psychoeducation Skill development
- Neighborhood social cohesion
- .....
- **No effective strategies targeted at university students in NL**

in architectural aspect

- **Focus on medical buildings**
- **Limited research on mental health and university environment**
- **Limited research on mental health and student living environment**

Overall

There is a lack of research that is inspired by **combining the prevention strategies in social mental health field** and **the existing architectural design principles related to mental health** to specifically research for **university students** about how the architectural and built environment can be designed to **support depression prevention** in their **residential environment on campus.**

RESEARCH GOAL

The research aims to combine depression prevention strategies with mental health-related architectural design principles to design living environment on campus that can have a positive impact on depression prevention in university students.

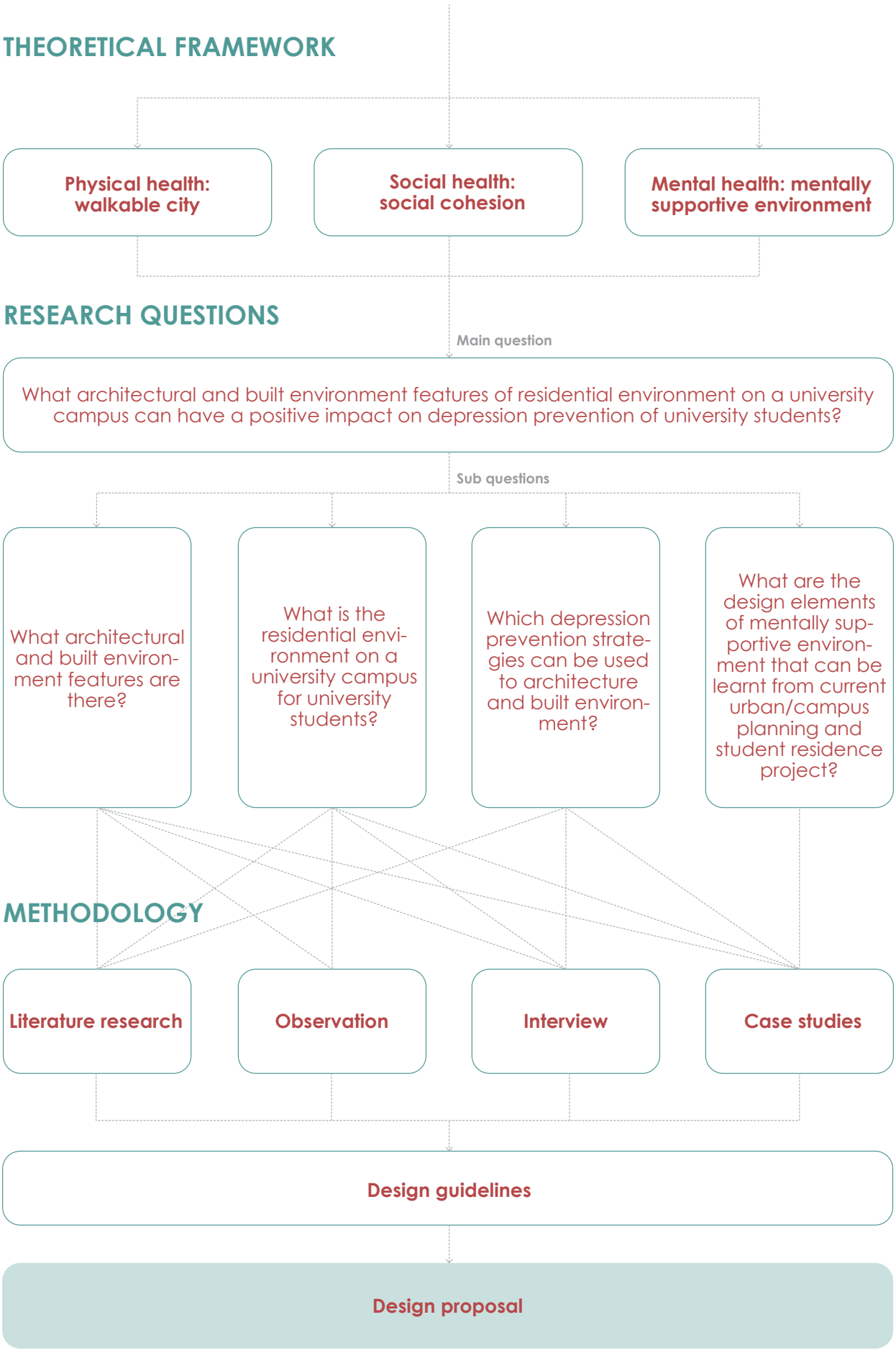


Figure 2: Flow diagram of research plan (illustrated by author)

CHAPTER 2
LITERATURE RESEARCH

According to the theoretical framework, the theoretical study is divided into three parts, **2.1 physical health: walkable city, 2.2 social health: social cohesion, 2.3 mental health: mentally supportive environment**. Combining the content of design factors narrated by theories in three sections, I have analyzed and compared them. There are factors whose contents are similar or overlapping in the different theories, which I have merged into one factor. Also, there are factors that cannot be realised through the built environment will not be used as a reference.

2.1 Physical health: walkable city

The literature research in this section consists of three main theories, **Southworth, 2005, Zuniga-Teran et al. 2017, and Zumelzu & Herrmann-Lunecke, 2021**.

1. Connectivity
Accessibility and the continuation of walking trails between locations are a symbol of connectivity. According to Southworth's theory, connectedness is defined as the presence or lack of total barriers separating different kinds of pathways (Southworth, 2005). Connectivity would encourage people to walk more. Similar ideas are covered by the two additional theories regarding walkability. According to the study by Zumelzu & Herrmann-Lunecke, walkability, defined as being able to walk to activity nodes, has a good impact on people's mental health (Zumelzu & Herrmann-Lunecke, 2021). Additionally, Zuniga-Teran et al.'s study explains walkability in terms of connectedness and five other factors. Only connectivity is highlighted in this section, as the other five features overlap with other design factors.

2. Green space
Walking and enjoying in the natural areas. It has been demonstrated that urban green spaces are beneficial to both physical and mental health (Zumelzu & Herrmann-Lunecke, 2021). In pedestrian areas, the presence of green balconies, street gardens, and pavement trees can all help to lessen tension and mental exhaustion (Zumelzu & Herrmann-Lunecke, 2021). It is possible to create seating areas in natural settings and up-close interaction with the natural world can boost feelings of well-being. The study by Zuniga-Teran et al mentions trees and explains that, among other benefits, having trees on the street or a higher degree of greenery in the built environment makes for a more enjoyable and secure walking experience, which in turn enhances the psychological wellbeing of those who choose to walk (Zuniga-Teran et al., 2017). Overall, there are many different types of green areas, and they can benefit people's mental

health.

3. Density
Density refers to areas where there is a lot of foot activity or pedestrian concentrations. There is contradiction in the study's discussion of density. Human companionship and engagement are more likely to occur in areas with heavy foot circulation. But there's also a chance that an excessive density can result in cramping or a lack of room, which can then contribute to stress and depression (Zumelzu & Herrmann-Lunecke, 2021). In the study of Southworth, factor "Fine Grained and Varied Land Use Patterns", is mentioned that walking can be promoted by mixed-use areas to increase the density of the environment (Southworth, 2005). Since density is contradictory, care should be taken during design process to avoid going overboard with densification and de-densification. While encouraging human relationships and encounters is crucial, it shouldn't be overly congested to the point of stress.

4. Spatial design
The design of the pedestrian area, which includes the proportion of the building's height to the width of the street, the façade design around the walkway, decorations, etc. According to Zumelzu & Herrmann-Lunecke, having buildings that are too tall for the width of the street might make people feel anxious and uncomfortable. Proper ratios can result in increased spatial comfort and beneficial effects on mental health (Zumelzu & Herrmann-Lunecke, 2021). The study of Southworth uses the term "path context," but the information is comparable to that of "spatial design." This component is described as diversified and comprises elements such as the built environment's visual interest, the street's general design, observable activities, and more (Southworth, 2005). In pedestrian systems, the quality of the environment in terms of its influence on mental health should be taken into consideration in addition to the fundamentals of the physical surroundings.

5. Social interaction
In public areas, environment can encourage familiarity and social engagement. According to the study, encouraging social connection can help people feel more secure, satisfied with their homes, and generally well-being. When planned well, mixed-use areas promote social interaction (Zumelzu & Herrmann-Lunecke, 2021). It was mentioned that shared areas in residential environments can enhance a person's sense of community and social interaction. People who walk, exercise, or otherwise simply recreate near their homes are more likely to be familiar with and interact with their neighbors (Zuniga-Teran et al., 2017). Overall, there is a need to consider ways to promote greater use of walking trails and public spaces through design.

6. Motivation for walking
People usually walk for recreation and transportation. Research has indicated that pedestrian networks ought to be linked to other transport options, such buses, trams, trains, etc., at a suitable travel

time (Southworth, 2005). To encourage people to walk, other locations that they frequently visit for business or pleasure, including cafes, gyms, libraries, etc., must likewise be a fair stroll away. The study from Zuniga-Teran et al. noticed a link between leisure walking and suburban growth (Zuniga-Teran et al., 2017). In my opinion. this demonstrates that walking for recreation cares more about the quality of the walking environment than walking for transportation, which cares more about walking distance. These two purposes for walking are, of course, occasionally mixed.

7. Path quality

The feeling of walking is influenced by the quality of the path. Whether the walkway is conspicuously and clearly designated is one aspect of the path's quality. The path's width, lack of trees or other obstructions, strong lighting, wire clutter on the ground, obstructions from streetlights or utility poles, etc. can all have an impact on the path's quality (Southworth, 2005). The characteristics of a good path include being continuous, having a smooth surface, not being uneven, conducive to wheelchair or pedestrian access, and so on. To make the path comfortable, even its width and material might be considered.

8. Physical activity

Walking is a physical exercise that has been shown to have a positive impact on an individual's sense of wellbeing. Since there is a strong link between physical activity and good mental, physical, and social health, walking systems reflect society's care for these aspects of life (Zuniga-Teran et al., 2017). Walking systems can be used to connect other forms of physical activity. This way, a big community space or even an urban area can reflect the promotion of physical activity and, by extension, healthy lifestyles.

9. Ambient noise

Long-term exposure to environmental noise might result in tension and anxiety (Zumelzu & Herrmann-Lunecke, 2021), such as that produced by construction, traffic, crowds, etc. When it comes to noise reduction and sound insulation, the built environment must also be considered. Trees and other greenery can help reduce noise in urban areas. Soundproofing materials on the external walls of the structure can help reduce noise levels interior. Obviously, totally shutting out all sounds is not excessive (Zumelzu & Herrmann-Lunecke, 2021). It's been said that certain ambient noises, like birdsong and the sound of running water, can also cause happy feelings.

In these three theories, safety (Southworth, 2005) and perceived crime (Zuniga-Teran et al., 2017) are also mentioned, which emphasize the crime-free safety of a society positively affects the mental health of people. However, because the problem of crime is complex and cannot be fully solved by only architectural and built environment, it is not referenced in this section.

Literature	Designing the Walkable City (Southworth, 2005)	Neighborhood Design, Physical Activity, and Well-being: Applying the Walkability Model (Zuniga-Teran et al., 2017)	Mental Well-Being and the Influence of Place: Conceptual Approaches for the Built Environment for Planning Healthy and Walkable Cities (Zumelzu & Herrmann-Lunecke, 2021)	Design factors
Factors	• Connectivity • Linkage with other modes • Fine grained and varied land use patterns • Safety • Path quality • Path context	• Walkability • Motivation for walking • Social interactions with neighbors • Physical exercise • Perceived crime • Trees	• Green space • Walkability • Density • Spatial design • Social interaction • Ambient noise	• Connectivity • Green space • Density • Spatial design • Social interaction • Motivation for walking • Path quality • Physical exercise • Ambient noise

Figure 3: design factors in walkable city (illustrated by author)

2.2 Social health: social cohesion

The literature research in this section consists of two main theories, **Anderson et al., 2017 and Breedvelt et al., 2022.**

1. Volunteering
Volunteering can take the form of participating in community groups to volunteer more in the community. Especially non-profit activities like community planting, mental health prevention initiatives, and the like qualify as volunteer work. The goal is to empower individuals to increase their sense of personal and collective efficacy (Breedvelt et al., 2022). Through these kinds of communal events, people strengthen their bonds with both known and unknown people (Anderson et al., 2017). Engaging in conversation and listening within volunteer group promotes social cohesion.

2. Creative activity
Art, culture, and other creative endeavors are all considered forms of creative activity. In general, a community's cultural activities will draw a larger participation from its artistic and culturally rich members (Breedvelt et al., 2022). Young people and university students have a strong interest in artistic pursuits. People naturally bond with their shared interests in and tastes for the arts (music, photography, etc.). Additionally, young adults believe that providing communal areas with activity groups enhances connection and a feeling of inclusion (Breedvelt et al., 2022).

3. Sports group
A sports group is an organized group that participates in sports together. There are many kinds of sporting activities, like friendly or competitive ball games (Anderson et al., 2017). Among peers or adults, joining a sports group is one approach to create a vibrant social network (Breedvelt et al., 2022). A favorable athletic atmosphere in a community or location can draw large numbers of individuals to participate in shared sports or team sports. Engaging in group exercise activities can enhance the

benefits of exercise for physical and social health.

4. Improve community environment
Improvement of the built environment in community is referred to as neighborhood regeneration programmes in the study of Breedvelt et al., thereby improving social benefit (Breedvelt et al., 2022). Individuals need to be aware of their surroundings outside of them (Anderson et al., 2017). Basically, focusing on the neighborhood's current built environment and encouraging more people to use it by making improvements to it encourages people to use the area more frequently. To meet human needs through the environment, I think this is based on analyzing the current environment and the needs of its users.

5. Psychosocial interventions
Social cohesion is improved by psychological intervention groups that residents can join and organize, as these groups foster connections and experience sharing (Breedvelt et al., 2022). Through workshops or various methods, psychosocial intervention groups can be used to increase connections. These events can be held in cafes, meeting rooms, or other locations where people meet. Through psychological intervention groups, the primary goals are to reduce barriers between individuals who are lacking to relate to and communicate with one another and to foster social cohesion.

There is also a factor "online space" mentioned in Breedvelt et al.'s study, which means promotion of social cohesion through social media publicity and connections. Since this factor cannot be realized through architectural and built environment, it is not taken as a reference.

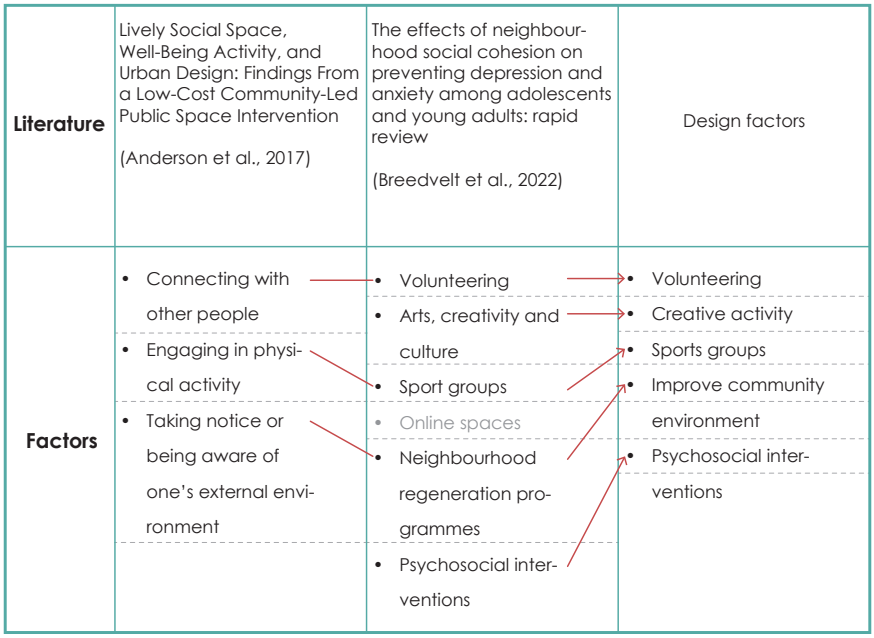


Figure 4: design factors in social cohesion (illustrated by author)

2.3 Mental health: mentally supportive envrionment

The literature research in this section consists of two main theories, **Lundin, 2015, Huisman et al., 2012 and Channon, 2018.**

1. Material
People's most basic sense, touch, has been demonstrated to be strongly correlated with our emotions (Channon, 2018). Textural materials in architecture, such genuine wood, exposed brick, etc., come into direct touch with the human sense of touch, bringing comfort and pleasure. besides the building blocks of the area, aesthetic elements like carpets are employed to create a cozy atmosphere for individuals (Huisman et al., 2012). The beauty of the materials as well as their preservation and cleaning should be considered concurrently.

2. Light
Light includes natural daylight and interior lighting. Daylight is very important to people, which not only affects their biological clocks, but also affects their moods to a certain extent (Channon, 2018). In the design phase, the direction of daylight is considered, and the building's orientation should be selected to optimize daylight. Winter depression can be treated medically with intensive light therapy during the day (Huisman et al., 2012). Furthermore, uniformity and glare-free illumination should be used for interior artificial lighting. Too bright, harsh light has been found to increase people's emotions, according to studies, and this could be detrimental to our mood (Channon, 2018).

3. Control
Psychological research has shown that people feel more content if they believe they have more control, even if the actual level of control does not change (Channon, 2018). By altering the design of the area, they use, adding unique elements, etc., people can be made to feel in

charge of it. A raised sense of control over the place can also result from an element, space, or piece of furniture having several uses (Channon, 2018).

4. Nature

Numerous research studies have indicated that spending time in natural environment and connecting with the natural world might enhance an individual's mental and overall health (Channon, 2018). Through the design process, architects can include more natural elements into buildings and cities. Expanding the spaces (such as municipal parks, rooftop gardens, indoor plant decorations, and so on), where people can engage with nature directly. In the study, ese natural landscapes are also called "psychologically appropriate" artwork, where people can immerse themselves in nature in addition to connecting with it visually (Huisman et al., 2012).

5. Aesthetics

A pleasant setting is mostly composed of aesthetics, and beautiful and visually appealing things are more enjoyable (Channon, 2018). The concept of aesthetics is broad and manifests itself in a variety of ways in constructed and urban contexts. For instance, appropriate architectural proportions, visual diversity (prevent monotony), careful color selection (too bright colors might be unsettling), and so forth.

6. Physical activity

Mental health is positively impacted by exercise. Exercise releases endorphins, which are substances that stimulate the body's opiate receptors, enhancing mood, lowering pain, and strengthening our sense of self and independence (Channon, 2018). By creating indoor or outdoor areas for exercise or establishing connections with nearby facilities to encourage human movement, architects can encourage the incidence of physical activity.

7. Acoustic comfort

The psychosocial environment can be enhanced and influenced by the aural environment (Huisman et al., 2012). Noise levels in hospital settings should be carefully controlled because it may hinder patients' ability to recuperate (Huisman et al., 2012). It is plausible and implied that individuals who are depressed or experiencing depression could also be negatively impacted by noise. Therefore, it's crucial to improve the noise level in the living space.

8. Social interaction

In addition to promoting socialization, this part address how people might manage themselves using environments or spaces (Lundin, 2015). People who are depressed or who are experiencing emotional difficulties may find it simple to withdraw and refuse to interact with others. Both normal living spaces and hospital environments exhibit consistency in this regard. To help isolated persons socialize, the built environment must both satisfy their desire for privacy and provide them with a visual connection to

social places (Lundin, 2015). The study's use of the term "orientation" indicates to furniture arrangement and orientation, which should be considered since they can either promote social contact (Huisman et al., 2012).

9. View

To promote healing, it's critical to provide patients with views of the outside world and unrestricted access to it. This allows patients to feel more liberated and open, which reduces stress (Lundin, 2015). From a medical perspective, this is related to distraction therapy, which aims to divert the patient's attention from their suffering (Huisman et al., 2012). According to medical study, having a nice view in an individual's daily living space not only makes most people feel visually comfortable, but it also enables depressed individuals to focus their attention on the view rather than their emotions all the time.

In addition, these three theories also mention factors such as promote dignity, encourage normalcy, and so on (Lundin, 2015) (Channon, 2018), which cannot be realized through architectural and built environments and are not suitable for use in living environments. environment, so it is not taken them as reference.

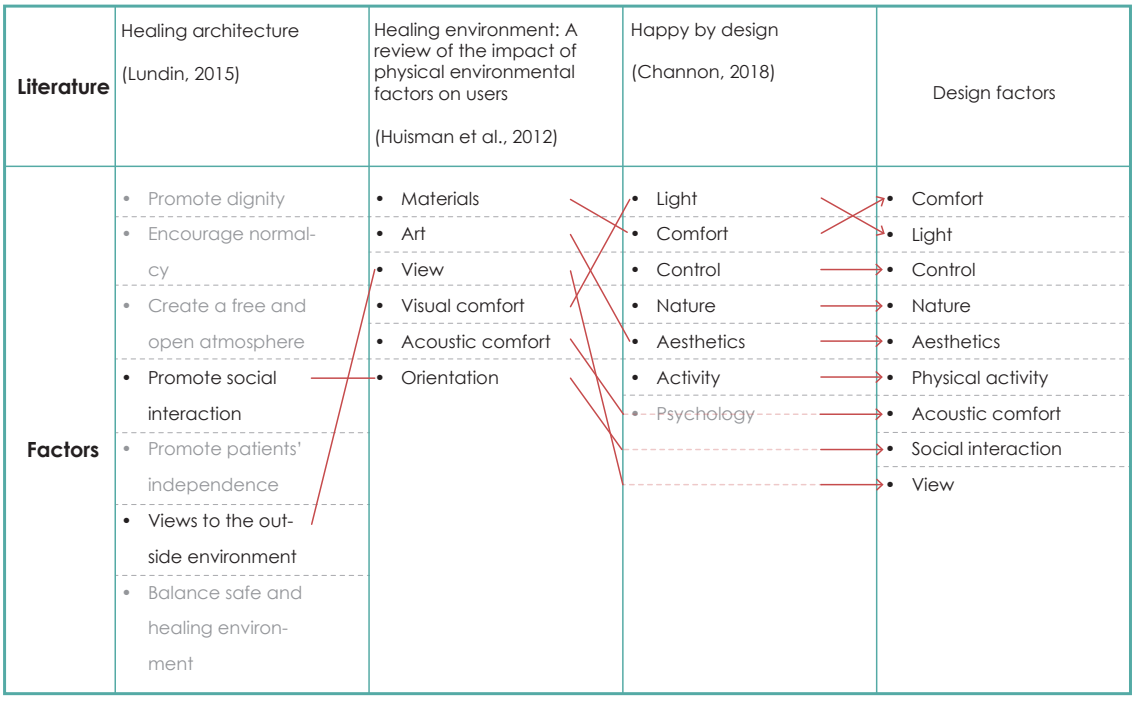


Figure 5: design factors in mentally supportive environment (illustrated by author)

2.4 Conclusion for design guidelines

Physical health: walkable city
- Connectivity
- Green space
- Density
- Spatial design
- Social interaction
- Motivation for walking
- Path quality
- Physical exercise
- Ambient noise

Social health: social cohesion
- Volunteering
- Creative activity
- Sports groups
- Improve community environment
- Psychosocial interventions

Mental health: mentally supportive environment
- Comfort
- Light
- Control
- Nature
- Aesthetics
- Physical activity
- Acoustic comfort
- Social interaction
- View

Comparing the design factors in the three sections, there are several factors overlapping content with different terms that appear in two or three sections. These overlapping factors were merged, and the

relationships between them were visualised (see Figure 6). These guidelines were categorised into three levels according to their importance, indicated by stars (see Figure7). Those with three stars are guidelines of the first level, as they are commonly emphasised in three-part literature. Two stars are guidelines of the second level, and they refer to more specific measures. One star is for guidelines of the third level, which are related to the actual activities of the user and can be realised in ideal situations.

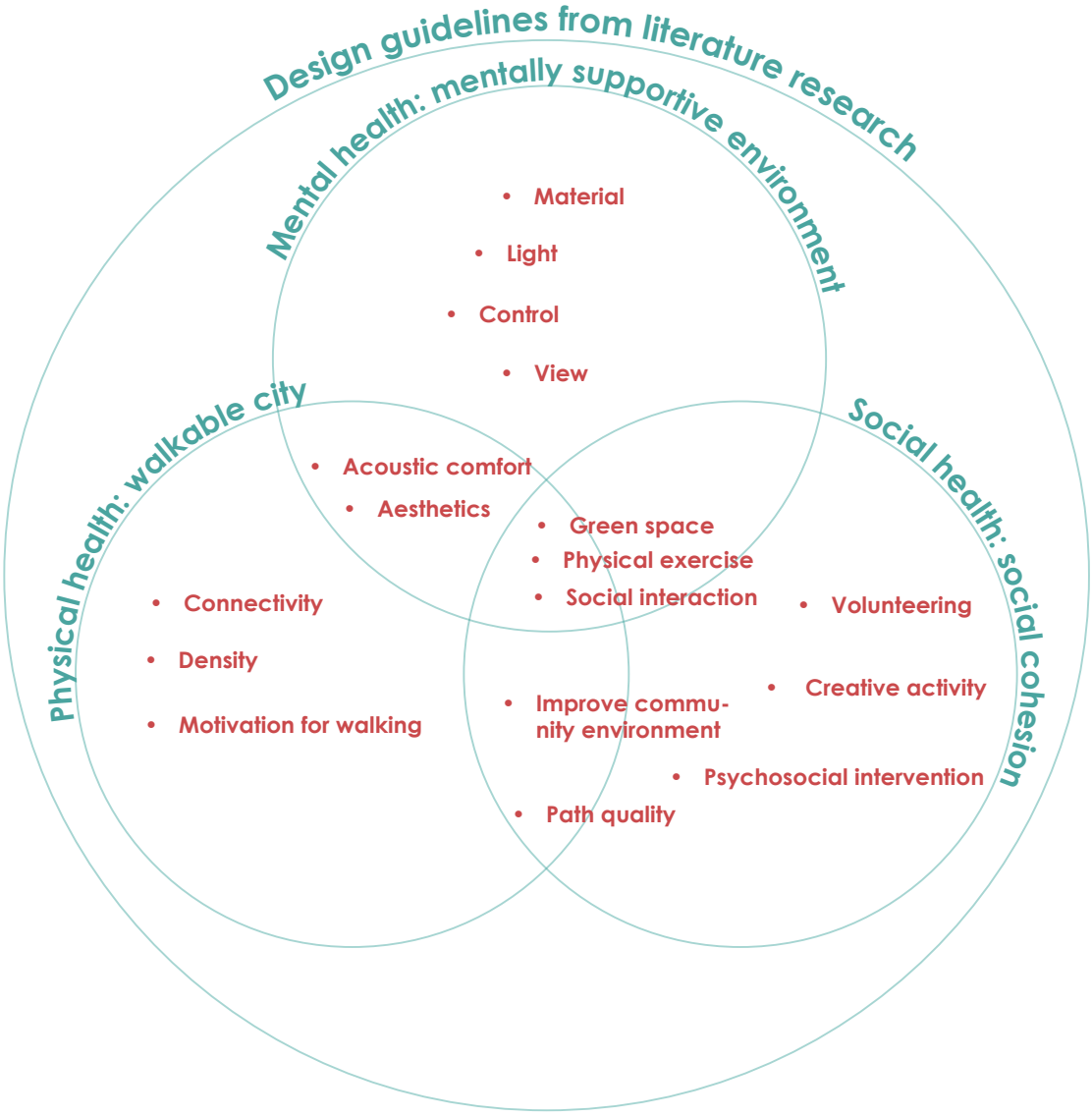


Figure 6: Design guidelines from literature research (illustrated by author)

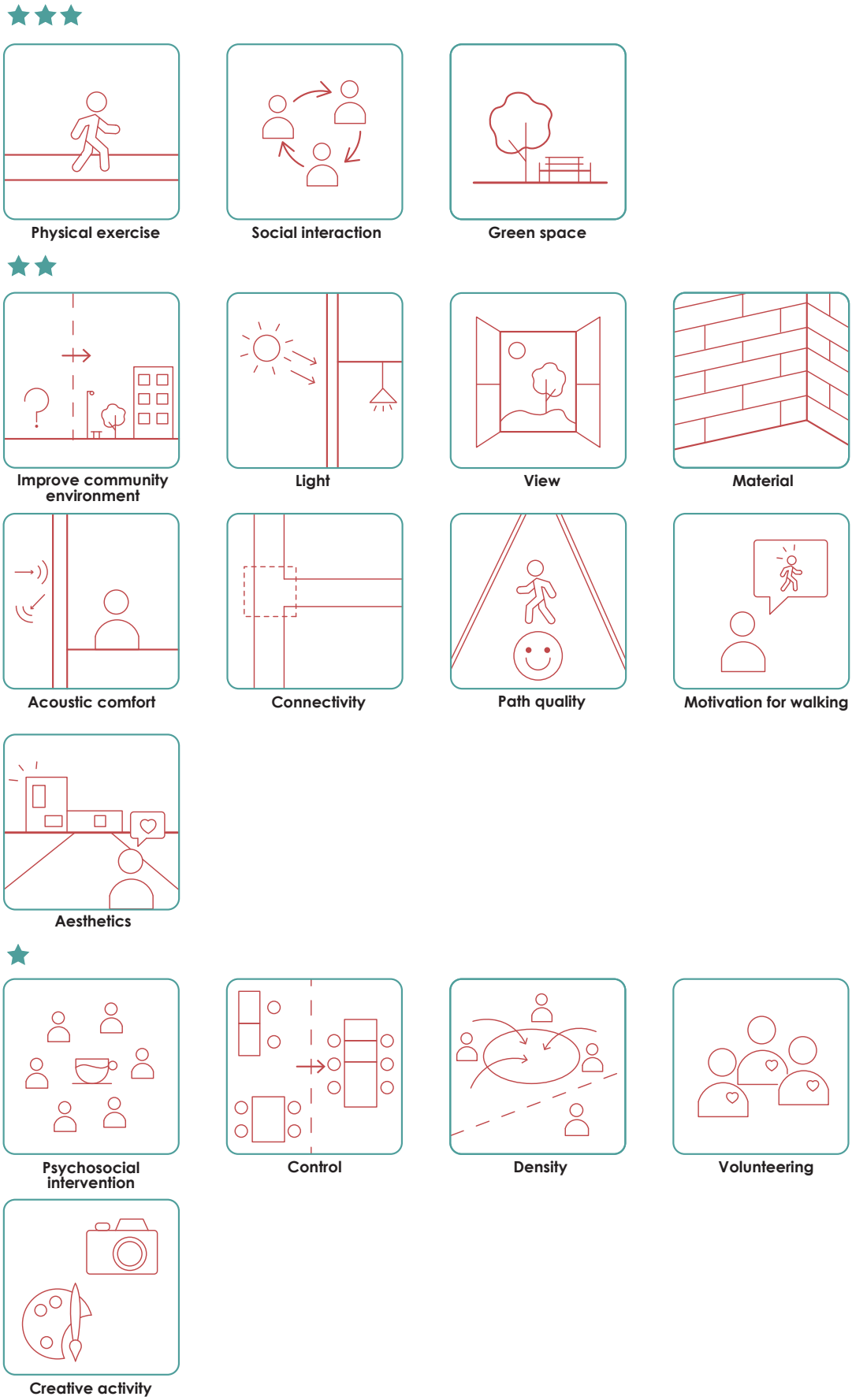


Figure 7: Visualization of design guidelines from literature research (illustrated by author)

CHAPTER 3
FIELDWORK

The fieldwork research consisted of **3.1Observation** and **3.2 Interview**. I observed six student residences on campus. However I was unable to access some rooms during the observation, so the information on several residences was not complete. Only one of the student residences with the best information is presented in this research report. The information in the observation section includes location (connection to campus space, surrounding facilities), green space, common room and typology. The interview section includes interviews with the psychologists and the TU Delft students, and the interview result which is relevant and could guide the design is presenting in the visual way. At the end of both the observation section and the interview section, there is the analysis and reflection based on the design guidelines summarised in the literature research. Based on that, Some of the factors are updated.

3.1 Observation

Figure 8: Building of student housing Korvezeestraat (sketch by author)

Student residence Korvezeestraat

Location

Figure 9: Mapping of student housing Korvezeestraat (illustrated by author)

The student residence Korvezeestraat is located in the middle of the TU Delft campus and consists of eight buildings.The housing is near to several other student residences to the west and south, and on an empty plot of land to the south, construction is underway to build a new student residence. To the north of the building are the educational buildings and an underused car park, which during the fieldwork was found to be rarely parked and mostly unused, surrounded by fences. To the east of the building are other educational buildings. The student residence is connected to the campus space and other student residences by walkways, and most of the buildings are within a 15-minute walk of each other. To the south of the building is a concentration of sports clubs with outdoor sports areas, and a TU Delft X gym, which are less than a ten minute walk away. There is also cafes and restaurants within a short walk. Since most of them are located in the education building, they are only open on weekdays and during working hours. There is a supermarket on campus, which is convenient for students to buy food, but I found from talking to students that the price of goods is quite expensive. Students will go to the supermarkets in city centre in the other neighbourhoods by bike and buy grocery.

Green space

Figure 10: Mapping of green space (illustrated by author)

The layout of green space in this student residence is shown in the green space mapping in Figure 10, which is interspersed between the gaps in the building. Green space is not only a natural environment, but also a space for students to gather outside (see Figure11), for example, there are tables and chairs to have meal together, there are benches wrapped with plants, and some lawns are used as mini volleyball courts. Some of them are just for viewing. Some people who live on the ground floor put a sofa or bench in front of the window. When the weather is nice, they will sit here and chat with their roomates or friends and drink beer.

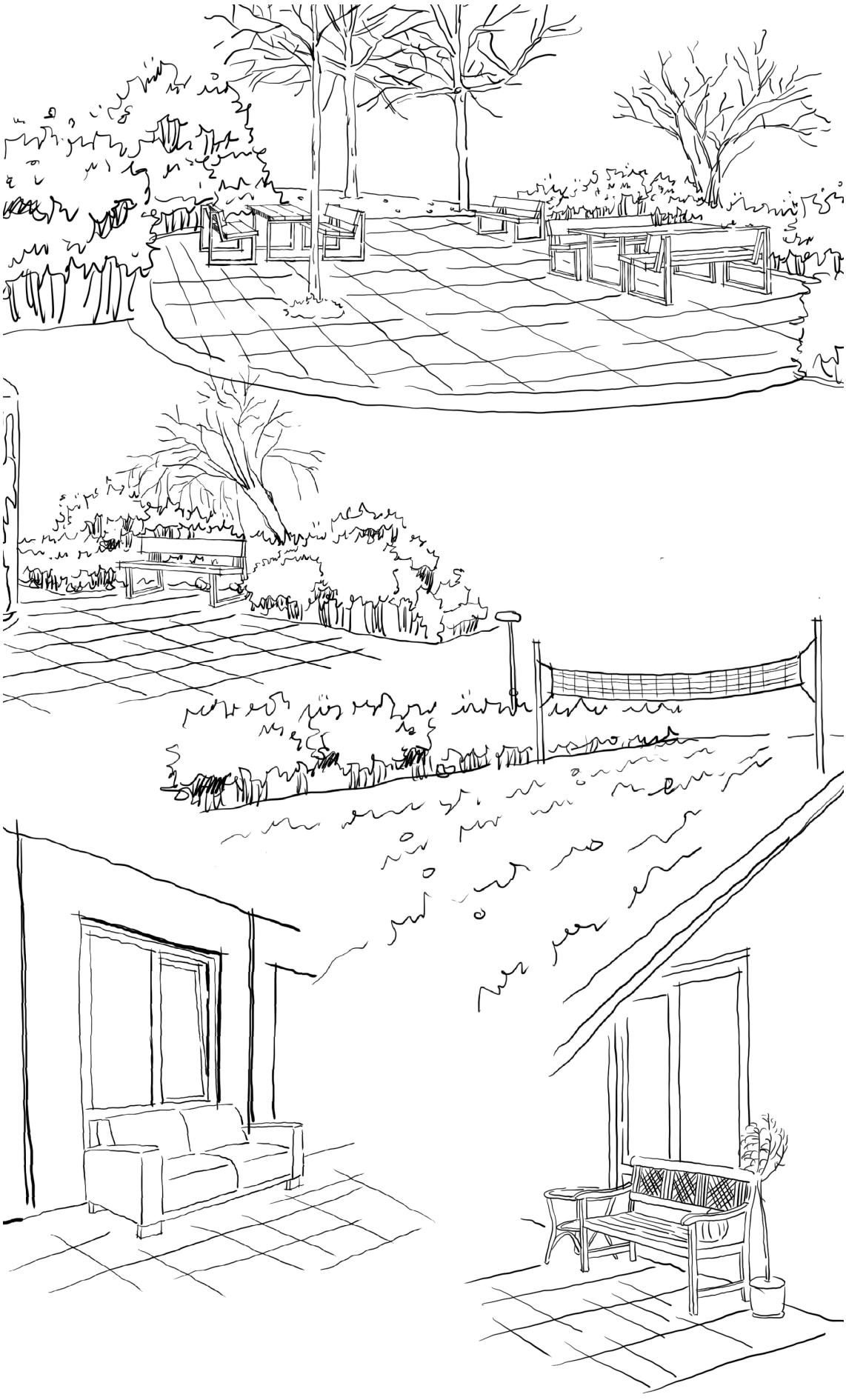


Figure 11: Green space (sketch by author)

Floorplan and common rooms

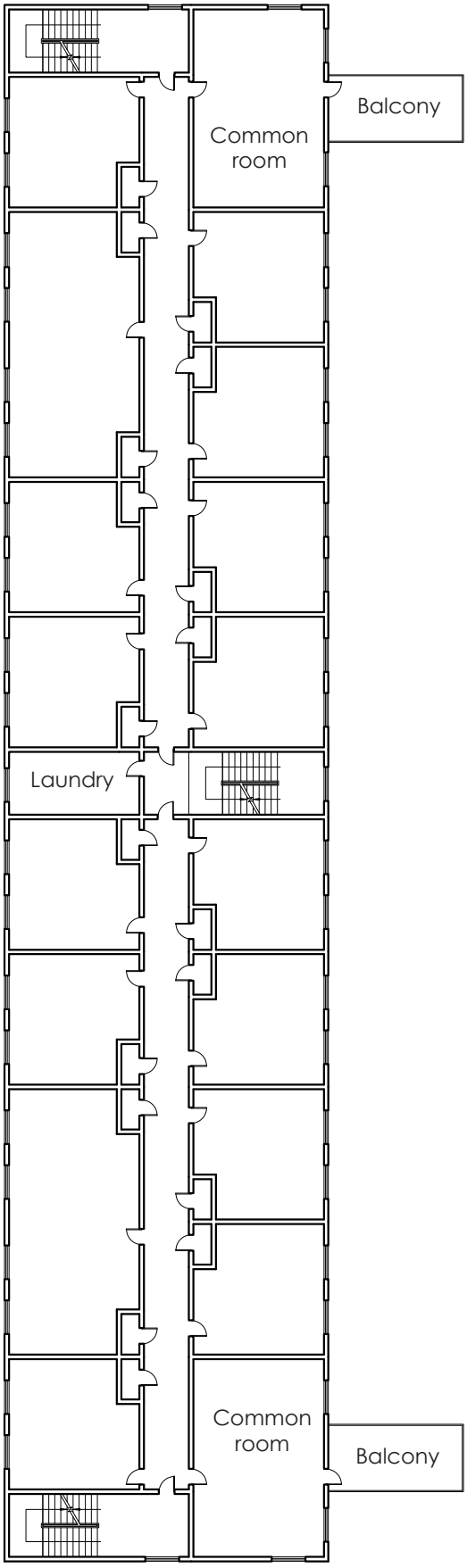


Figure 12: Typical floorplan 1:300
(illustrated by author)

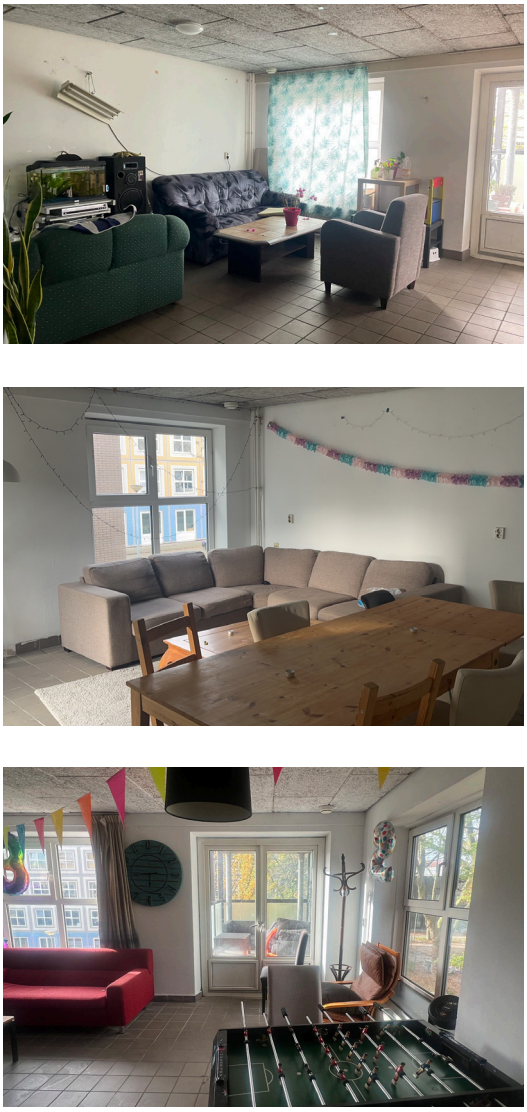


Figure 13: Common rooms
(photo by author)

The common room inside the building is located at the far ends of the corridor, each with a balcony (see Figure 12). Inside, there are some common furnishings for various activities, such as sofas, conference tables, board games etc. (see Figure 13). Common rooms are rarely used during the day and are occasionally used on weekend evenings. To understand the students' perspectives on the common room, I conducted brief interviews with them(see Figure 14),

Interviews with students living there about common room

"I have tried to study there several times, but I have hardly ever encountered anyone else studying here. I'm not familiar with my neighbors either, not even those in the same hallway. Only occasionally do I meet them when I come home."

Student I

"Sometimes I invite friends here to have parties. We play musical instruments and dance together. It's a lot of fun."

Student II

"I have several friends who also live here, and sometimes, we come here to play board games, maybe on weekend"

Student III

"To be honest, I don't really want to use this room because some people don't clean up after using it, and I find it a bit messy."

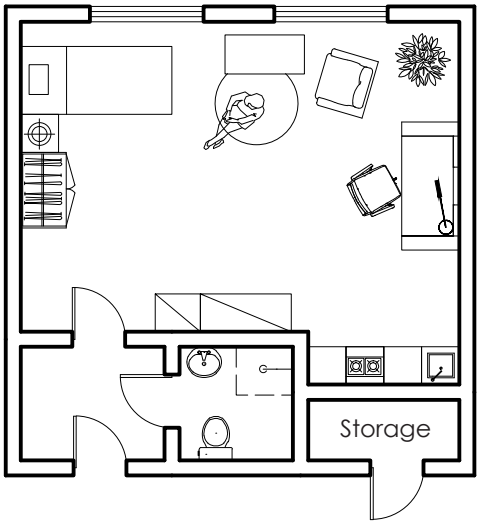
Student IV

"I feel annoyed when people party in the common room at night because my room is next door and I find it very noisy and can hear the whole corridor!"

Student V

Figure 14: Interview with students living there (sketch by author)

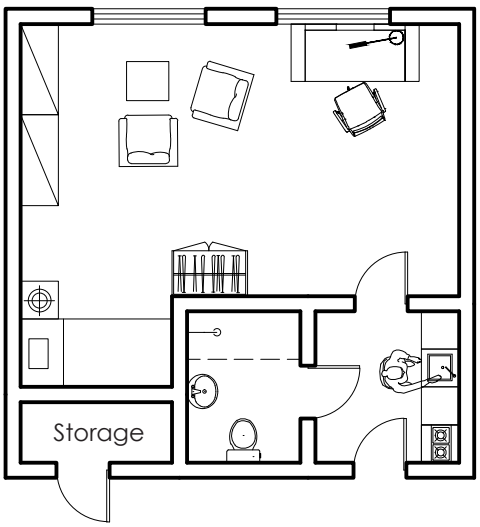
Typology of residence



Type A: Studio **Student IV**

Student D prefers a quiet and private space, so she chooses to live in a studio. She likes to cook, and she uses the kitchen a lot. She thinks it would be nice if there was a barrier between the kitchen and the bedroom so that the smell of cooking fumes would be kept away. She loves green plants and has a lot of plants in her home. She mentioned that especially in the winter in the Netherlands she tends to feel depressed and having lots of greenery would cheer her up. She thinks that outdoor green spaces are boring, and although there are tables and chairs. it's not a very cozy place to sit, so she hardly goes there.

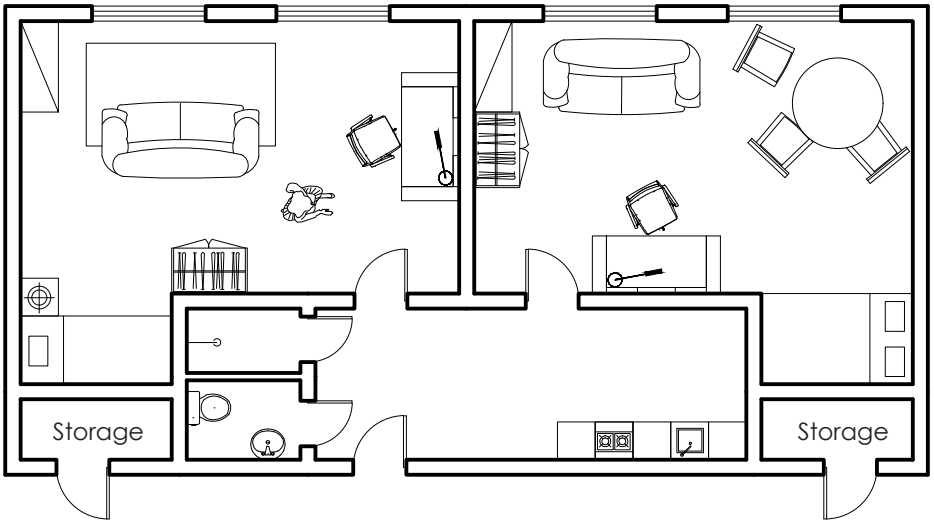
Figure 15: Type A (illustrated by author)



Type B: Studio **Student V**

student E had the experience of sharing a flat with someone else, and he mentioned that the difference in habits with his roommate bothered him, so now he prefers an independent living space. This room makes him feel comfortable because there are two large windows and good daylight. He likes to have his desk facing the window so that he can look out and relax his eyes while he studies. But he doesn't think the view out of the window is nice enough, it's just a boring green pool.

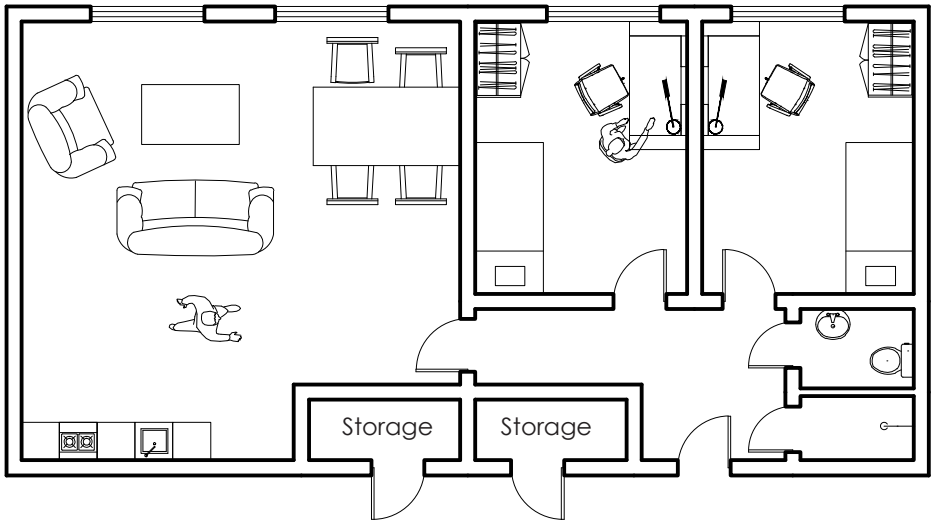
Figure 16: Type B (illustrated by author)



Type C: Share for 2 people **Student II**

Student B shares the flat with another girl. They share the kitchen and bathroom and have their own separate bedroom. She mentions that it is good to have a roommate because it helps to alleviate her loneliness. However, she thinks that the shared space is too dark and too small. She said there was a balcony only in the common room, it would be nice to have their own balcony.

Figure 17: Type C (illustrated by author)



Type D: Share for 2 people **Student III**

Student C shares this flat with another boy. They have a shared kitchen and living room, as well as their own individual bedroom. He really likes their living room because they can invite friends over and have fun chatting together. He mentioned that although there is a laundry room in the building, the washing machine is private. It's a bit inconvenien since he doesn't have a washing machine, he has to go to a nearby residential building to wash it.

Figure 18: Type D (illustrated by author)

Reflection of observation

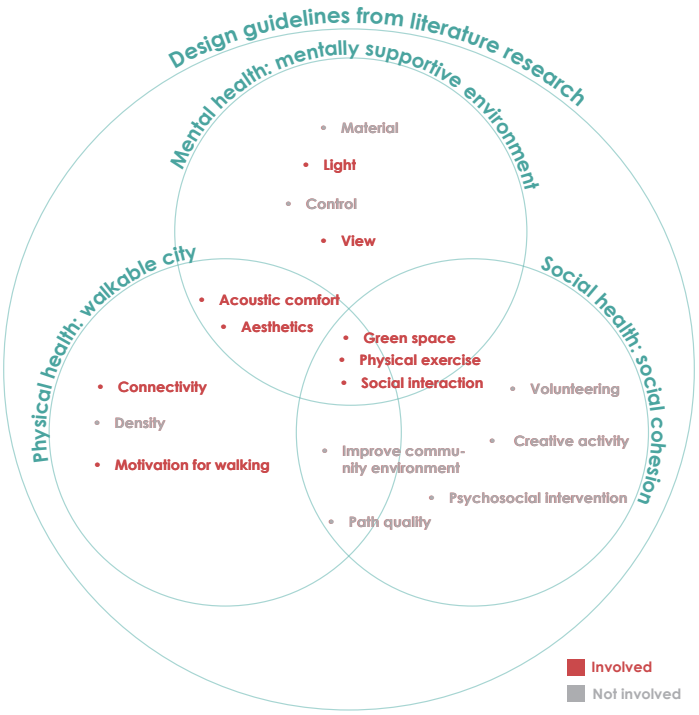


Figure 19: Involved factors in observation
based on literature research (illustrated by author)

Based on the three sections of the literature research and the factors, I have labelled the factors that were involved and not involved in this observed student residence on the diagram of guidelines from literature research. For the factors involved, the reflection of this student residence is as follows.

Physical health:
The residence location is in the central part on campus, at a short distance to other academic buildings, which provides students with the motivation to walk or bike to class. The students can do physical exercise at the nearby TU Delft X gym and other sports clubs to the south of the buildings. Basicly, residents are not bothered by traffic or other noise, as there are no highways in the surrounding area.

Social health:
The common room and the outside tables and chairs are the only areas that encourage social interaction. Unfortunately, the messy arrangement, lack of familiarity among neighbours, inappropriate use for group study, etc., make the common area insufficiently utilized. It's occasionally used for parties, but the poor noise insulation keeps the neighbors from being bothered. Because of the weather and lack of cozy, the outside tables and chairs are rarely used. In the residence, there are hardly any other social events.

Mental health:
The interior big windows and the excellent daylight have pleased some students. Many students considered the green space or green plants to be their favorite spot, but they also thought it was uninteresting and

unattractive here. Meanwhile, residents' views from the interior were also related to the green space, and they found the views boring as well.

Combined with observations and interviews, five factors have been updated based on the previous design guidelines.
1. Group study room
2. Separation of Kitchen and bedroom
3. Private balcony
4. Shared laundry

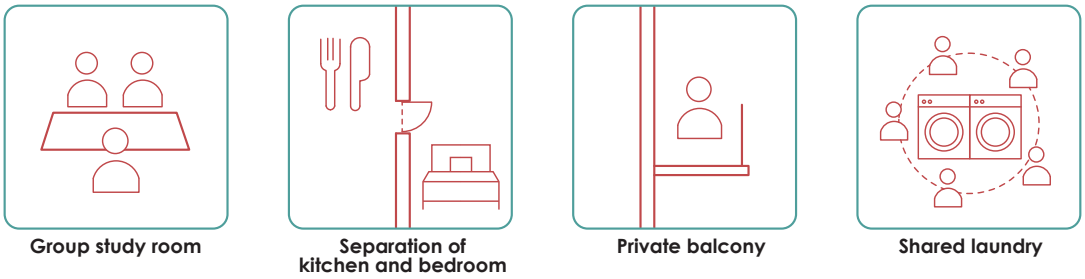


Figure 20: Visualization of design guidelines from observation (illustrated by author)

3.2 Interview

Figure 21: Psychologist & student (sketch by author)

During fieldwork, I conducted interviews with psychologists and TU Delft students. The interviews with the psychologists consisted of both offline face-to-face and online video. The interviews with TU Delft students were conducted randomly on campus. The questions and content of the interviews were primarily related to the topic of this research. Detailed questions and interview record can be found in the Appendix. The related results to the interviews are presented in visualisation.

Interview with psychologists

*"I have found in my counselling sessions that people feeling depressed or patients suffering from depression are very easy to isolate themselves. So I would advise them to try to get themselves outside in these situations. You can **go and hang out outdoors**, you can **go and stay with friends**."*

*"I know it's very difficult for people with depression problems to go outside. Then I would suggest that they don't push themselves too much and that they can create **small goals for getting out**. For example, going for **a five-minute walk today**, a **10-minute walk tomorrow**, a **15-minute walk the next time**, and slowly increasing the amount of time they go out like this will help improve their mood."*

Psychologist A

*"Comfort in the indoor space is also very important. Basicly, in living spaces, I would prefer to suggest constructing peaceful spaces and **not using too bright, too colourful colours**, which will help to ease the mood. Also, **daylight is important**, a space that is too dark can be stressful, so try to make sure there is plenty of daylight."*

*"For the interior space, I would also recommend that people try to use **soft furniture**, such as like fluffy pillows, soft sofas, and so on. These furniture will make them easier to relax. It would be nice to have some **greenery.***

*"**Walking** is really an effective way to relieve depression. I would advise depressed patients to go out more often or do **other sports**, of course for healthy people this is also good because exercise is good for the mood.*

Psychologist B

*"**Chatting and companionship** is important for depressed patients because they can feel very helpless and lonely. So if a **friendly social environment** is helpful in preventing depression."*

Figure 22: Interviews with psychologists I(sketch by author)

*"I often suggest to people who come for counselling on depression that they can put some greenery in their homes. I mean the **lively greenery**, not the dead branches. These two types of plants give a different feeling.*

"Walking is good because exercise could improve mood. It is good if people can exercise moderately every day. You can go to the gym or ***exercise outside***, such as running, doing strength training, dancing, etc., just do your favourite sport. Exercise will also help you fall asleep quickly, *but of course, you need to **fall asleep** in a **quiet environment**.*"

Psychologist C

*"The environment could encourage people to **communicate and interact**, which could be helpful in preventing depression. For example, talking to friends in a cosy lounge area or shared space.*"

*"But people also need individual and **private spaces** that allow them to feel independent and relaxed, and to restore their mental energy.*"

Psychologist D

*"The size of the living space affects people's mood. Too small can be cramped and stressful. Too big will be too empty and make people feel nervous. If it is a studio for **one person** to live, the size of **20-40 square metres** is more suitable. Of course it also has to do with the arrangement of the person living there.*"

*"In the daily space, it would be better if people can **interact closely with nature**. This will relax the body and brain.*"

Psychologist E

Figure 23: Interviews with psychologists II(sketch by author)

Interview with students

*"I have a lot of **greenery** in my home because I love green plants and it makes me feel relaxed. I also like to have my work desk facing the window because I can **see the greenery outside** as well."*

*"There are a lot of walking paths on campus now so it allows for walking. It would be nice if the walking spaces were more interesting, like having some **benches** for people to sit down and relax after walking for a while. However, when it rains it's not a walking-friendly campus. There's no place to **hide from the rain** on the road.*

Student A

*"I don't like living alone, I get lonely. I have **two roommates** in my current flat and I am happy to live with them so we can talk together during the week."*

Student B

*I really **enjoy walking** and I do it a lot because it relieves my stress. Sometimes I switch to **running outside** which also helps my mood.*

*"For the current TU Delft campus, I don't think the walking environment is cozy enough, it might be better if we could walk in **more green parks** with **lots of trees** on the walking paths."*

Figure 24: Interviews with students in TU Delft I(sketch by author)

*"When I feel depressed I just like to be **home alone** and don't want to go out. Sitting on the sofa at home and **looking out of the window** is also a way for me to relax and relieve stress."*

*"Usually I also like to **spend time with my friends**, it's fun to chat or work together."*

*"I **love greenery** and I have a lot of it at home. I also like to **go for a walk in the park** and get some fresh air to relax my brain."*

*"I like to **live alone**, I live in a studio now. I live in the student housing on campus, but I don't think the school is a good place to **meet up with friends**, especially at weekends.*

*"The walking environment at the school is friendly, but it's just a bit **far from the supermarket**. I usually cycle to the supermarket in the city centre to buy groceries, because things in the one on campus is very expensive."*

*"I like **do sports** and I've got a membership at X, so I go there quite often. I always **walk** to there because it's close."*

*"I think the windows in my room are very important. I like **big windows** with plenty of **daylight** and a **beautiful view** out of the window."*

*"I like to study in a place where there are people to study with, such as a library or a place in a school building where I can study. My flat doesn't have a **group study room**, but it would be nice to have one so it's closer to my home."*

Figure 25: Interviews with students in TU Delft II(sketch by author)

Reflection of interview

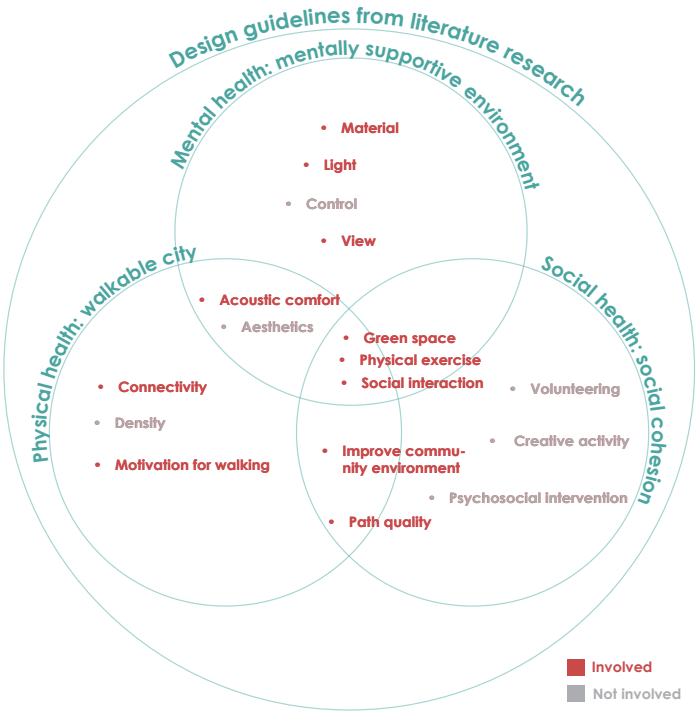


Figure 26: Involved factors in interview
based on literature research (illustrated by author)

Based on the three sections of the literature research and the factors, I have labelled the factors that were involved and not involved in interview on the diagram of guidelines from literature research. For the factors involved, the reflection of interview is as follows.

A. Interview with psychologists:

Physical health:

Psychologists have mentioned that exercise is an effective way to prevent and relieve depression. Of course, walking is also considered as a kind of exercise, and this is also the advice they would give to depressed patients. One of the psychologists also mentioned that if a depressed person thinks that walking out is too difficult, then they can start by setting small goals for themselves to walk out because it is easier to accomplish. For example, the first time he/she goes out for 5 minutes, the second time he/she goes out for 10 minutes, and so on, increasing the amount of time he/she goes out will help to alleviate depression.

Social health:

Psychologists mentioned the promotion of social interaction as an effective way of preventing depression. People who are depressed can easily isolate themselves, and at the same time getting out of their isolated space can be very difficult for them. But creating a friendly social environment with the support of friends and family will ease depression and reduce their loneliness and helplessness.

Mental health:

Getting people to interact with nature closely as an effective way to relieve stress. This includes in the possibility of arranging greenery indoors

and going outside into the natural environment. In terms of interior space,they mentioned that the size and arrangement of the room should not be too empty or crowded; sound needs to be taken into account as people need quiet space to rest, relax and sleep; daylight is also very important as a space that is too dark can be stressful; and the choice of materials used in indoor spaces, such as softer materials to make people feel more relaxed.

B. Interview with students:

Physical health:

In terms of physical health, most students agreed that walking is an effective way to alleviate depression. They also mentioned other physical activities such as going to the gym and running. The majority of people also felt that the TU Delft campus is a walking-friendly community, but there are some small problems. For example, the lack of shelter from the rain; the walking routes are not interesting enough; there is a lack of space to stop and rest; there is a lack of parks to wander, and so on.

Social health:

People relieve their depression in different ways because of the different personality of each person, some like to be with friends and some like to be alone at home. Both private and public spaces need to be taken into consideration. Private space is for people to feel undisturbed, for when they want to be by themselves individualy, while public space may be able to attract people to socialise, for when they want to interact with people. All of these can alleviate depression.

Mental health:

Most people talked about how nature, greenery, green spaces, and other related terms had a positive impact on their mental health. Of course a few people talked about all the other specific effects such as big windows with daylight, soft sofa or couch, etc. So nature as a key word is very important in alleviating depression and mentally supporting environment.

Combined interviews with psychologists and students, five factors have been updated based on the previous design guidelines.

1. Walking goals
2. Benches on the walkpath
3. Rain shelter
4. Ourdoor exercise
5. Big window

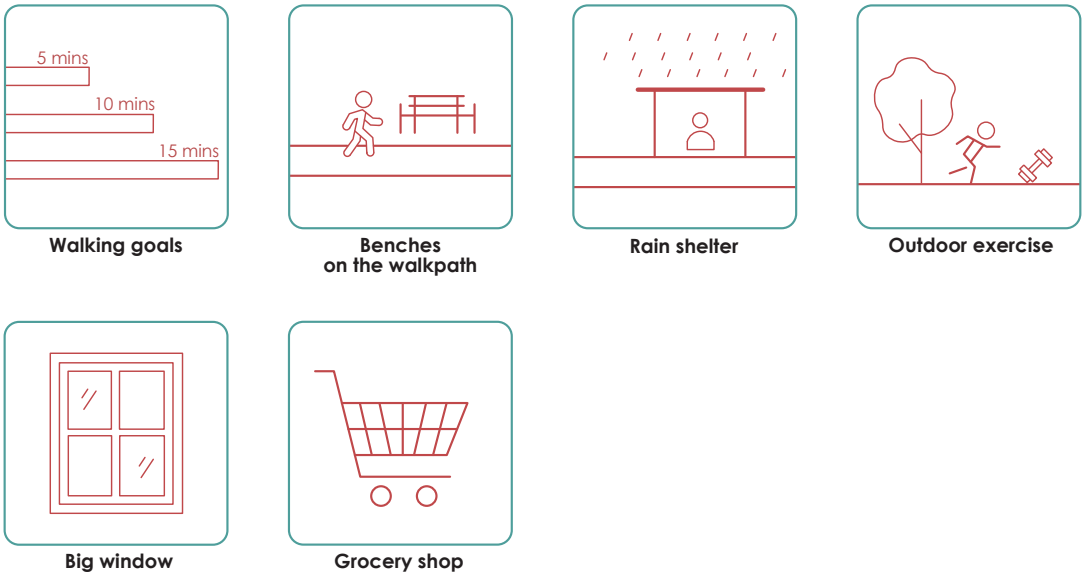


Figure 27: Visualization of design guidelines from interview (illustrated by author)

3.3 Conclusion for design guidelines

The design guidelines summarised in the fieldwork are specific design measures, so they are added to the second level of the two stars. Combining the literature research and the fieldwork, the design guidelines summarised so far are shown in Figure 28. (Note: In order not to overlap "physical exercise" and "outdoor exercise", based on literature research, "physical exercise" is updated to "walking".)

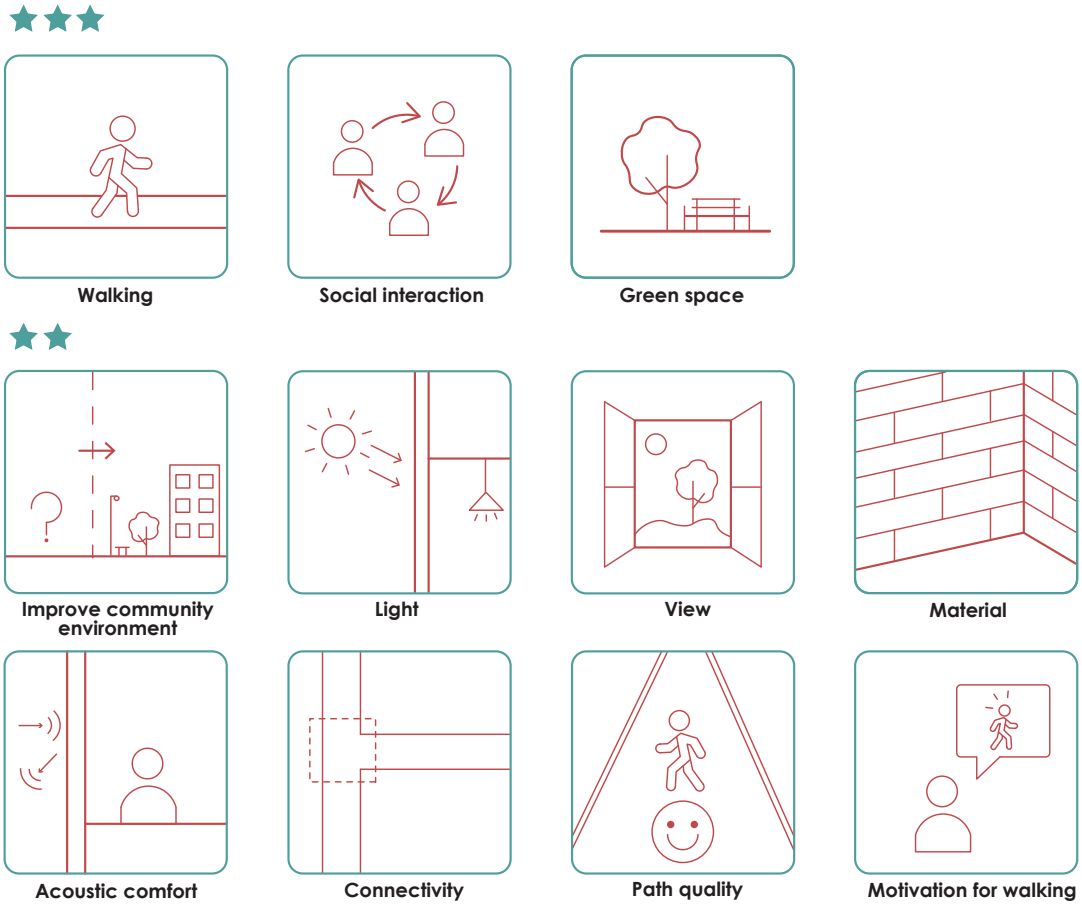


Figure 28: Visualization of design guidelines
from literature research and fieldwork(illustrated by author)

CHAPTER 4
CASE STUDIES

The case studies consisted of analysing two student residence cases, (**4.1 Grand Morillon Student Residence and 4.2 Student Experience Minervahaven**) and one urban design case (**4.3 Healthy Tracks**). The selection of the two scale cases was based on the previous hypothesis, which means the design guidelines summarised in this research will guide the design of the two scales (residence scale and campus scale). In addition, these three cases were chosen because they all consider the physical health, social health and mental health of the users, which is relevant to this research. The physical activity area, common area, green spaces, floorplan and typology are analysed in the two student housing cases. The walking system concept of urban scale is analysed in the urban design case. The design guidelines that were developed in the literature research used as the analysis criteria at the conclusion of each case study. Some factors are updated based on the original design guidlines according to the results of each case study.

4.1 Grand Morillon Student Residence

Kengo Kuma & Associates | 2021

Figure 29: Grand Morillon student residence/ Kengo Kuma & Associates (CCHE, 2021)

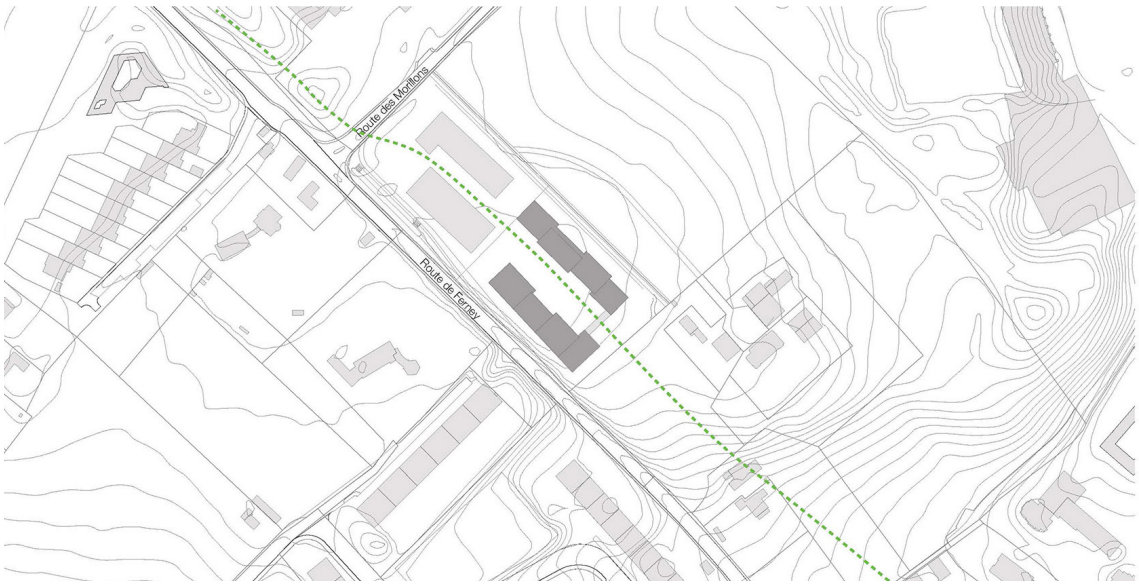


Figure 30: Site plan(Kengo Kuma & Associates, 2021)

Architect: Kengo Kuma & Associates
Location: Geneva, Switzerland
Year: 2021
Type: Student residence
Floor area: 24000m2
Residents: 680

Grand morillon student residence is a flat in Geneva, Switzerland. Kengo Kuma & Associates won this international competition as a design team. The building consists of two main blocks connected by a footbridge. The promenade is one of the special features of the building. The promenade runs throughout the building from the ground floor of one block to the roof of the other, which promotes walking activity for pedestrians. The function of the residence mainly contains around 680 beds and other common areas.

The reason why this residence is considered as a case study for this research is that the design takes into account the physical health, social health and mental health of university students.

Vertical walking path and interior circulation

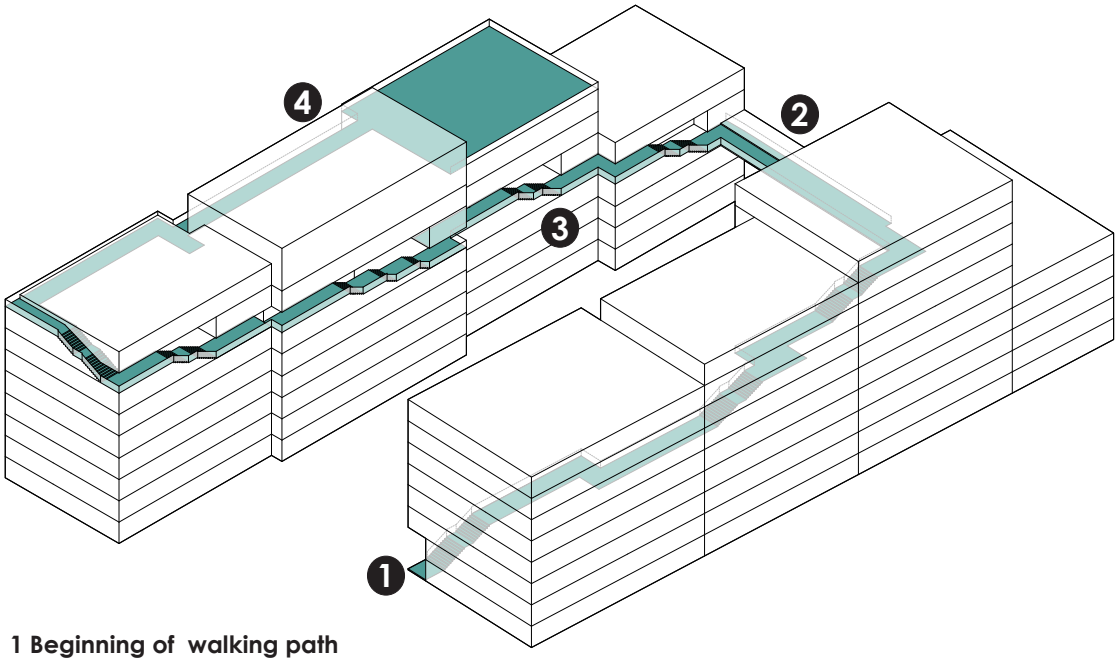
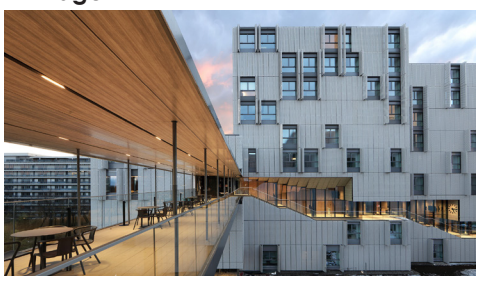


Figure 31: Vertical walking path (illustrated by author)

1 Beginning of walking path

2 Bridge



3 Walking path

4 Terrace

Figure 32: Photos (CCHE, 2021)

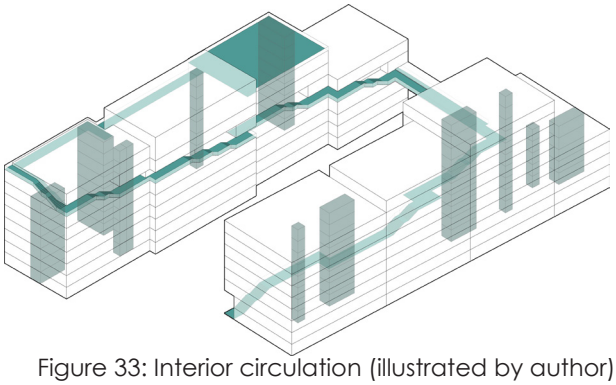


Figure 33: Interior circulation (illustrated by author)

The conventional vertical functional segregation of upper level apartments and ground floor public spaces, according to the architects, would result in a vertical functional segregation that would promote an undue dependence on internal elevator circulation (*Grand Morillon Student Residence / Kengo Kuma & Associates*, 2022). The architects broke the spatial layout of the drive and added a continuous rising promenade to the building (see Figure 32). People can reach each floor through the promenade, and the building still retains the internal lift and stair circulation (see Figure 33). The presence of the promenade makes walking more interesting than the lift circulation.

Common area

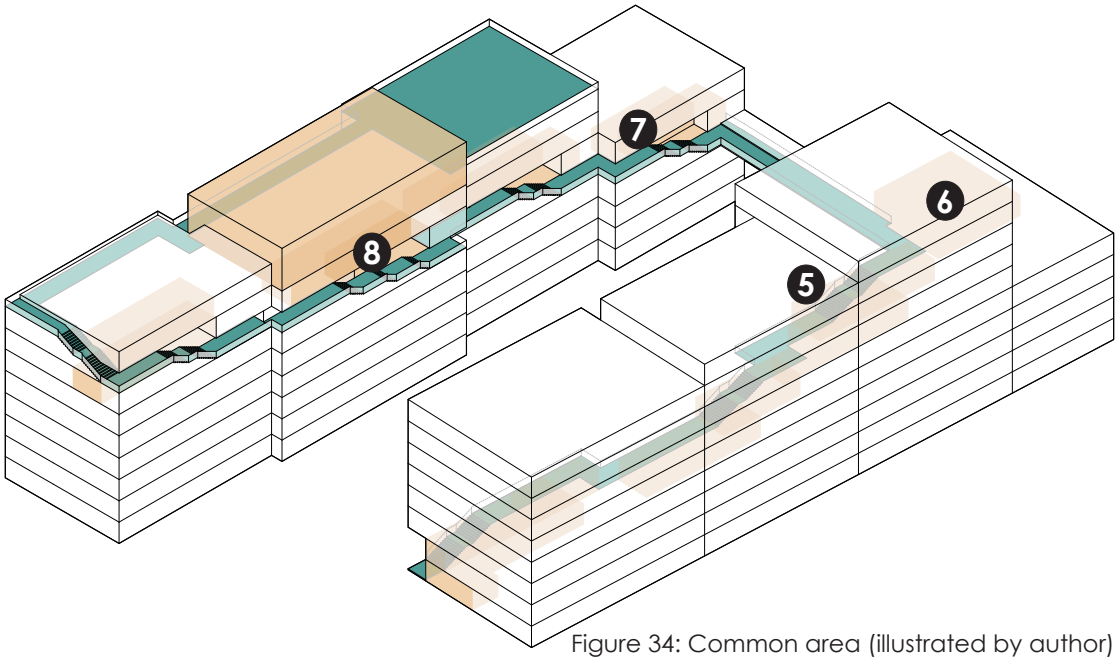
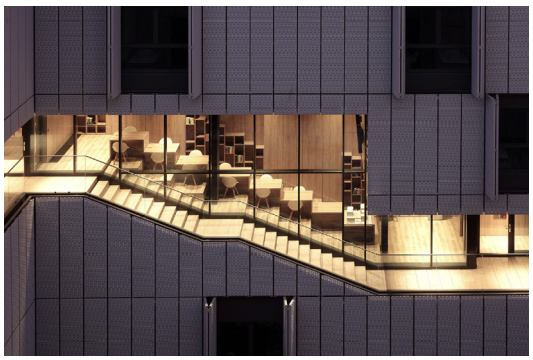


Figure 34: Common area (illustrated by author)

5 Library



6 Cafe

7 Student association

8 Recreation room

Figure 35: Photos (CCHE, 2021)

The spatial layout is to arrange all the common areas along the promenade (see Figure 34). The common areas in the building are arranged on each floor directly connected to the promenade. This spatial arrangement allows for common areas on each floor and promotes social interaction. overall, the common areas dominated by the promenade become the active part of the building. The public space is rich in functions, such as public kitchen, laundry, sports facilities, library, study area, cafeteria and so on (*Grand Morillon Student Residence / Kengo Kuma & Associates*, 2022). These functions meet the needs of university students in their daily life.

Green space

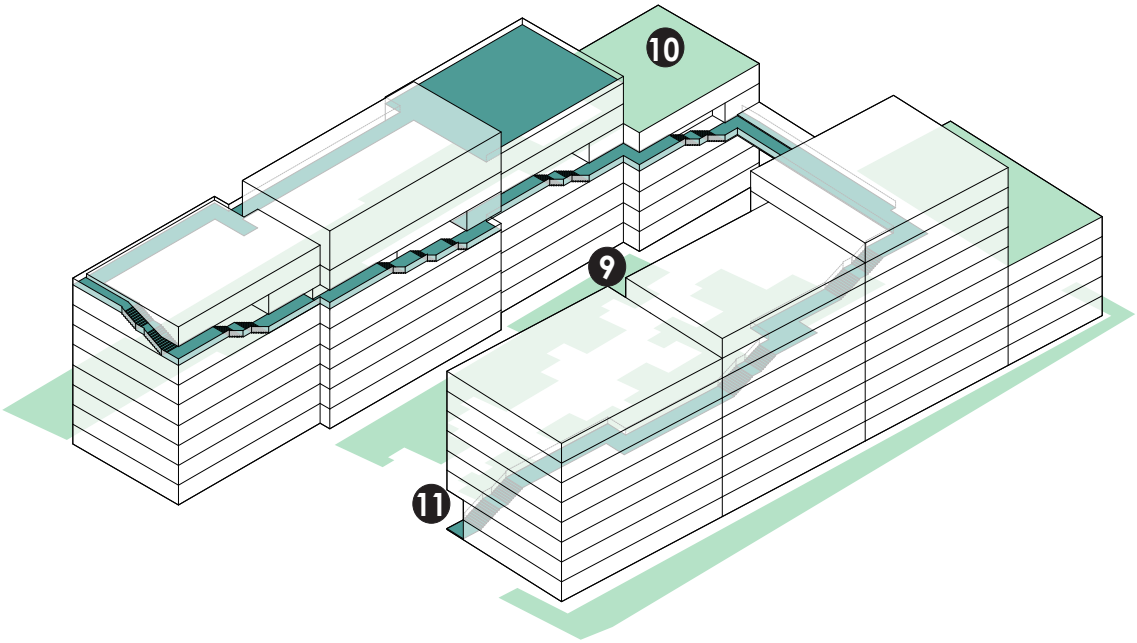


Figure 36: Green spaces (illustrated by author)

9 Ground green space

10 Ground green space

11 Green orchard

Figure 37: Photos (CCHE, 2021)

The green spaces (see Figure 36) are mainly distributed in the outdoor ground floor and rooftops, the green space of the ground floor is the geometrical form of greenery and paving around the building block, where people can take a walk or do leisure activities. The rooftops are the green orchards, which can be utilised for planting.

Typical floorplan and typology

Vertical walking path
Housing area
Shared kitchen
Common area
Interior circulation

Figure 38: 3rd floorplan (Adapted from Kengo Kuma & Associates by author)

Figure 39: Typology of housing (illustrated by author)

The promenade has direct access to each floor and the common area (see Figure 38). housing area is arranged in each block facing outwards, with a corridor in the middle connecting the rooms on both sides. There are five housing types (see Figure 39), Type A and B are individual studios, the difference between them is that B has a kitchen and A does not have a kitchen. However, there are shared kitchens on each floor near Type A. Type C is suitable for one or two people with one bedroom, Type D is suitable for two people sharing with two bedrooms, and Type E is suitable for three people sharing with three bedrooms. There are different types of rooms available depending on the student's personal preference.

Reflection of Grand Morillon student residence

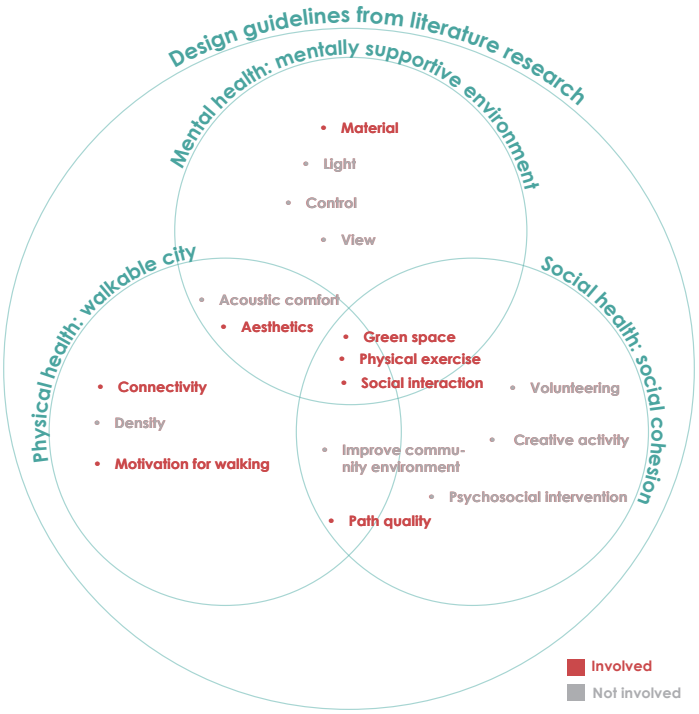


Figure 40: Involved factors in case study Grand Morillon student residence based on literature research (illustrated by author)

Based on the three sections of the literature research and the factors, I have labelled the factors that were involved and not involved in this case study on the diagram of guidelines from literature research. For the factors involved, the reflection of this case study is as follows.

Physical health:
The promenade, or vertical walking path, in this case is designed to promote physical health for the residents. For convenience, people can also choose to go directly to the stairs or lift inside the building. The promenade has been designed with aesthetics in mind and the scale is suitable for people to walk on. The architects used wood for the promenade and aluminium for the building façade. The visual contrast between the two materials emphasises the presence of the promenade.

At the same time the connection between the promenade and other public spaces promotes the usefulness and interest of the promenade and facilitates access to other housing areas or common areas on foot. In addition to walking, there is also a gym in the common area where people can participate in other sports activities.

Social health:
There are a variety of common areas to meet the needs of students in their daily lives. For example, students can study in the library or group study room, meet and chat with friends in the cafe, hold parties in the recreation room, etc. The common areas promotes social interaction between students. The arrangement of the common areas is dispersed on each floor along the rising direction of the promenade. They are centrally located within each floor to avoid disturbing other residents who need quiet and private space.

Mental health:
In this case, green space is considered so that the residents can be close to nature, such as the outdoor greenery and the green orchard on the roof. In terms of the use of materials, wood is used in the promenade and most of the indoor space. Wood is one of the natural materials that make people feel closer to nature and feel more relaxed.

Based on the above case study, seven factors have been updated based on the previous design guidelines.
1. Vertical walking path
2. Common area connects with walking path
3. Green roof
4. Shared kitchen
5. Recreation room
6. Cafe
7. Different housing types

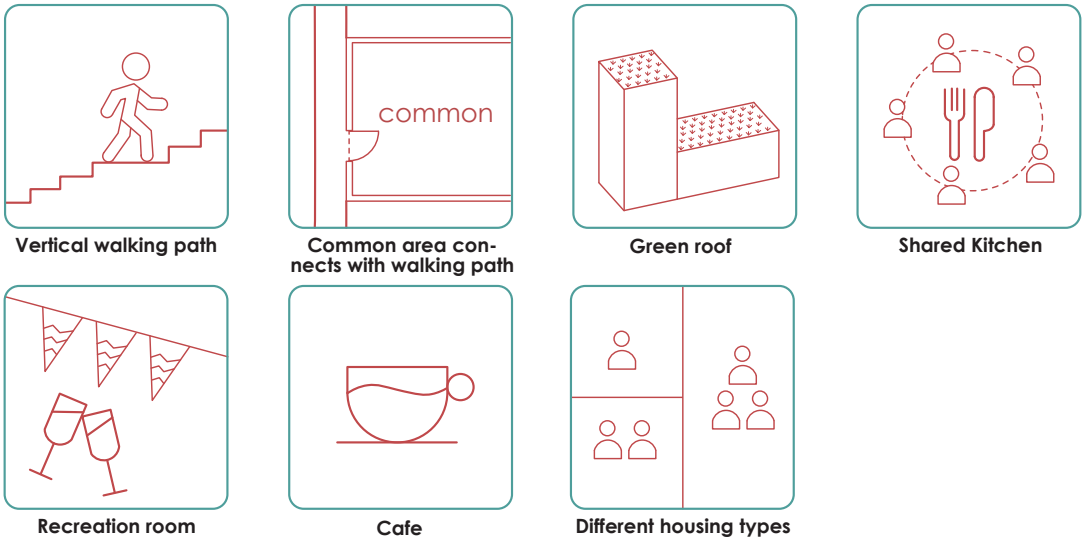


Figure 41: Visualization of design guidelines from case study Grand morillon student residence (illustrated by author)

4.2 Student Experience Minervahaven

VURB Architects | 2021

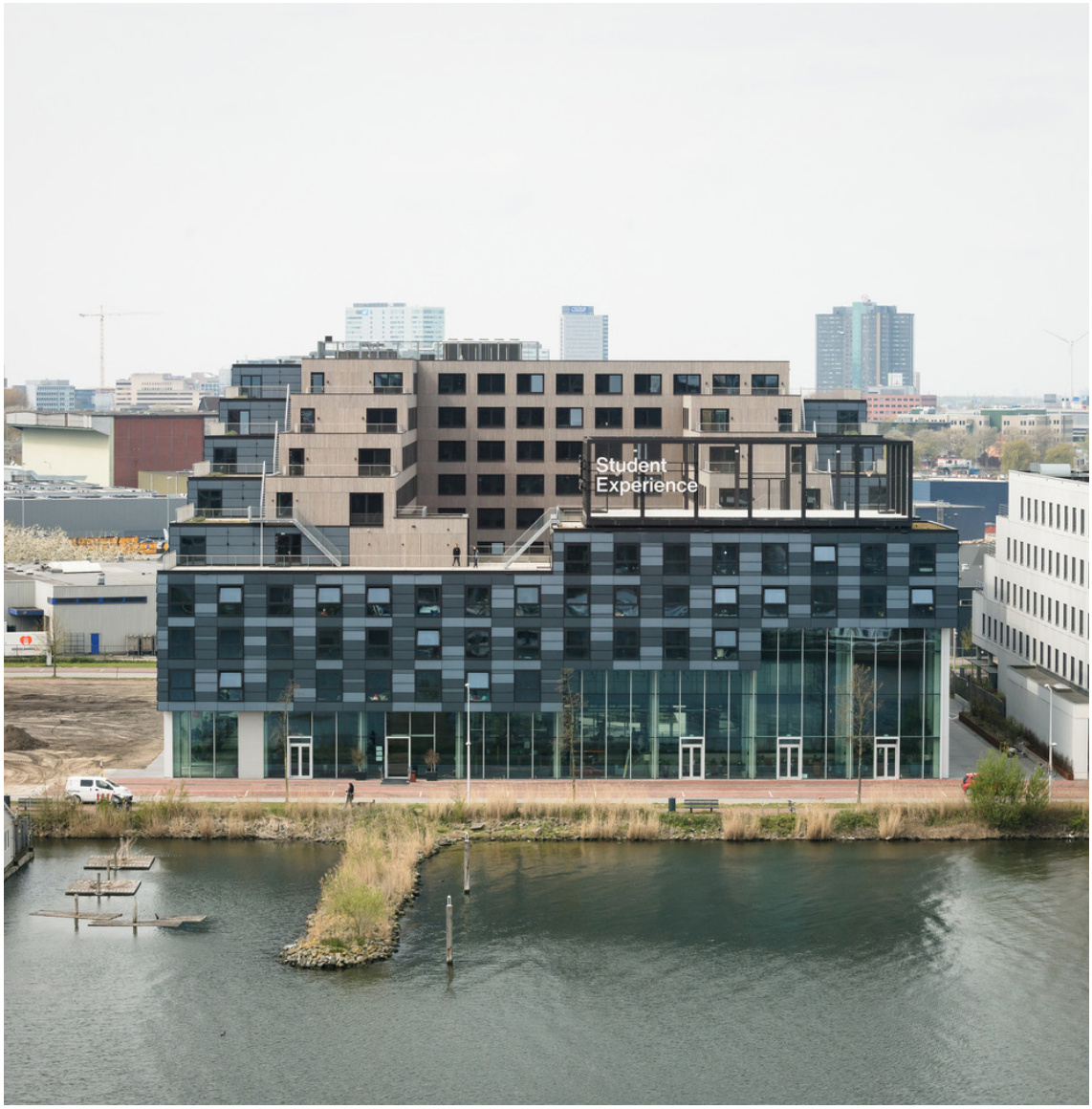


Figure 42: Student Experience Minervahaven/ VURB Architects (Bollaert, 2021)

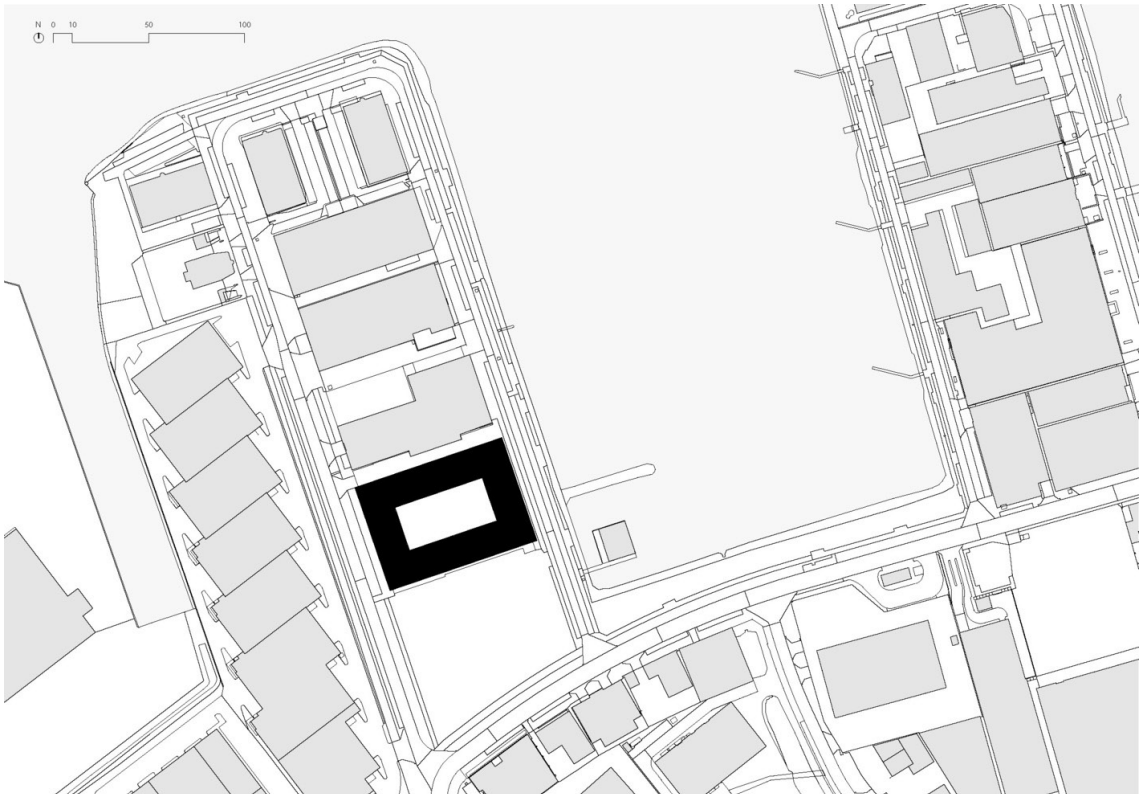


Figure 43: Site plan (VURB Architects, 2021)

Architect: VURB Architect
Location: Amsterdam, The Netherlands
Year: 2021
Type: Student residence
Floor area: 25000m2
Residents: 600

Student Experience Minervahaven (SEM) is a student residence in Amsterdam, the Netherlands. The owner of the building wanted to develop a building that would bring life to the area 24 hours a day, considering that the area is very lively during the day and very quiet at night. Therefore they planned to develop the building as an international student residence (VURB Architects, 2021).

The flats can accommodate approximately 600 students. The architects chosen a layered and open design. The lobby and ground floor are public spaces for all to use. The upper floors are residential spaces for the use of the residents (VURB Architects, 2021). On each floor in addition to the residential areas there are also common areas, including common terraces, rooftop footpath and basketball courts.

The reason why this residence is considered as a case study for this research is that the design takes into account the physical health, social health and mental health of university students.

Houing area & common area

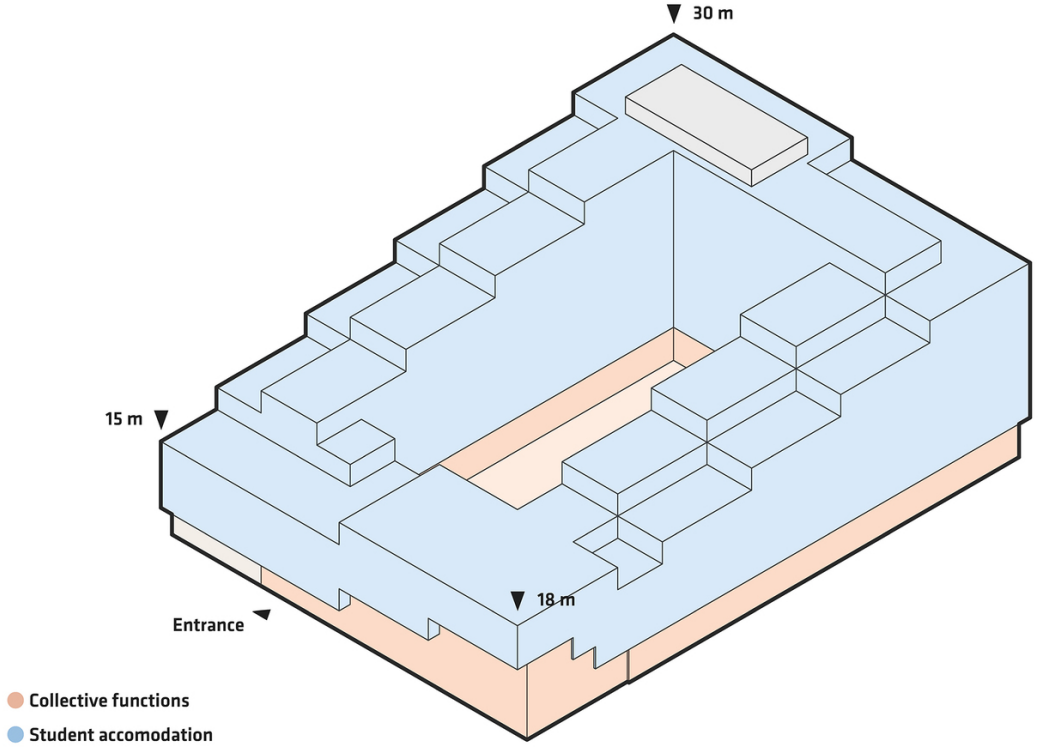


Figure 44: Program (VURB Architects, 2021)

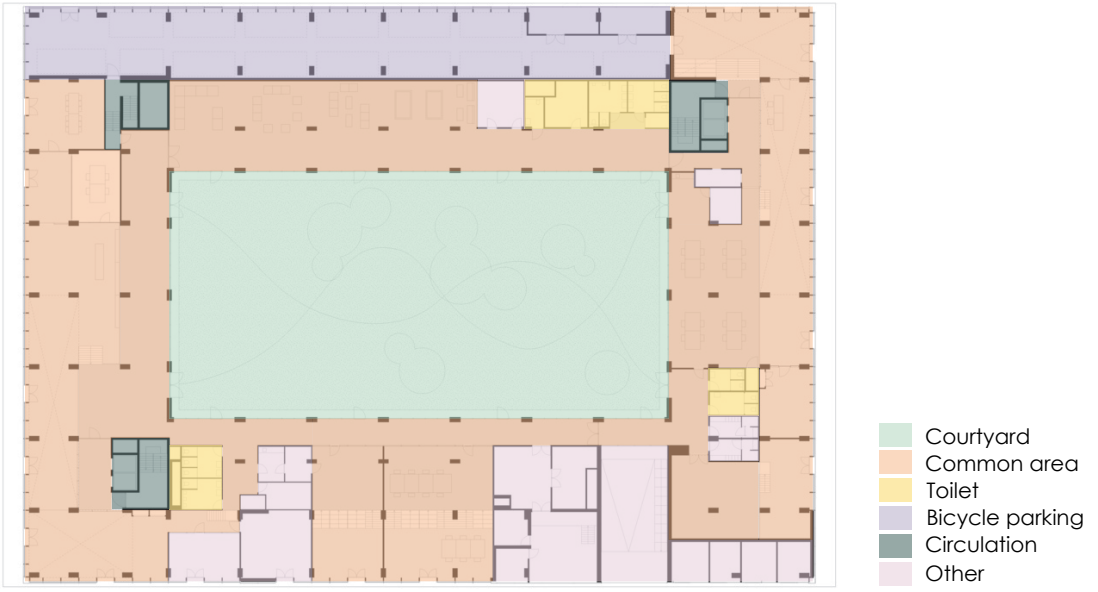


Figure 45: Ground floor plan (Adapted from VURB Architects by author)

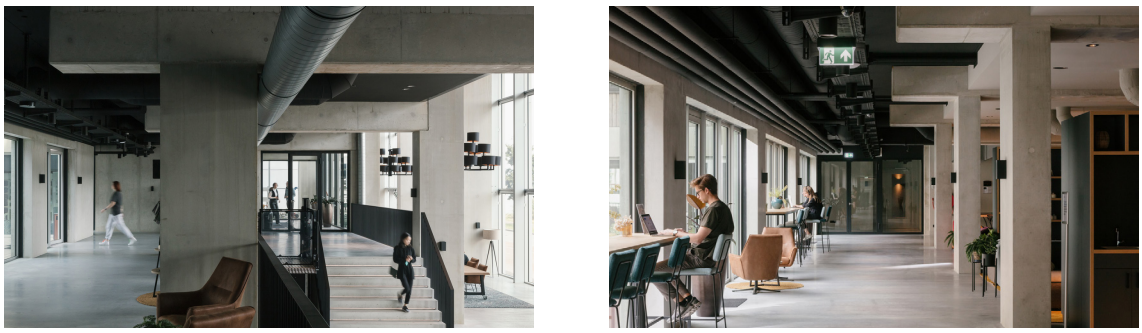


Figure 46: Photos of common area on ground floor(VURB Architects, 2021)

The building has a clear separation of functions, with public spaces on the ground floor and residential spaces on the upper floors (see Figure 44). Only internal lifts and staircases provide access to the residential floors, ensuring that the occupants of the upper floors are not inconvenienced. The ground floor common areas (see Figure 45), which include a restaurant, lounge, conference rooms, open study areas, bicycle parking, and an outdoor courtyard, are available for everyone to use (VURB Architects, 2021). There are very few walls dividing the wide general areas inside. In these areas, neighbours and residents can get together, work, study, and enjoy leisure (see Figure 46). The social interaction of the neighborhood's residents is encouraged by these public areas.

Physical activity area

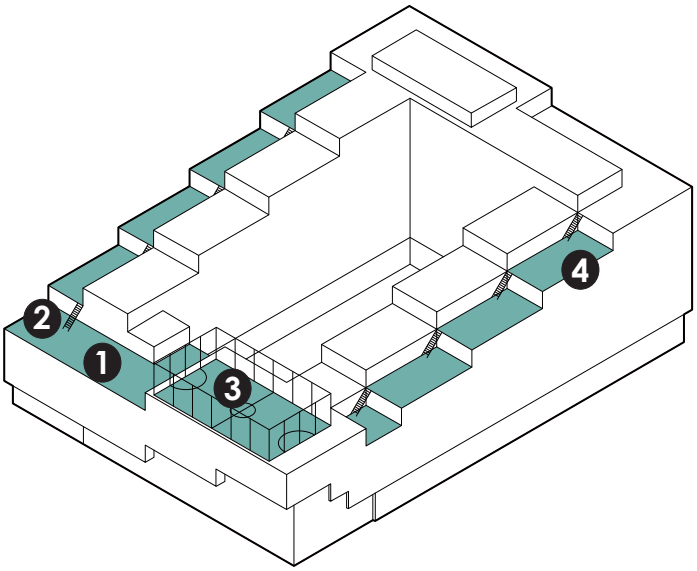
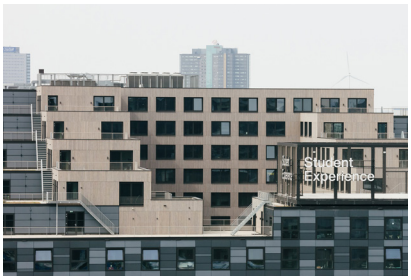


Figure 47: Physical activity area on the rooftops
(Adapted from VURB Architects by author)

Half of the building's rooftops are physical activity areas (see Figure 47). There is a rooftop terrace on each residential floor. A continuous rooftop footpath is created by stepping the roof terrace and combining it with the outdoor staircases. The design of the rooftop footpath not only promotes communication between residents on different floors, but also promotes walking activity. There is also an outdoor sport facility,a basketball court on the rooftop (see Figure 48) .

1 Overview of rooftops



2 Rooftop footpath

3 Sports facility

4 Common terrace on rooftop

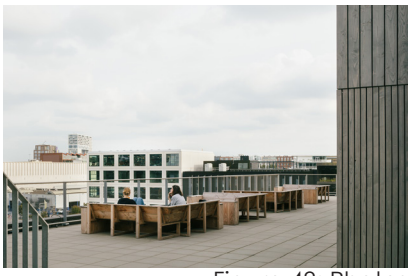


Figure 48: Photos
(VURB Architects, 2021)

Green space

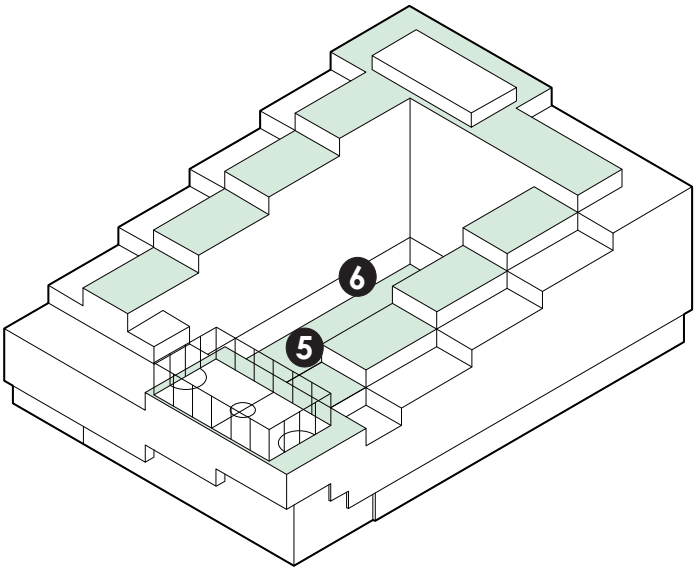


Figure 49: Green space (Adapted from VURB Architects by author)

5 Courtyard

6 Courtyard from indoor

Figure 50: Photos (VURB Architects, 2021)

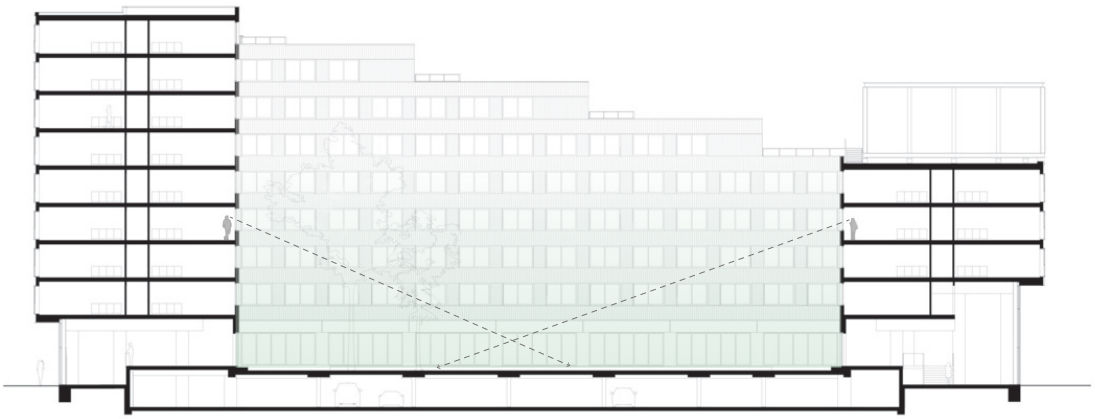


Figure 51: People's visual connection to the courtyard (Adapted from VURB Architects by author)

The other half of the rooftops of the building are the green spaces, which can be seen in the design drawings on each residential floor, in the same stepped form as the rooftop footpath (see Figure 49). Since the residence is new, the green terraces are not yet entirely realized. In addition, there is a green courtyard on the ground floor, located in the centre of the building (see Figure 50). It's an accessible public area where people can get close to to the plants while also enjoying a lovely view of the rooms that have windows facing the courtyard (see Figure 51), which improves the the residents' mental health.

Typical floorplan

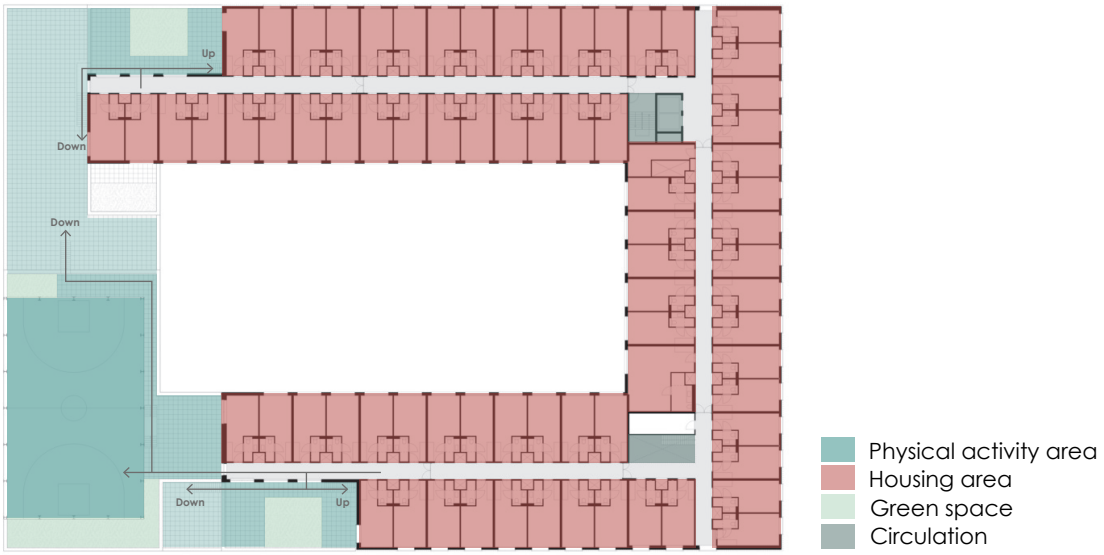


Figure 52: 5th floorplan (Adapted from VURB Architects by author)

For instance, in the fifth floorplan (see Figure 52), internal corridors connect the residential areas on each floor, which are arranged towards the courtyard and the exterior. Internal lifts and staircases provide access to the residential areas. The terrace on every floor is easily accessed from the corridors. There is an outdoor basketball court located on the fifth floor. Walking is possible on the terraces with the external staircases that connect each terraces.

Reflection of Student Experience Minervahaven

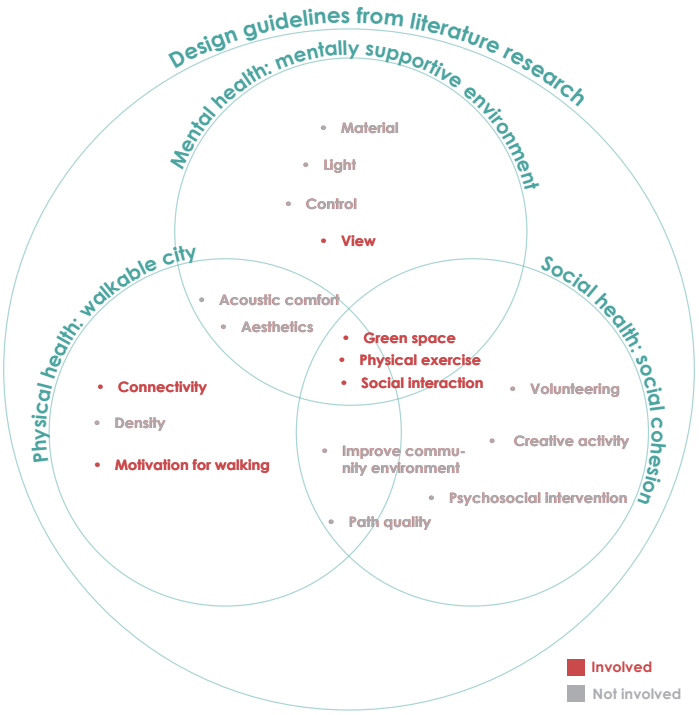


Figure 53: Involved factors in case study Grand Morillon student residence based on literature research (illustrated by author)

Based on the three sections of the literature research and the factors, I have labelled the factors that were involved and not involved in this case study on the diagram of guidelines from literature research. For the factors involved, the reflection of this case study is as follows.

Physical health:
To encourage residents' physical activity, a continuous rooftop footpath and sports facilities are built on the roof terraces. Residents can easily access the rooftop walkway and take a walk on terraces, which is directly connected to the housing area on every floor. Another way for people to exercise is on the roof, where there is an outdoor basketball court. People become more familiar with one another when they participate in physical activities.

Social health:
There are two types of public space in this case. The first type is the common area on the ground floor, which is open to everyone, including residents and neighbours, and where people carry out activities, such as studying and working together, chatting together or doing other group activities. The second type is the common area on the upper floors, which is open to residents and includes rooftop terraces and sports facilities. These common areas promotes social interaction between residents and neighbours and between residents.

Mental health:
The green space in this case includes green rooftops and a courtyard. The residents can be closed to nature in different spaces. The central

position of the courtyard also creates a visual connection between the residents and it. The green courtyard as a view of nature from the windows has a positive effect on the residents' mental health.

Based on the above case study, five factors have been updated based on the previous design guidelines.
1. Lounge
2. Open study space
3. Courtyard
4. Bicycle parking
5. Sports facility

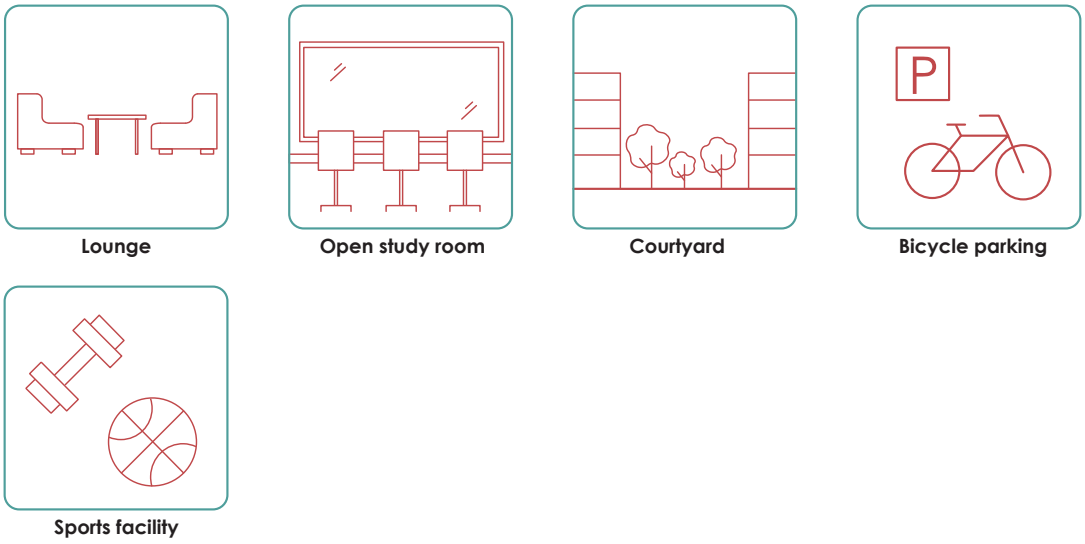


Figure 54: Visualization of design guidelines from case study Student Experience Minervahaven (illustrated by author)

4.3 Healthy Tracks

Felixx | 2018-2019

Figure 55: Healthy tracks/ Felixx (Felixx, 2019)

Figure 56: Master plan of the multi-loop (Felixx, 2019)

Architect: Felixx
Location: Amsterdam, The Netherlands
Year: 2018-2019
Type: Research by design for the Amsterdam Zuidoost railway

Healthy Tracks is a research project for the amsterdam zuidoost railyway area. For this case, the team of architects from Felixx believes that disease prevention should be considered in urban planning and that urban life should make a positive contribution (Felixx, 2019). Using the features of the current urban structure, the architects in the project simulated a healthy multi-loop space and constructed linear green spaces around the railway region.

The reason why this urban project is considered as a case study for this research is that the design concept of linear structure and the multi-loop spatial model for disease prevention inspired this research and design.

Concept: the linear structure

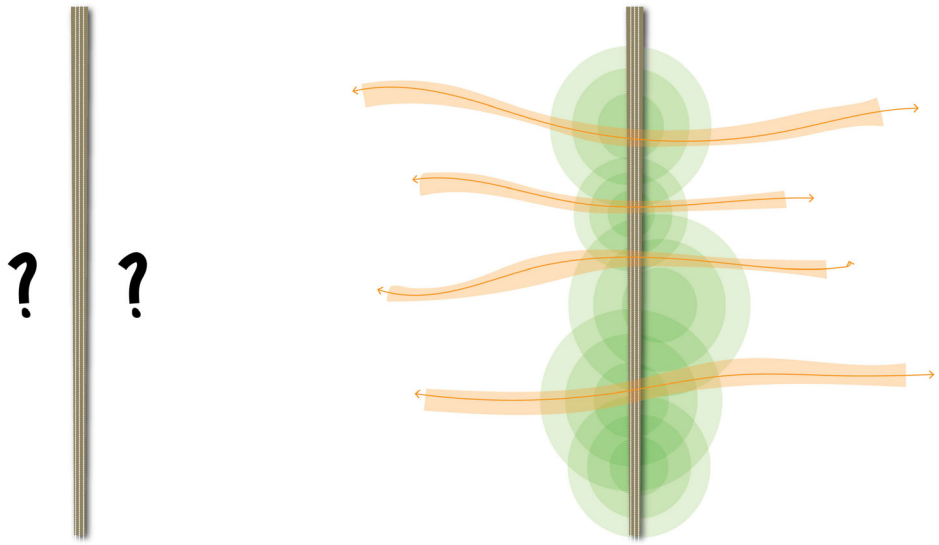


Figure 57: Concept (Felixx, 2019)

The railway line separating Bullewijk and Amstel III districts of Amsterdam Zuidoost. The area is characterised by the presence of railroads, and the municipality hopes to develop appealing urban areas between the two sides (Felixx, 2019). The architect's proposal is to increase the spatial connection between the two areas by creating a linear green urban space on the axis of the railway and spreading the green space to the two areas divided by the railway (see Figure 57). Furthermore, the development of a multi-loop structure with several themes linked to the axis in the neighborhood encourages people to engage in other sports like cycling, walking, and other activities that could make the area healthier.

Active loop

Figure 58: Active Loop (Felixx, 2019)

In order to encourage everyday physical exercise, the Active Loop suggests building a double sports track (Felixx, 2019). The entire active loop is a collective sports area that offers diverse physical activities. For example, running on the active loop, working out outside, playing ball games, etc (see Figure 58).

Fun loop

Figure 59: Fun Loop (Felixx, 2019)

The Fun Loop arranges a healthy and secure excursion for kids (Felixx, 2019). Interesting children by placing spatial nodes of interest to them along the railway axis (see Figure 59).

Eco-loop

Figure 60: Eco-Loop (Felixx, 2019)

The 17 km of recreational and ecological routes proposed by the eco-loop would link the local wildlife with the landscape(Felixx, 2019). The eco-loop is not only an ecological framework but also a green leisure framework. It allows people to be more in touch with natural elements and the environment (see Figure 60).

Reflection of Healthy Tracks

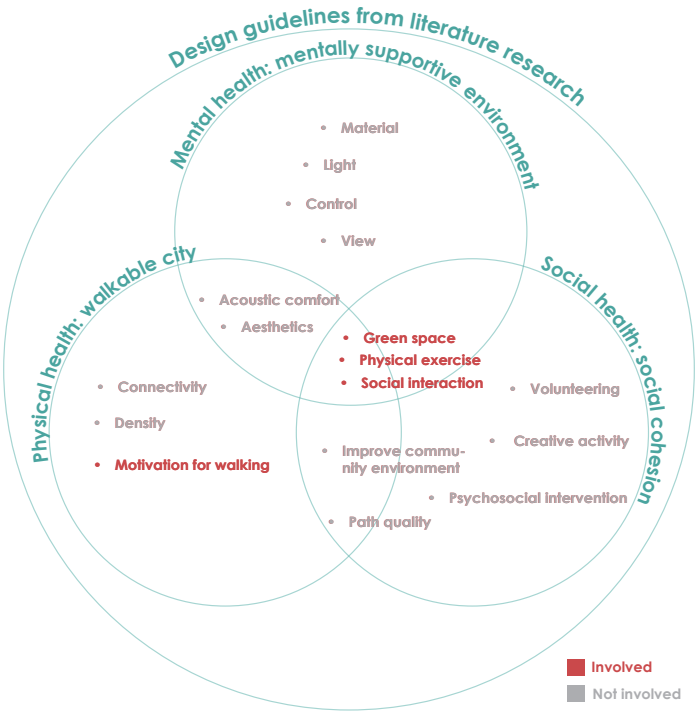


Figure 61: Involved factors in case study Healthy Tracks based on literature research (illustrated by author)

Based on the three sections of the literature research and the factors, I have labelled the factors that were involved and not involved in this case study on the diagram of guidelines from literature research. For the factors involved, the reflection of this case study is as follows.

Physical health:
The case promotes people's physical health by modelling healthy multi-loop with different themes. Each theme in the multi-loop promotes people walking in the urban space with different purposes. In the active loop, the theme of physical activity promotes not only linear activities such as walking, cycling, and outdoor running, but also other physical activities at nodes along the loop route.

Social health:
The fun loop in this case is a healthy track that engages children by setting up activity nodes of interest to them. The concept of this loop can be used to inspire the design guidelines of this research, which is to promote social health by setting up activity nodes of interest to university students to gather in these urban spaces.

Mental health:
The eco-loop is a huge system. It connects the green parks of the area with green paths and combines the biodiversity of the area to create green and recreational routes. People can interact with the natural environment while walking or cycling, whick is positive for their mental health.

Based on the above case study, five factors have been updated based on the previous design guidelines.

1. Linear axis
2. Active loop
3. Fun loop
4. Green loop

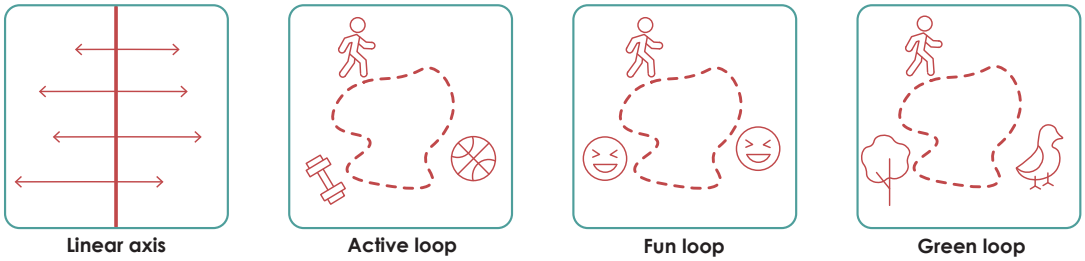
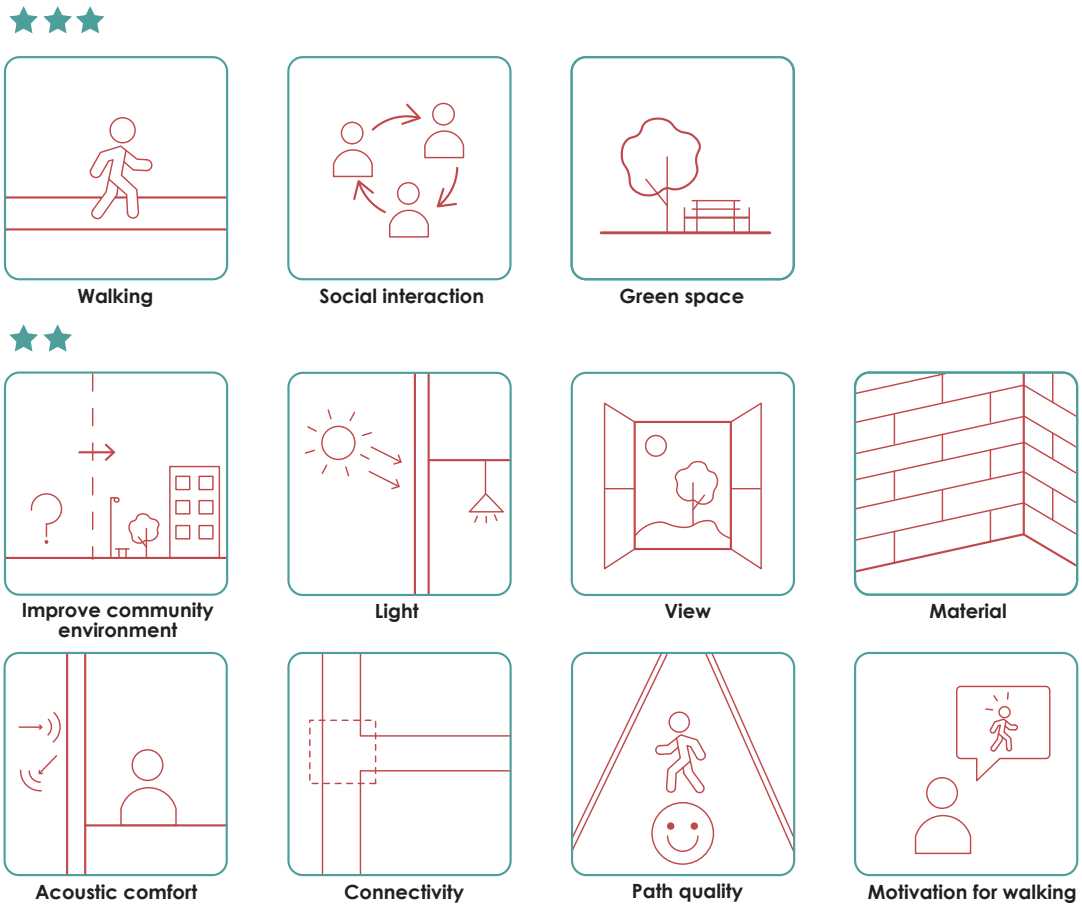
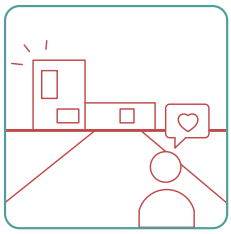


Figure 62: Visualization of design guidelines from case study Healthy tracks (illustrated by author)

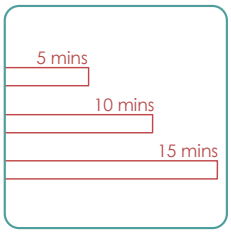
4.3 Conclusion for design guidelines

The design guidelines summarised in the case studies are specific design measures, so they are added to the second level of the two stars. Combining the literature research and the fieldwork, the design guidelines summarised so far are shown in Figure 63.

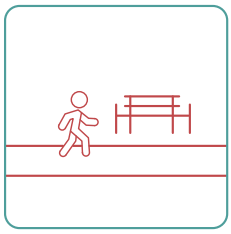




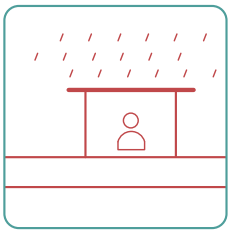
Aesthetics



Walking goals

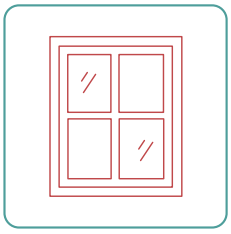


Benches
on the walkpath



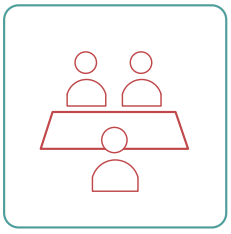
Rain shelter

Outdoor exercise

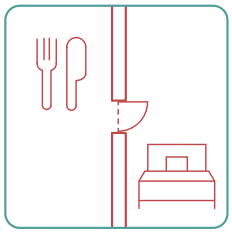


Big window

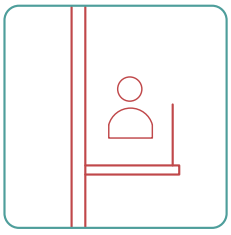
Grocery shop



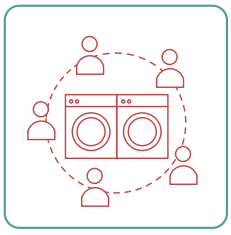
Group study room



Separation of
kitchen and bedroom

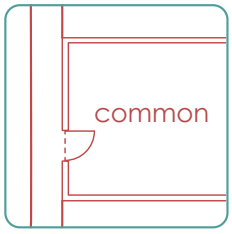


Private balcony

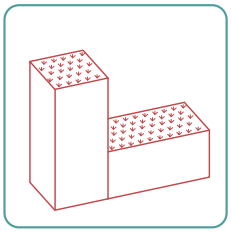


Shared laundry

Vertical walking path



Common area con-
nects with walking path

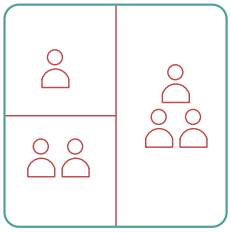


Green roof

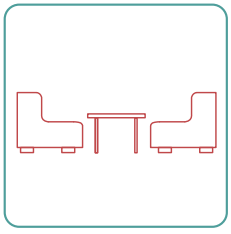
Shared Kitchen

Recreation room

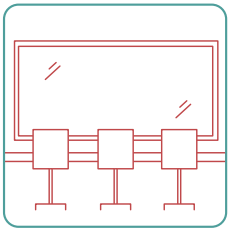
Cafe



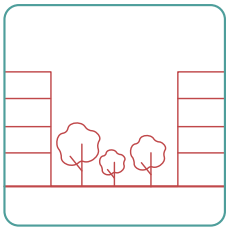
Different housing types



Lounge

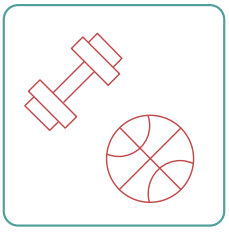


Open study room

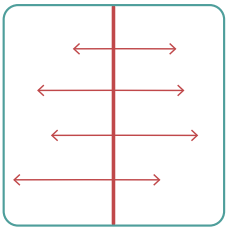


Courtyard

Bicycle parking



Sports facility



Linear axis

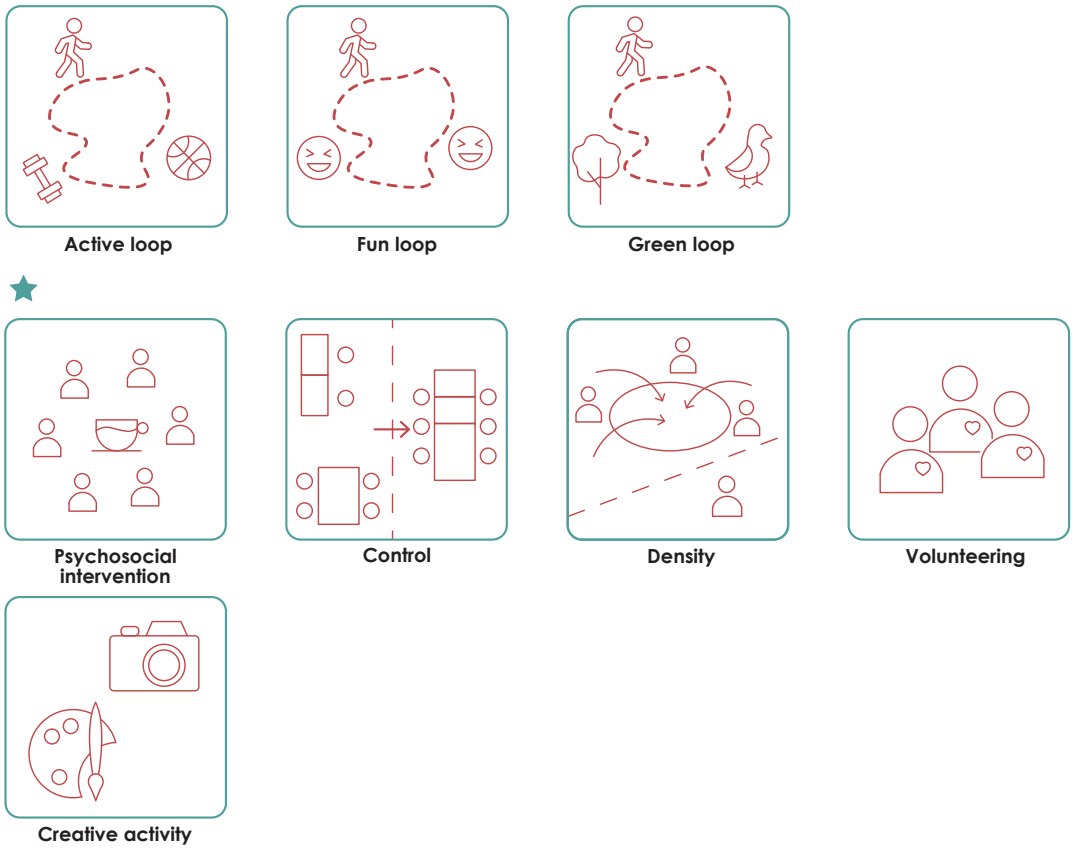


Figure 63: Visualization of design guidelines
from literature research, fieldwork and case studies(illustrated by author)

CHAPTER 5
CONCLUSION

5.1 Conclusion

Depression among university students is a serious problem. University students may experience depression for a variety of reasons, including competition, study pressure, relationships, and so on. Treating depression is a difficult and prolonged process. Therefore, prevention of depression is better than cure for depression. While architecture cannot directly prevent mental diseases as may be done in the medical profession, it can have a positive impact on preventing depression by providing a healthy architectural environment to encourage healthy lifestyle among university students.

This thesis focuses on how to create a healthy campus life for university students through campus design and living environment design, so as to achieve the purpose of supporting to prevent university students' depression. The methodology of the study mainly includes literature research, fieldwork (including observation and interview) and case studies.

In the first step of the research, literatures on physical, social and mental health are studied, while preliminary design guidelines are summarised from this process. The preliminary design guidelines are used as analysis criteria to guide the analysis of the parts involved in the fieldwork and case studies, and on this basis new design guidelines are generated step by step.

Secondly, in the fieldwork, observations are done on the student residences on the TU Delft campus and random interviews are conducted with TU Delft students. New design guidelines are updated including the factors of existing student residence that promote the three aspects of health and wellness of users from observations and factors about students' preferences and needs from interviews.

Finally, in the case studies, two student residence cases and one urban

design case related to the research theme are selected for analysis. Design concepts, spatial layout, functional settings, etc. are learnt from this process, which several new design guidelines are added based on the previous research.

Over all, through the above research process, the design guidelines related to the research topic are summarized and would to guide the design.

In this thesis, the main research question to be addressed is "**What architectural and built environment features of residential environment on a university campus can have a positive impact on depression prevention of university students?**" In addition, the following four sub-research questions are examined to obtain specific answers and details.
1. What architectural and built environment features are there?
2. What is the residential environment on a university campus for university students?
3. Which depression prevention strategies can be used to architecture and built environment?
4. What are the design elements of mentally supportive environment that can be learnt from current urban/campus planning and student residence project?

The answers to these sub-questions are as follows.

1. What architectural and built environment features are there?

According to research, creating a healthy environment is beneficial in encouraging university students to establish healthy lifestyles, which can help prevent depression. Physical, social, and mental health are the three aspects of healthy environment, and they are interrelated. Specific criteria are included in each aspect and are described in the design guidelines. The guidelines on Level 1 (three stars) and level 2 (two stars) that can be realized through the architectural and built environment. The guidelines on Level 3 (one star) guidelines are those that are more related to user activities in addition to the built environment, which can be realised under ideal situations.

2. What is the residential environment on a university campus for university students?

For university students who live in the student residence on campus, they spend most of their daily time hours on campus. Therefore, the campus space and residential environment are worth to research and design for them. On campus scale, students engage not just in academic pursuits but also in recreational activities, exercise, and social interactions. Consequently, it is crucial to recognize and improve the comprehensive, engaging, and vibrant characteristics of the campus environment to encourage students to utilize and enjoy the campus space greatly. On residential environment scale, the student residence, as an integral component of the campus, serves an independent and interconnected role within the campus environment. The function of student residence is comprehensive, encompassing not only housing aspects but also

addressing various daily requirements of students, including physical exercise, recreation, and social interactions.

3. Which depression prevention strategies can be used to architecture and built environment?

Through research, the main strategies for preventing depression are participating in physical activities, promoting social activities and having more interaction with nature. They correspond to the three health aspects of physical, social, and mental health and guide the function and characteristics of architectural features. Participation in physical activities includes walking, outdoor exercise, and sports facilities. Promoting social activities means providing common areas, such as group study room, shared kitchen, shared laundry, recreation room, etc. Having more interaction with nature by setting up courtyards, green roofs and so on. Of course, these strategies are mutually reinforcing. For example, socialising can be done while participating in group sports activities, and sports and socialising can be done in natural environments while being in contact with nature, and so on.

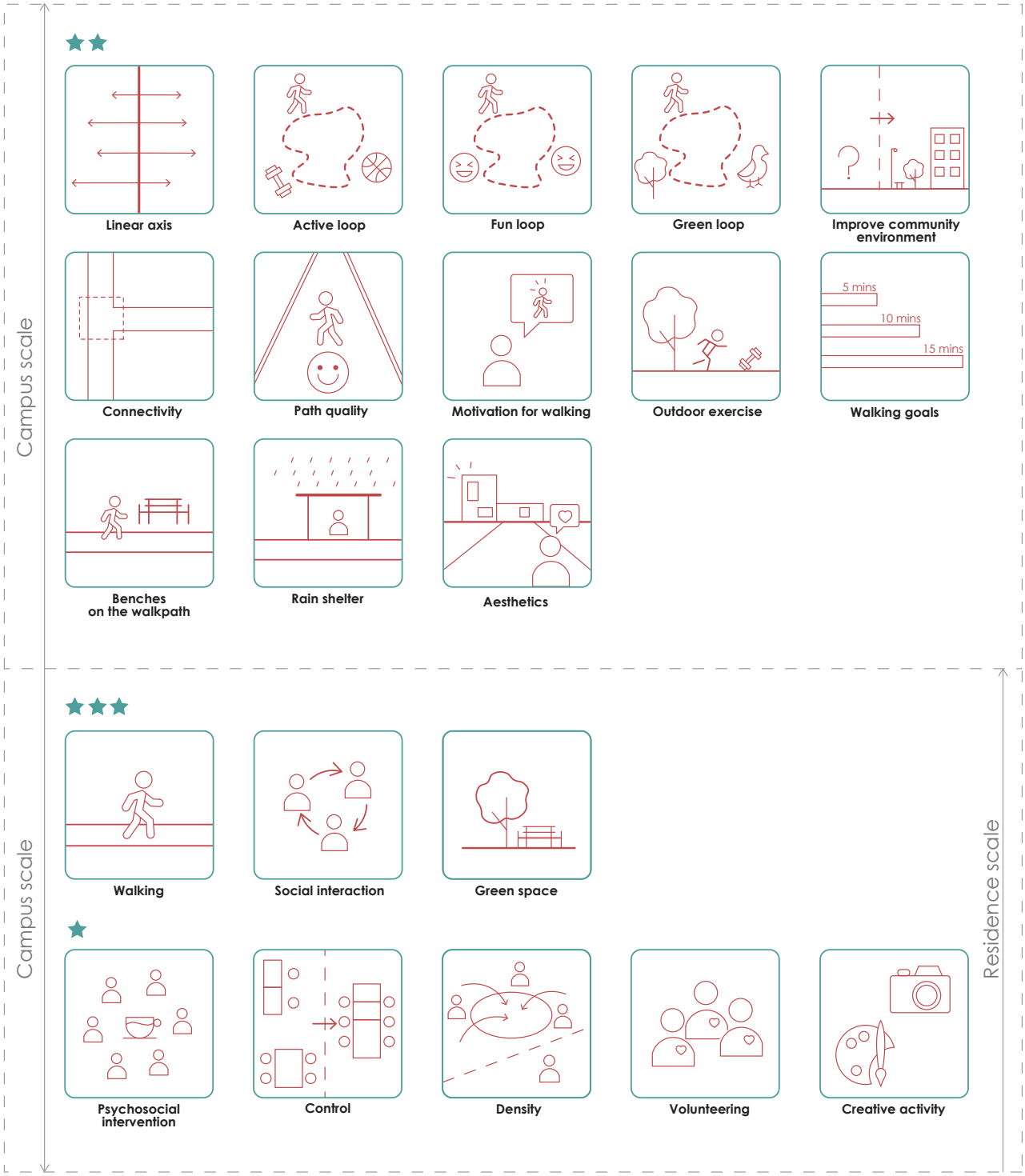
4. What are the design elements of mentally supportive environment that can be learnt from current urban/campus planning and student residence project?

The answer to this question mainly comes from the case studies process. From the urban design case, it is discovered that physical activities and social activities and interaction with nature are promoted by creating walking loops with different themes (including sports, fun and green loop). From the student residence cases, it is learnt that physical, social and mental health can be promoted through the creation of vertical walking path at the architectural scale connecting common areas and green spaces. These design elements contribute to a mentally supportive environment.

In conclusion, building a healthy environment for university students in terms of physical, social and mental health by designing residential environment on campus can support depression prevention for them.

5.2 Design guidelines summary

Based on the research, the design guidelines were divided into campus scale and residence scale.



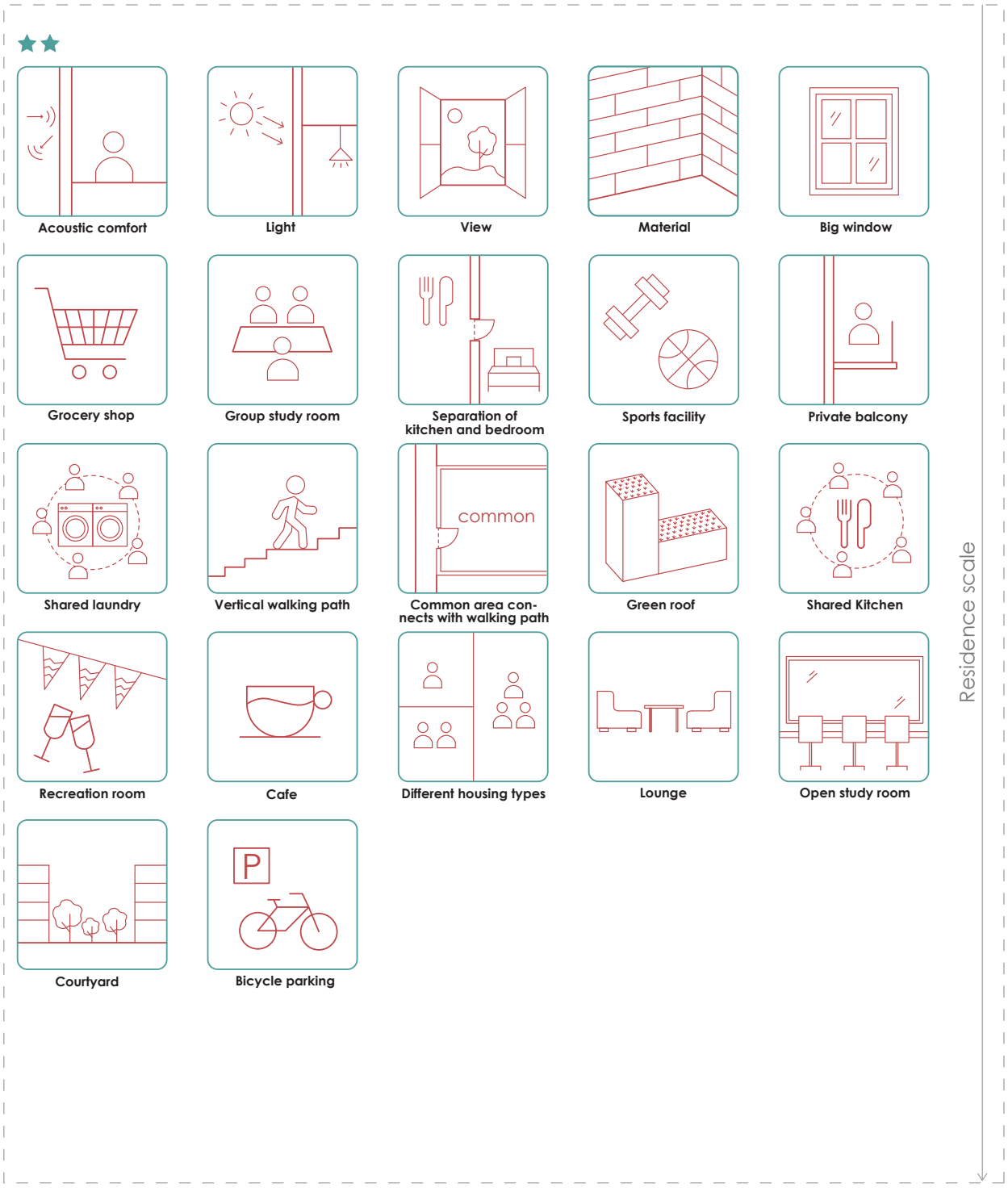


Figure 64: Design guidelines summary(illustrated by author)

5.3 Reflection

In general, I am happy with this research. From the initial discovery of the depression problem among university students, to structuring the framework, to completing this research through the research methods. I am very pleased with the three aspects of physical, social, and mental health to explore and promote a healthy lifestyle for university students. Supporting depression prevention through healthy lifestyles is also an idea that deserves attention and development. Of course, these three aspects can be realised not only in the group of university students, but also in other population's lifestyles which are worth thinking about.

Depression among university students is a serious problem in a global context. Currently, research related to emotional problems has been focused on medical buildings, and limited research has been conducted on daily living environments. In the current research context, this research combines psychological, social, and architectural measures to support the prevention of depression through architectural environments. It is hypothesized that the built environment can be used to promote healthy lifestyles in terms of physical, social, and mental health among university students, and thus to prevent depression. Students can gain happiness and enjoy their campus life in the campus and living environment. This research, as a tiny piece of a huge research framework, may not guarantee the complete prevention of depression, but it has the potential to provide a possible research direction for subsequent studies that consider healthy lifestyles in the context of three different aspects of physical, social, and mental health.

The whole research process is very impressive and memorable for me. For me, it is my first experience of pushing the design entirely from the research. Each step of the research advancement was very difficult for me, but also very surprising. It was difficult because the early stages of the research involved constantly searching for and learning new knowledge and organising them into the research framework to guide the research.

I was pleasantly surprised because I learnt a lot of new knowledge about architecture and psychology through the research and slowly advanced the research step by step.

I am very appreciated for this research process that has taught me a lot, both about research and about life. While this research report only go so far, research is always on the way in the future.

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APPENDIX

Friday, October 13th, 2023
A TALK WITH PSYCHOLOGIST A

1. How commonly do you deal with people who are depressed?
· Lighter depression- treat here with 4 or 5 appointment- multiple therapy, such as: emotional focus therapy, and so on.
· More serious depression- suggest them to GP, longer therapy 5 to 10 appointment and even more.

2. What do I do if I'm worried about my mental health?
· Be more active- everyday go walking outside- exercise is good.
· Mainly in the winter- go a lot outside.
· If you feel sadder and don't like go out or go to friends- you have to change it. Try to go friends' house, go out, try to not be isolated
· First step is going outside, make small goals: 5mins-10mins-15mins and more, not too big goal.

3. What do you think an ideal environment is like to alleviate their mental condition?
· This is not really good room.
· Peaceful, not too bright color
· Better seat- maybe not table and chair, you can seat anywhere and more comfortable.
· Daylight is important.

4. Where do depressed patients tend to spend most of their time?
· Stay at home, get isolated.

5. What do depressed patients usually do in their time?
· Do nothing, just stay at home.

6.What are the main causes of depression among students at TU Delft?
· Perfection is a big problem, high expectation/ standard, want to do really good.
· Pressure of studies

7.Does TU Delft have established measures aimed at preventing student depression? If so, could you kindly share details about these specific measures?
· There are multiple projects for that, I have to ask my colleagues about if we have any documents for that, and I can send to you.
· Prevention psychologist- if someone feels stressed/sad- mood not change- high stress- good point to come here- it will help them to not be real depression.
· Suggest them to go to the grouP talk with others.

Thursday, November 16th, 2023
A TALK WITH PSYCHOLOGIST B

1. What do you think an ideal environment is like to alleviate depression?
· Whether it's the living space or the healing space, the ideal environment must feel like home. Because the feeling of home relaxes people.
· The atmosphere of home can be constructed through furniture or decorations. For example, soft sofas, soft pillows, green plants, mild colors, not too bright, etc.

2. What role does the layout, organization, and flow of living spaces play in promoting positive psychological outcomes?
· I don't think the layout of the space should be too crowded because crowded spaces make people feel oppressed.
· But it should not be too empty either, empty space makes people feel nervous.

3. Are there specific natural features that are particularly effective in promoting concentration, focus, and productivity in a student's living environment?
· I think it needs to be separate and private, with as little intrusion from other people or the outside world as possible.

4. What activities do you think can prevent or alleviate depression? For example, is walking one of them?
· Yes, walking could be helpful.
· But I think talking or confiding is more important for depressed people.

5. Do you have established measures aimed at preventing student depression? If so, could you kindly share details about these specific measures?
· Psychoeducation. Let people learn to motivate themselves and learn to identify themselves.

Friday, November 17th, 2023
A TALK WITH PSYCHOLOGIST C

1. What do you think an ideal environment is like to alleviate depression?
· Supportive Social Space. The support of friends can give patients emotional comfort and understanding and reduce feelings of loneliness and emotional stress.
· Stable family living environment, warm understanding and supportive families can provide patients with a sense of security and stable emotional knowledge.
· Creating a positive environment. This includes changing the living space that you are in at this stage of your life that is keeping you down (maybe small, dirty), surrounding yourself with positive people and things, and reducing negative and stressful factors, including spending time with positive friends, engaging in favorite activities and developing an optimistic mindset.

2. What role does the layout, organization, and flow of living spaces play in promoting positive psychological outcomes?
· All of this affects psychological outcomes. For example: a small, cramped room can be depressing and uncomfortable, while a spacious, open space can be relaxing and enjoyable.

3. Are there specific natural features that are particularly effective in promoting concentration, focus, and productivity in a student's living environment?
· Of course, putting a dead tree at a classroom would have a very different effect than putting a flower in full bloom. If it were possible, I think every classroom should have the beautiful plant, which would give the students an immediate and pleasurable emotional experience.

4. What activities do you think can prevent or alleviate depression? For example, is walking one of them?
· Exercise can improve your mood, so it is recommended to keep exercising every day.
· Lack of sleep can negatively affect your mood, making you feel tired and irritable. Try going to bed at the same time every night and getting at least 7 hours of sleep (8 hours is even better). If you struggle to sleep, try staying away from screens such as mobile phones and computers for at least an hour before bedtime, and do some simple relaxation programs to help you prepare for sleep.
· Increase socializing as much as you can. Don't spend all your time on your own. Being open and talking to others can make you feel better about yourself and others. Call a friend or family member, or find a group you feel comfortable sharing with.

5. Do you have established measures aimed at preventing student depression? If so, could you kindly share details about these specific measures?
· Regular psychological test. Through psychological tests or assessments, students are in a way facilitated to be aware of their inner thoughts, so that they can change and develop themselves better in a targeted manner.

· Psychoeducational Lecture. Lectures can make students aware of the prevalence of psychological problems and reduce feelings of isolation and helplessness due to psychological problems.

Friday, November 17th, 2023
A TALK WITH PSYCHOLOGIST D

1. What do you think an ideal environment is like to alleviate depression?
· Social support system. An ideal environment is one in which there is a close group of friends and supporters who can listen, understand, and support you. Such an environment can be a warm family or a friendly and equal social circle.
· Natural and beautiful environment. The beauty of nature can ease depression. An ideal environment is a place surrounded by nature, such as a suburb, park or beach. These places can provide opportunities to relax.
· Comfortable living space. The ideal environment is a comfortable, clean and cozy home.
· Physical and mental health support. An ideal environment is a place that provides physical and mental health support, such as a counselling center, gym or yoga studio. These places can provide professional help and resources to help alleviate depression.

2. What role does the layout, organization, and flow of living spaces play in promoting positive psychological outcomes?
· Promoting social interaction. This environment can encourage communication and interaction between people. For example, providing comfortable lounge areas and shared spaces that facilitate communication and bonding among family members or friends.
· Privacy and personal space: People need to have spaces that are independent of themselves to relax and restore their mental energy.
· Promote physically and mentally healthy activities, such as exercise, recreation, and artistic creation.

3. Are there specific natural features that are particularly effective in promoting concentration, focus, and productivity in a student's living environment?
· Green Plants. Plants with ornamental value provide a natural and beautiful environment that can help reduce stress, increase concentration, and improve productivity.
· Natural Light. Good natural light can enhance one's concentration and emotional state and increase productivity. Compared to artificial light, natural light stimulates the brain to release more dopamine, boosting motivation to learn and work.

4. What activities do you think can prevent or alleviate depression? For example, is walking one of them?
· Do exercise. Physical activity releases stress and tension in the body. Walking is one of them.
· Socializing. Communicating and interacting with friends, family or like-minded people can improve support and emotional connection, alleviating feelings of loneliness and depressive moods.
· Counselling. Seeking counselling and receiving therapy are effective ways to deal with depression.

5. Do you have established measures aimed at preventing student depression? If so, could you kindly share details about these specific measures?
· Provide mental health education. Schools can run mental health edu-

cation programs to help students understand the common symptoms of psychological problems and how to deal with them, as well as how to build positive mental health habits and skills to cope with stress.
· Creating a friendly environment: Schools can create a friendly and supportive environment. It encourages mutual respect and support among students, reduces bullying and exclusionary behaviors, as well as provides safe, rewarding social activities.

Saturday, November 18th, 2023
A TALK WITH PSYCHOLOGIST E

1. What do you think an ideal environment is like to alleviate depression?
·I don't think different genres of psychologists focus on the same aspects. Some experts think blank spaces are ideal, others think soft accessories and decorations are ideal.

2. What role does the layout, organization, and flow of living spaces play in promoting positive psychological outcomes?
·I've seen this talked about in some research before. If it's a one-person studio probably around 20 - 40 square meters are the good size so it's not crowded.
·It's also important to keep the living space clean.
·Some studies also talk about the importance of having a social space in the home where you can invite friends over and chat, which promotes mental health.

3. Are there specific natural features that are particularly effective in promoting concentration, focus, and productivity in a student's living environment?
·In our area, we have many treatments. For example, nature therapy, forest therapy, etc. The purpose of these is to bring people close to nature and interact with it, so that close contact with plants can relax the body and mind.

4. What activities do you think can prevent or alleviate depression? For example, is walking one of them?
·I remember in Holland there is a requirement for green plant coverage. To increase the coverage many people would add vegetation to their roofs.

5. Do you have established measures aimed at preventing student depression? If so, could you kindly share details about these specific measures?
·Psychoeducation could be one of the prevention strategies for students.

Monday, November 13th, 2023
A TALK WITH STUDENT A

1. Where would you go and how would you spend your time when you feel depressed?
· Go to supermarket with my friends. We can chat on the way.
· Chat with my friends in their room, I don't want to stay alone.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
· Noisy environment is stressful for me and I can't concentrate on what I'm doing.
· The weather also affects my mood, for example in winter I feel depressed.
· I like facing outside/window when I study. When I see people walking around, I find it refreshing, interesting and not boring.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
· Fluffy toys/ things
· Green plants
· Photos with friends and families

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
· Yes, those are my favourite things in the last reply and I would decorate my room with them.
· Keep my room light, especially in winter.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
· I would choose a lot of green, Because I care more about green space.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
· I think having green space will have a positive impact. Because I need green spaces a lot. If there are few of them in the city, I think it's okay to have them in buildings.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
· Yes, I like walking
· Go to gym
· Chat with friends
· Facetime with families
· Hang out for a big meal

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?

· No, I don't think so. I think walking path and bike path are too close. Especially at peak time, there are so many bikes, very crowded. They even ride onto the walking path. That's dangerous.
· For the improvements, I think it would be better if there are some stop place that I can stop and take a break for walking.
· It would be great if there are roofs or umbrellas which can provide shelter from the rain.

9. Do you do any other activities on campus besides studying?
· No, it's not interesting.

Monday, November 13th, 2023
A TALK WITH STUDENT B

1. Where would you go and how would you spend your time when you feel depressed?
It depends, sometimes
· Go home and stay alone
· Go to the party with friends

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
· For my home, I like live with friends. I don't like live alone.
· For the faculty, it doesn't support mental health.Everyone is busy for study, and it's difficult to make appointment with each other or use spaces.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
· yellow,green, pink

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
· Clean up my room
· Music
· Sunlight is really important for me
· Nice smell

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
· A lot of green. That's more important.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
· I don't have the experience. But i think it's okay. it will make me happy for green spaces.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
· Definitely. I always walk when I stressed. I like that.
· Sometimes I also like running outside.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
· A bit, not very much. I think the campus it's too open, not very cozy.
· Maybe more trees would be better.

9. Do you do any other activities on campus besides studying?
· No, I just study here.

Monday, November 13th, 2023
A TALK WITH STUDENT C

1. Where would you go and how would you spend your time when you feel depressed?
· Go back to my room. I don't go outside.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
· I think the environment would not impact my mental health. My stress or depressed emotion are always from study.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
· Green. I really like garden. That makes me relaxed.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
· Green plants
· Family photos
· Other girly style decorations

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
· A lot of green, because it's important.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
· No, I don't have the experience like that. But I'm happy for green spaces.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
· Yes, I think walking is helpful.
· I don't have time to do other physical activity after I came to this school, because I'm so busy for my study.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
· Yes. I'm from India. Here is more wild and open for me.
· As I said, I like open and nature space. I thinks it would be better if there are more green parks that can let me to wander in them.

9. Do you do any other activities on campus besides studying?
· Yes. I Have a membership in CEG(?) faculty. I would do some social, excursion in campus with o ther members.

Tuesday, November 14th, 2023
A TALK WITH STUDENT D

1. Where would you go and how would you spend your time when you feel depressed?
・Just stay at home alone.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・I don't like busy and noisy environment. Sometimes the faculty(3ME) is really busy.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・I love sunny days. When I see the green grass, I feel happy.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・Just in winter, I will buy flowers to decorate my room. That makes me feel better, because the weather in
winter is so dark.
・In other season, it's fine.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・I think a lot of green. I don't care high rise or low rise.
・And I really care about the environment is not humid.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・It's okay. Not very much.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・No, I don't like walking. That makes me so tired.
・No, I don't like any sports. When I'm depressed, I just do nothing at home.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・No, I don't think so. It's really awful especially when it's raining and there's no place or things to hide from the rain
・Maybe add the roof on the pedestrain.It is good.

9. Do you do any other activities on campus besides studying?
・No, I like go outside campus when I'm free.

Tuesday, November 14th, 2023
A TALK WITH STUDENT E

1. Where would you go and how would you spend your time when you feel depressed?
・Go to X, do some sports.
・Just stay alone.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・Size, I don't like too small space
・Cozy environment, daylight, sofa, soft furniture, plants, etc.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・No specific elements I think.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・I like collecting candles. I felt warm and relaxed when I lit the candles all the way up. I like the atmosphere and the warm light.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・A lot of green. Green space is good for my mental health.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・It doesn't have much impact.I can accept that. I didn't have the experience like that. There are many parks in my hometown.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・Yes, walking is really good.
・I will do sports in X like I said before.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・Yes. it's walking-friendly. Because I like walking in campus.
・For improvements, I thinks it's better to have some benches or stop places.

9. Do you do any other activities on campus besides studying?
・Yes. do sports, lunch lecture, sometimes meeting with other friends and having coffee.

Wednesday, November 15th, 2023
A TALK WITH STUDENT F

1. Where would you go and how would you spend your time when you feel depressed?
・Go to my parents' house and talk to families.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・Sometimes faculty is busy and somewhere is dirty. I think that is the problem for me.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・Nature
・Daylight

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・I like keep my room light.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・I don't know how to choose. I like a lot of green and low rise city. I don't like very high-density city.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・I can accept that if I have to. Because at least there's green space, and that would make me more comfortable. I don't have the experience like that.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・It depends the weather, I don't like walking in rainy days. But it's okay for sunny days.
・Do sports, running with friends, cycling is also good.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・Yes, it's friendly.
・I think it would be nice to be closer to a supermarket. Now I think it's so far when I'm walking from my room to the supermarket. Although there is a SPAR on campus, that one is a bit expensive.

9. Do you do any other activities on campus besides studying?
・No, just study.

Wednesday, November 15th, 2023
A TALK WITH STUDENT G

1. Where would you go and how would you spend your time when you feel depressed?
・Hang out with friends. I really need friends when I feel depressed.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・Nature
・Daylight
・Big windows

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・Warm colors, like orange.
・I like cozy sofa.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・I like collecting cups to decorate my room. That makes me comfortable.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・High rise city with a lot of green. I like greenery. If there is green space, I can stay outside for green.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・Not much, I guess it looks cool.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・Yes, walking is helpful.
・Go to gym

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・Yes. I agree
・I think the tramline is a bit of a disruption to walking, it interrupts the walking experience. Sometimes it's crowded.
・If there is a park I can walk around, that's nice.

9. Do you do any other activities on campus besides studying?
・No, I don't live in campus, and I just study here.

Wednesday, November 15th, 2023
A TALK WITH STUDENT H

1. Where would you go and how would you spend your time when you feel depressed?
・Stay at home
・Friends's house, I mean closed friends
These make me comfortable.

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・Weather
・Big windows
・Not live alone

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・Soft/ clear colors: grey, white.
・Not bright colors: green, red, yellow

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・I really need a couch for rest and take a nap.
・I also like to keep the study are separate from the relaxing area of my home so I can completely relax after work.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・A lot of green, I care more about that.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・I don't have the experience.
・It would influence me a bit. But maybe sometimes I would think I could not go outside because there is few parks. I just stay in the building.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・Yes, walking is good.
・Exercise
・Reading in a peaceful space, which let me feel as my place.
・Hang out with friends

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・Yes, I agree.
・I'm a city person, and I like green in the city, not a green island.
・I don't like isolated feeling. I think our campus is like a isolated place.

9. Do you do any other activities on campus besides studying?

· Yes, running in the campus

· Sometimes hang out with my friends in campus.

Thursday, November 16th, 2023
A TALK WITH STUDENT I

1. Where would you go and how would you spend your time when you feel depressed?
・Go out, bar, supermarket, shopping

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
・Season. In winter, I get depressed easier in the winter.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
・Green, let me feel nature.
・Blue, I like blue sky.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
・I like to clean up my room and organize it. It makes me comfortable and relaxed.

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
・A lot of green. It's more important to me.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
・Not very much. Green space will positively impact my mental health.
・I don't have the experience.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
・It depends. I like walking in an interesting route rather than a boring route.
・I will go to gym.

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
・I'd rate it a 5 out of 10. Because I think the walking routes in our campus are not interesting. I don't usually wandering around campus when I'm free.
・I don't know how to improve it.

9. Do you do any other activities on campus besides studying?
・No. I think the social activities would in more alive place, like city center.

Thursday, November 16th, 2023
A TALK WITH STUDENT J

1. Where would you go and how would you spend your time when you feel depressed?
· Stay at home
· Stay with closed somebody
· Take a walking

2. How does your physical environment, such as your home or faculty, impact your mental well-being?
· For my home, I think it's a safe place, because I live with my friends.
· For the faculty, people around here, I also feel safe. I don't like alone.

3. Are there specific colors or elements in your environment that triggers you to relax and reduce stress?
· Bright colors, warm colors
· The weather is grey recently, but sunny days would make me feel better.

4. Are there any specific strategies you have done to your room that benefitted you to improve your mental health, such as stress or depression?
· Families' and friends' photos
· I'll put fuzzy blankets on my couch.
· Warmy and cozy decotations
· Clean and organize my place

5. If you had a choice between living in a high rise city filled with a lot of green and a low rise city with some green? Which would you choose and why?
· A lot of green. I like that.

6. Lets say if there's barely any parks in the city because there isn't a space for them, but they do have buildings filled with green spaces? Will there be much of an influence to your mental condition? Have you ever had that experience?
· Not much. I just care about the movement of people. For example, Delft is too calm.

7. Assuming you feel depressed, do you think walking would improve your mood? Or some other physical activity would help you improve your mood?
· Yes
· Go to gym, give me more energy
· Watch movies

8. Do you agree that the current campus is a walking-friendly community? What improvements do you think could be made?
· Yes. I agree
· I think weather is uncontrollable. It would be better to have the rain protection setup, like the umbrella.

9. Do you do any other activities on campus besides studying?
· No

Delft University of Technology

Master Architecture, Urbanism and Building Sciences

Dwelling Graduation Studio_AR3AD110 (2023/2024)
Designing for Care in an Inclusive Environment

Ying Shen (5792371)