Exploring the benefits of VR therapy:

designing small houses for mental health
treatment in a university setting

MSc Degree in Interior and Spatial Design

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Abstract

This research thesis aims to explore the benefits of virtual reality (VR) therapy as a possible solution for accessible and captivating mental health treatment for university students, especially in the aftermath of the COVID-19 pandemic. The current situation has highlighted the need for mental health support, and young people are among the most affected. Through a review of relevant literature and data from various sources, including the World Health Organization, this research examines the prevalence and impact of anxiety, stress, and depression on mental health.

To gain a deeper understanding of the mental health conditions of young people, this study examines the work of Miguel Benasayag, Gérard Schmit and Umberto Galimberti, who provide insights into the human experience and the impact of social and cultural factors on mental health. Specifically, their publications "The Age of Sad Passion" and "L'ospite inquietante" offer relevant perspectives on the current state of mental health in contemporary society among new generations. Based on this research, the study proposes the design and implementation of small houses for VR therapy, which can provide a more immersive and engaging therapeutic experience. The proposed solution aims to address the accessibility and engagement barriers associated with traditional mental health treatments.

Overall, this study contributes to the understanding of the role of VR therapy in mental health treatment and offers insights into the design and implementation of small houses for VR therapy as a potential solution for mental health challenges faced by university students.

Abstract - Italian

Questa tesi di ricerca si propone di esplorare i benefici della terapia in realtà virtuale come possibile soluzione per un trattamento della salute mentale accessibile e accattivante per gli studenti universitari, soprattutto in seguito alla pandemia di COVID-19 che ha evidenziato la necessità di un supporto alla salute mentale, particolarmente per i giovani che sono tra i più colpiti. Attraverso una revisione della letteratura di riferimento e dei dati provenienti da varie fonti, tra cui l'OMS, questa ricerca esamina la prevalenza e l'impatto di ansia, stress e depressione sulla salute mentale. Inoltre, per comprendere più a fondo le condizioni dei giovani, questa ricerca riporta il lavoro di Miguel Benasayag, Gérard Schmit e Umberto Galimberti, che forniscono approfondimenti sull'esperienza umana e sull'impatto dei fattori sociali e culturali sulla salute mentale. In particolare, le loro pubblicazioni "L'età delle passioni tristi" e "L'ospite inquietante" offrono prospettive rilevanti sullo stato attuale della salute mentale nella società contemporanea tra le nuove generazioni. Sulla base di questa ricerca, la tesi propone la progettazione di piccole case per la terapia in VR, che possono fornire un'esperienza terapeutica più immersiva e coinvolgente. La soluzione proposta mira ad affrontare lo stigma, l'accessibilità e il coinvolgimento associati ai trattamenti tradizionali per la salute mentale.

Nel complesso, questo studio vuole portare l'attenzione sul ruolo della realtà virtuale nel trattamento della salute mentale e offre spunti per la progettazione e l'implementazione di casette per la terapia VR come potenziale soluzione alle sfide della salute mentale affrontate dagli studenti universitari.

Contents

Index of abbreviations

AR: Augmented Reality
CBT: Cognitive Behavioral Therapy
DASS-21:   Depression Anxiety Stress Scale 21 questions
DOF: Degrees of Freedom
DSM-IV: Diagnostic and Statistical Manual of mental disorders, fourth edition
GAD: Generalized Anxiety Disorder
HMD: Head Mounted Display
IVE: Immersive Virtual Environment
iVR: immersive Virtual Reality
LCD: Liquid-Crystal Display
MBP: Mindfulness-based programs
MDI: Major Depressive Index
MH: Mental Health
OLED: Organic Light-Emitting Diode
PTSD: Post-Traumatic Stress Disorder
SAD: Seasonal Affective Disorder
SDGs: Sustainable Development Goals
STAI-Y: State–Trait Anxiety Inventory
RCT: Randomized Controlled Trial
RT: Reading Task
VE: Virtual Environment
VR: Virtual Reality

// 1

Mental health matters

Chapter 1

Mental health
overview

Chapter 1

Mental health
overview

1.1 // Definition by World Health Organization (WHO)

According to the WHO, "mental health is a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community". [1]

Looking back to past years, this definition marks a significant advancement in the effort to move away from the idea that mental health is merely the absence of mental illness when it is characterized by a broad range of experiences, from the best possible state of well-being to crippling bouts of extreme sorrow and emotional distress. It is in fact part of our general health and well-being and a basic human right. Although WHO's definition is universally accepted, some researchers do not think it is complete or even leads to an incorrect understanding of mental health. It is possible that people in a good mental state can be depressed, ill, furious, or unhappy, which is a normal part of living a complete life. Despite this, mental health is frequently thought of as a purely positive state characterized by emotions of joy and environmental control.

From the concern of a misleading definition, researchers are trying to come up with more complete and explicatory ones, like:

> "Mental health is a dynamic state of internal equilibrium which enables individuals to use their abilities in harmony with universal values of society. Basic cognitive and social skills; ability to recognize, express and modulate one's own emotions, as well as empathize with others; flexibility and ability to cope with adverse life events and function in social roles; and harmonious relationship between body and mind

> represent important components of mental health which contribute, to varying degrees, to the state of internal equilibrium." [2]

This definition seeks to avoid relying on the notion that to achieve mental health, a person must seek happiness and joy, but instead broadens the idea of mental health to a more realistic scenario that is as true to human life experience as possible.

1.2 // Mental health matters

All people's lives are inextricably linked to and dependent on their mental health. It has an impact on how we think, feel, and act. It is the foundation of our ability to make decisions, form connections, and affect the world we live in. When our mental health is compromised and we do not have access to proper help, our well-being might deteriorate. A variety of mental health issues can interrupt our thoughts and feelings, alter our behaviors, jeopardize our physical health, and impair our relationships, education, or livelihood. It is also essential for personal, communal, and socioeconomic growth.

> "Neglecting the intrinsic and instrumental value of mental health happens at the expense of individual and family well-being as well as local and national economies. Close to 15% of the world's working population is estimated to experience a mental disorder at any given time." [3]

14

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1 // "Health and Well-Being," World Health Organization (World Health Organization), accessed August 12, 2022, https://bit.ly/3VCx2r7

2 // Silvana Galderisi et al., "Toward a New Definition of Mental Health," World Psychiatry 14, no. 2 (June 2015): pp. 231–233, https://doi.org/10.1002/wps.20231.
3 // World mental health report: transforming mental health for all. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO.

As a matter of fact, the estimated number of people who experience depression as one of the primary causes of disability is 264 million, with symptoms of anxiety plaguing many of these individuals. People with good mental health can work more productively and reach their full potential. Poor mental health, on the other hand, interferes with people's capacity to work, study, and learn new skills. It impedes children's educational attainment, which might have an influence on future career opportunities. Meanwhile, individuals with mental health disorders may find themselves unable to work, or unable to work as well as normal, for lengthy periods of time.

According to recent research conducted by the WHO, lost productivity caused by depressive and anxiety disorders costs the world economy $1 trillion USD annually. The economic case for investment in mental health is strong: for every $1 invested i ment for depression and anxiety, there is a $4 return in better health and productivity. [4]

Besides its economic consequences, mental health is extremely relevant as it impacts, and is impacted by, many of the 17 Sustainable Development Goals (SDGs) that make up the world's blueprint for a better and more sustainable future. [see table 1.1]

12 billion work days are lost every year to depression and anxiety.

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4 // The Lancet Global Health, "Mental Health Matters," The Lancet Global Health 8, no. 11 (2020), https://doi.org/10.1016/s2214–109x(20)30432–0.

Table 1.1
Mental health is linked to each of the SDGs

1	No poverty	Mental health conditions are closely linked to poverty in a vicious cycle of disadvantage.
2	Zero hunger	Poor nutrition impairs cognitive and emotional development in children. Food insecurity increases the risk of mental health conditions in adults.
3	Good health and well-being	Mental health is an integral part of general health and well-being.
4	Quality education	Mental health is important for learning; and learning environments are key determinants of mental health. People with mental health conditions experience barriers in accessing education.
5	Gender equality	Inequity and gender-based violence are risk factors for mental health conditions.
6	Clean water and sanitation	Socioeconomic deprivation and poor access to facilities creates multiple life stressors and is linked with a range of mental health conditions.
7	Affordable and clean energy	
8	Decent work and economic growth	Work practices and environments are determinants of mental health. People with mental health conditions experience barriers in accessing decent work.
9	Industry, innovation and infrastructurE	Employment and economic growth is an important protective factor against mental health conditions.
10	Reduced inequalities	Discrimination and inequitable treatment of people with mental health conditions is pervasive and causes psychological stress.
11	Sustainable cities and communities	Well-planned urbanization can benefit mental health through improved access to work, education and housing as well as safe environments and green spaces. Exposure to community-level violence is a risk factor for mental health conditions.

12	Responsible consumption and production	Socioeconomic deprivation and poor access to resources are linked to a range of mental health conditions.
13	Climate action	Climate change and environmental events cause human suffering and can undermine mental health.
14	Life below water	The availability of natural resources on land and at sea impacts people's health, including their mental health.
15	Life on land	
16	Peace, justice, and strong institutions	Conflict and violence is a major threat to mental health, while mental health may contribute to reduced violence.
17	Partnerships for the goals	Mental health is a universal concern. Lessons from mental health partnerships can be applied to the SDG agenda.

Table 1.1 // C. Lund et al., "Social Determinants of Mental Disorders and the Sustainable Development Goals: A Systematic Review of Reviews," The Lancet Psychiatry 5, no. 4 (2018): pp. 357–369, https://doi.org/10.1016/s2215-0366(18)30060–9.

1.3 // Determinants of mental health

Depending on the situations in which we are born, raised, and live our lives, mental health disorders can vary substantially. They are the outcome of the interaction between a person's vulnerability, influenced by psychological factors (cognitive and interpersonal) and biological factors (genetics, substance use by the mother, oxygen deprivation at birth), and the stress brought on by recurring events and traumatic life experiences influenced by family, community, and structural factors in the environment.

> **Family and community** comprise a person's immediate surroundings, including their opportunities to engage with partners, family, friends or colleagues, opportunities to earn a living and engage in meaningful activity, and also the social and economic circumstances in which they find themselves. Parenting behaviours and attitudes are particularly influential, especially from infancy through adolescence, as is parental mental health. Harsh parenting and physical punishment are known to undermine child mental health, often leading to behaviour problems.
> [...]
> **Structural factors** relate to people's broader sociocultural, geopolitical and environmental surroundings, such as infrastructure, inequality, social stability, and environmental quality. These shape the conditions of daily life. Access to basic services and commodities, including food, water, shelter, health and the rule of law, is important for mental health. [5]

Other influential factors that can undermine mental health include gender, ethnic grouping, poverty, and place of residence. Those who live in adverse conditions, like in war zones, or where the natural

5 // World mental health report: transforming mental health for all. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO.
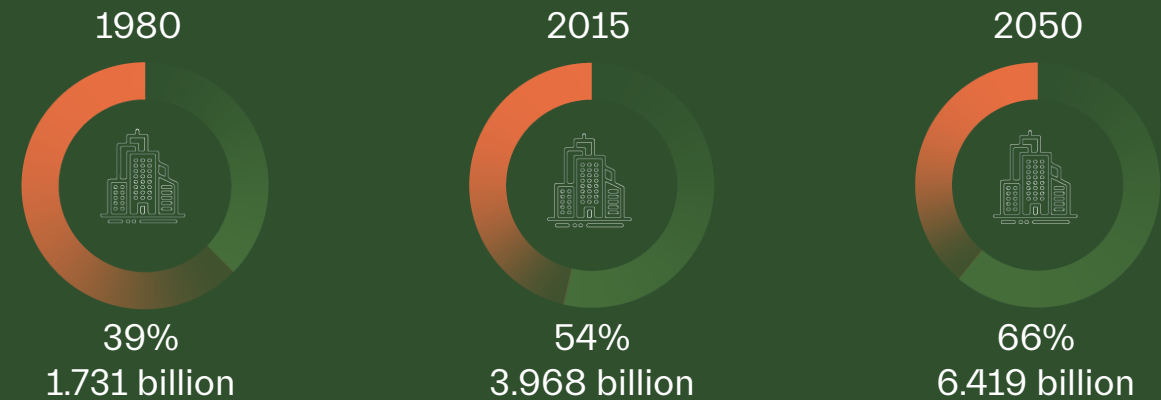
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environment has been compromised, for example by climate change, biodiversity and habitat loss, exploitation or pollution, experience more mental health conditions. For example, there is growing evidence suggesting that air pollution exposure may harm the brain and raise the likelihood, severity, and duration of mental health problems at all stages of life. A study conducted on 13.887 individuals ≥15 aged who had first contact with the South London and Maudsley NHS Foundation Trust for psychotic and mood disorders in 2008-2012 highlighted the association between air pollution exposure and mental health disorders.

Results from the study showed how those individuals with higher home air pollution exposure accessed mental healthcare services more frequently in the months and years after their initial presentation to secondary mental healthcare services. These correlations between in-patient and CMHS (Community Mental Health Services) usage were comparable, indicating that air pollution may be significant throughout the range of therapeutic needs. [6]

Since over half of the world's population lives in cities [Figure 1.1] [7], meaning that big urban environments contain the highest concentration of individuals with depressive/anxiety disorders and other mental illnesses, it's critical to improve access to mental health care to avoid worsening these conditions and to embed mental health in universal coverage, so that all people can receive the services they need without suffering financial hardship.

6 // J. B. Newbury, et al. Association between air pollution exposure and mental health service use among individuals with first presentations of psychotic and mood disorders: retrospective cohort study. Br J Psychiatry. 2021;1–8. doi:10.1192/bjp.2021.119.
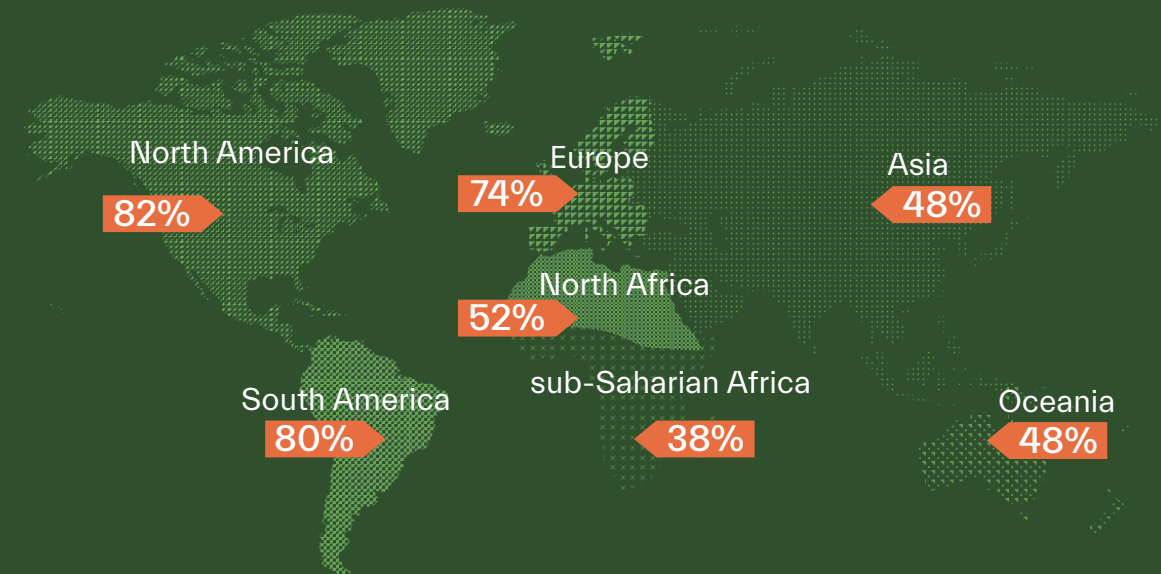
7 // Urbanet, "How Many People Live in Cities Worldwide? I Infographic," Urbanet, August 25, 2016, https://www.urbanet.info/world-urban-population/.

Fig. 1.1
Share of the urban population living in cities worldwide

1980	2015	2050
39%	54%	66%
1.731 billion	3.968 billion	6.419 billion

Source: The World Urban Population | Infographics

Fig. 1.2
Share of the urban population living in cities on all continents

North America 82%
Europe 74%
Asia 48%
North Africa 52%
South America 80%
sub-Saharian Africa 38%
Oceania 48%

Source: The World Urban Population | Infographics

1.4 // The impact of COVID-19

Public health emergencies can have far-reaching consequences and long-term effects on people's mental health worsening pre-existing diseases as well as causing new ones.
The COVID-19 epidemic is the most visible worldwide example, and it has had a significant influence on people's mental health all across the world.

The COVID-19 outbreak swiftly became one of the most serious global catastrophes in decades. It has had significant and far-reaching effects on economies, civilizations, and health systems. There has been strain and division within families and communities. Every country has lost out on the opportunity to educate and connect its youth. The poverty line has been crossed by millions of individuals and it has had a significant impact on mental health. Many of us experienced increased anxiety during the COVID-19 epidemic's numerous waves, but for a few others, the pandemic may have further worsened already existing mental health issues. Simultaneously, mental health services have been significantly impacted, particularly in the first year of the epidemic. Staff and resources were often redeployed to COVID-19 relief efforts. People were regularly denied access to care due to social factors, and in many cases, fear of the infection kept them from seeking aid. There were fewer interruptions by early 2022, but far too many people were still unable to obtain the necessary mental health care. Of course, some people and locations have been more affected than others. And, as the epidemic progressed, national public

Fig. 1.3
Share of reasons why people were not able to access mental health services in Europe in 2020
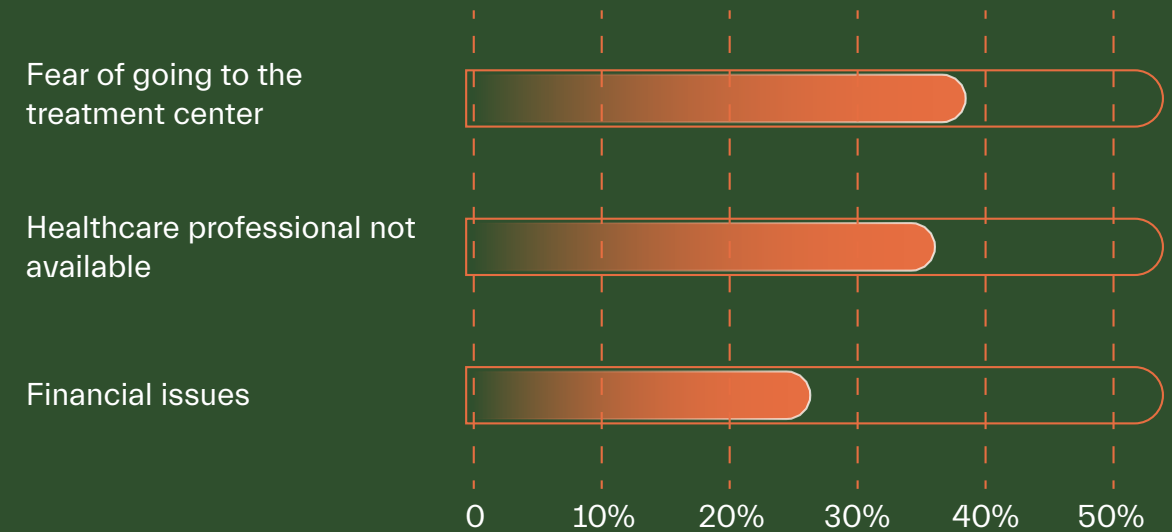
Source: GAMIAN-Europe @ Statista 2021

health measures, as well as mental health stresses and consequences, shifted.
COVID-19 has created several short-term and long-term stressors: stress from the potential impacts of the virus, stress from public health and social measures, stress from unemployment and financial insecurity, and stress from false information and uncertainty. As a result, the output of all these stressors is a substantial increase in depressive and anxiety disorders. According to the Global Burden of Diseases, Injuries and Risk Factors Study 2020 (GBD 2020)[8] , with the pandemic there was an increase of 28% and 26% for major depressive disorders and anxiety disorders, respectively in just one year.

8 // D. F. Santomauro et al., "Global Prevalence and Burden of Depressive and Anxiety Disorders in 204 Countries and Territories in 2020 Due to the COVID-19 Pandemic," The Lancet 398, no. 10312 (November 6, 2021), https://doi.org/10.1016/s0140–6736(21)02143–7.

Out of the entire population, young people have been more affected than older adults because

> Extended school and university closures interrupted routines and social connections, meaning that young people missed out on learning and experiences expected for healthy development. Disruption and isolation can fuel feelings of anxiety, uncertainty, and loneliness, and can lead to affective and behavioural problems. [9]

In order to minimize the impact of the pandemic, the Executive Board of the World Health Organization urged member states to:

- Apply a whole of society approach to promote, protect and care for mental health
- Ensure widespread availability of mental health and psychosocial support
- Support recovery from COVID-19 by building mental health services for the future.

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9 // World mental health report: transforming mental health for all. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO.

Fig. 1.4
National estimates of the prevalence of anxiety or symptoms of anxiety in select OECD countries in early 2020 and the year prior to 2020

- Pre-COVID
- 2020
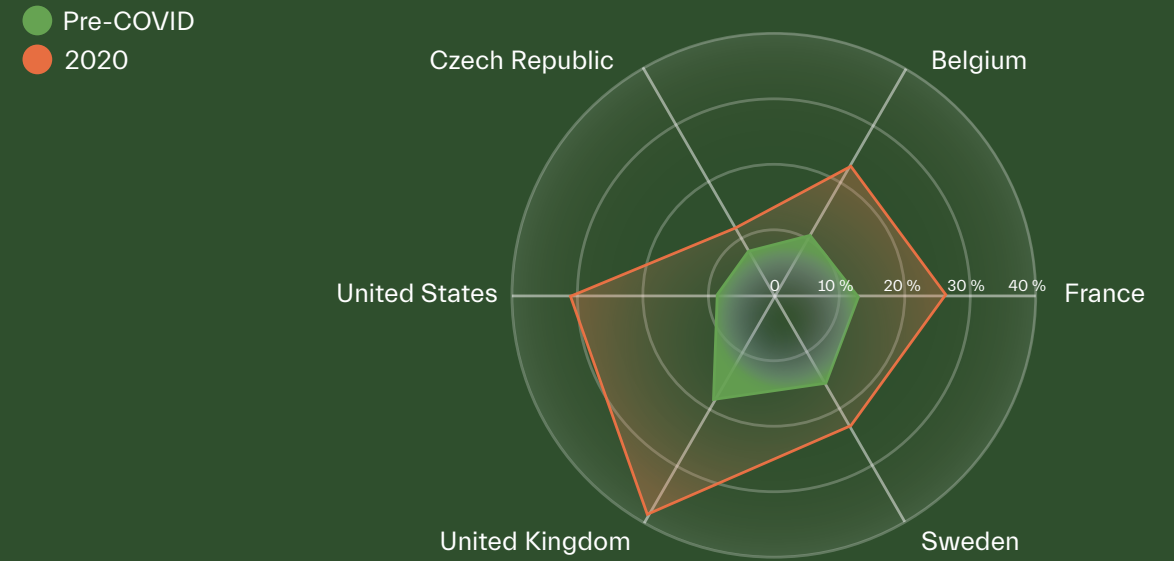
Source: Various sources (National sources) @ Statista 2022

Figure 1.5
National estimates of the prevalence of depression or symptoms of depression in select OECD countries in early 2020 and the year prior to 2020

- Pre-COVID
- 2020
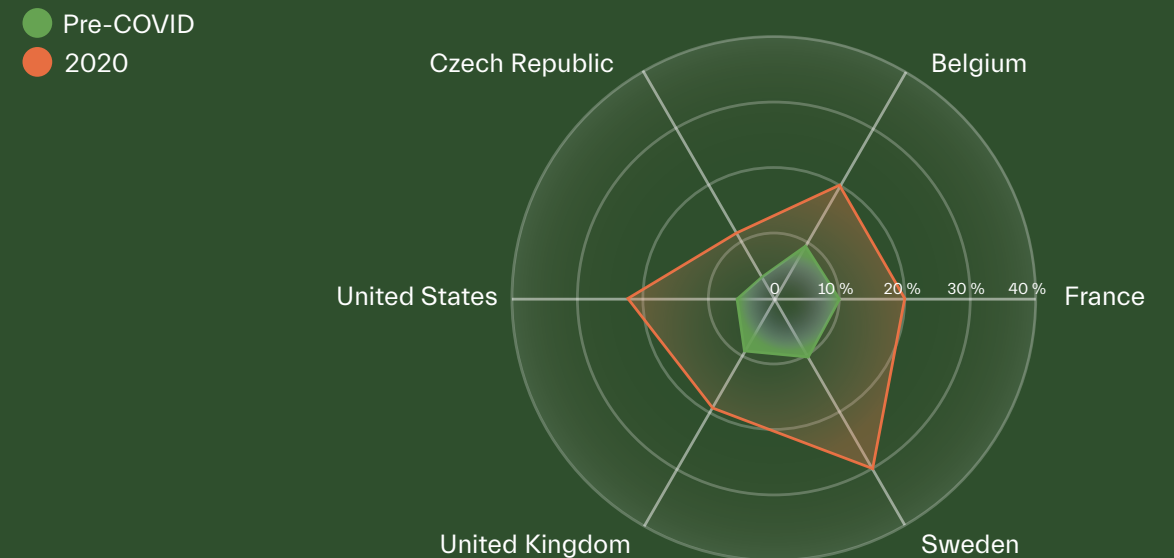
Source: Various sources (National sources) @ Statista 2022

1.5 // Common mental health disorders

Behavior is motivated by emotions, which significantly impact psychological health and well-being. Usually, emotions interact by motivating the individual to meet goals or reduce conflicts. However, when some emotions persist beyond their usefulness, they become pathological causing mental disorders. The latter are generally characterized by a combination of abnormal thoughts, perceptions, emotions, behaviors, and relationships with others. Mental disorders include: depression, anxiety, bipolar affective disorder, schizophrenia and other psychoses, dementia, intellectual disabilities, and developmental disorders (including autism). Only the two most prevalent disorders, anxiety and depression, will be explored in this section, as they are of high interest for the development of this research thesis.

Emotions interact by motivating the individual to meet goals or reduce conflicts.

1.5.1 // Anxiety

Anxiety is defined as an organic response, characterized by apprehension and increased vigilance in situations of uncertain danger or potential threat to the integrity of the organism. However, in the study of anxiety, there are two complementary concepts: a psychophysiological state (state anxiety) and a personality trait (trait anxiety).

State anxiety reflects transient psychological and physiological reactions directly related to adverse situations at a specific time. In contrast, the term trait anxiety refers to a personality trait, describing individual differences related to the tendency to present with state anxiety. Trait anxiety is, therefore, relatively stable over time and is considered an important characteristic of patients with anxiety disorders, as they exhibit higher trait anxiety than healthy individuals. This distinction between state and trait anxiety is an important conceptual development in the assessment of anxiety and can be attributed to the work of Spielberger et al[10]. According to these authors, anxiety is a one-dimensional construct; consequently, the higher the trait anxiety, the higher the state anxiety in different threat situations.

Anxiety disorders are divided into several types:

- Generalized Anxiety Disorder (GAD): usually involves a persistent feeling of anxiety or dread, which can interfere with daily life. This is not occasional worry or anxiety due to stressful events, but people with GAD experience frequent anxiety for months, if not years. Symptoms include feelings of restlessness, fatigue, headache or stomachache, muscle aches, and difficulty concentrating.

- Panic disorder: involves frequent and unexpected panic attacks. Panic attacks are sudden periods of intense fear, discomfort, or feeling of losing control even when there is no clear danger or trigger. At the time of the attack an individual may experience chest pain, trembling or tingling, sweating, rapid heartbeat, and a feeling of imminent danger or loss of control.

- Social anxiety disorder: consists of an intense and persistent fear of being watched and

10 // C. Spielberger, et al. Manual for the State-Trait Anxiety Inventory ("self-evaluation questionnaire"). Palo Alto: California Consulting Psychologists Press; 1970.

judged by others. For people with this disorder, the fear of social situations can be so intense that it seems out of control. In some cases it can become sufficiently overwhelming that it prevents them from working, going to school and doing ordinary actions. Individuals with social anxiety experience flushing, sweating and shaking, rapid heartbeat and stomach pain.

- Phobia-related disorder: Phobia is an intense fear or aversion to certain objects or situations. Although it may be realistic to be anxious in some circumstances, the fear that people with phobia experience is out of proportion to the actual danger caused by the situation or object. People with phobia take measures to avoid the feared object or situation, experience intense and immediate anxiety when they encounter the feared object or situation, and anxiously endure unavoidable objects and situations.

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See Table 1.2 for a summary of all the symptoms caused by the various types of anxiety.

Table 1.2
Symptoms of anxiety disorders

GAD	• Feeling restless, wound-up, or on-edge • Being easily fatigued • Having difficulty concentrating • Being irritable • Having headaches, muscle aches, stomachaches, or unexplained pains • Difficulty controlling feelings of worry • Having sleep problems, such as difficulty falling or staying asleep
Panic disorder	• Pounding or racing heart • Sweating • Trembling or tingling • Chest pain • Feelings of impending doom • Feelings of being out of control
Social anxiety disorder	• Blushing, sweating, or trembling • Pounding or racing heart • Stomachaches • Rigid body posture or speaking with an overly soft voice • Difficulty making eye contact or being around people they don't know • Feelings of self-consciousness or fear that people will judge them negatively
Phobia-related disorder	• May have an irrational or excessive worry about encountering the feared object or situation • Take active steps to avoid the feared object or situation • Experience immediate intense anxiety upon encountering the feared object or situation • Endure unavoidable objects and situations with intense anxiety

Table 1.2 // "Anxiety Disorders," National Institute of Mental Health (U.S. Department of Health and Human Services), accessed September 25, 2022, https://www.nimh.nih.gov/health/topics/anxiety-disorders.

1.5.2 // Depression

Depression, also known as major depressive disorder or clinical depression, is a mood disorder characterized by a range of symptoms such as constant sadness or lack of interest in life. Most of us feel sad, lonely or depressed from time to time. This is a normal reaction to loss, difficulties in life, or lowered self-esteem. However, when intense sadness - which includes feeling helpless, hopeless and worthless - lasts for many days or weeks and prevents one from living his or her life, it may be more than just sadness.

> ## It is normal to feel sad, lonely, or depressed from time to time.

There are different forms of depression, some of which develop under certain conditions:

- Major depression, which includes depressive symptoms most of the time, for at least 2 weeks, usually interfering with the ability to work, sleep, study, and eat.
- Persistent depressive disorder (also called Dysthymia), often includes less severe depressive symptoms that last much longer, usually for at least 2 years.
- Perinatal depression, occurs when a woman experiences major depression during pregnancy or after childbirth (postpartum depression).
- Seasonal affective disorder (SAD), which comes and goes with the seasons, typically beginning in late fall and early winter and disappearing during spring and summer.
- Depression with symptoms of psychosis, is a severe form of depression in which a person experiences symptoms of psychosis, such as delusions (disturbing and false beliefs) or hallucinations (hearing or seeing things that others do not see or hear).

Symptoms of depression include:
- Difficulty concentrating, remembering details, and making decisions
- Feelings of guilt, worthlessness, and helplessness
- Pessimism and hopelessness
- Insomnia, waking up in the morning or oversleeping
- Irritability or irritability
- Restlessness
- Loss of interest in things once pleasurable, including sex
- Overeating or loss of appetite
- Pain, headaches, or cramps that never go away
- Digestive problems that do not improve even with treatment
- Persistent feelings of sadness, anxiety, or "emptiness"
- Suicidal thoughts or suicide attempts
- Loss of enjoyment of life.

Although these symptoms are common, not everyone with depression has the same symptoms. The severity, frequency and duration of symptoms may vary.

// 2

What is
happening

Chapter 2

What is
happening

Chapter 2

What is
happening

The previous chapter attempted to set the frame-work for correct mental health comprehension and understanding. It has been established what are the possible causes of mental conditions, among that we recognize the COVID-19 virus, which still has a non-negligible impact, now I will introduce the factors closely associated with culture and society to comprehend the reasons for the un-easiness that pervades contemporary life. The general public's mental health will not be covered in this chapter; instead, the younger generation—particularly college students—will be the subject because young people are frequently confronted with issues that prevent them from leading care-free lives.

In a passage from his book L'ospite inquietante, philosopher, academic, and psychologist Umberto Galimberti states:

> "i giovani, anche se non sempre ne sono consci, stanno male. E non per le solite crisi esistenziali che costellano la giovinezza, ma perché un ospite inquietante, il nichilismo, si aggira tra loro, penetra nei loro sentimenti, confonde i loro pensieri, cancella prospettive e orizzonti, fiacca la loro anima, intristisce le passioni rendendole esangui." [11]

The goal is to talk about the situation in which young people are growing up, partly to investigate and understand the causes, partly with the hope that something might change. After all, the first way to solve a problem is to recognize it, and by highlighting not only sociocultural factors but also an analysis of the data I hope to be able to create enough of a framework to understand the magnitude of the situation.

11 // "young people, even if they are not always aware of it, are sick. And not because of the usual existential crises that punctuate youth, but because a disturbing guest, nihilism, prowls among them, penetrates their feelings, confuses their thoughts, erases perspectives and horizons, saps their souls, saddens their passions, making them lifeless." [my traduction] U. Galimberti, "L'ospite Inquietante: Il Nichilismo e i Giovani," in L'ospite Inquietante: Il Nichilismo e i Giovani (Milano: Feltrinelli, 2010), p. 11.

2.1 // Ask me how I feel

> "Comment bouger si nous n'avons pas la motivation d'une promesse?" [12]

The historical period we are facing appears to be full of small-, medium- and large-scale issues; some of these having been faced in the past by previous generations appear less frightening because they don't present new challenges and it is possible to prepare to counter them, while others bring new challenges that test the souls of the latest generations. The causes of worries in adolescents are found in problems such as environmental pollution, economic disasters, wars and geopolitical tensions, social intolerance, the appearance of new diseases, etc. In fact, young people are sick and are, or should I say we are, forced to live in a world that can no longer give them certainty, security, and visions. Unlike the times of our grandparents, when society was driven by a theological optimism according to which the past was evil, the present redemption, and the future the promise; in the 21st century, this optimism has been swept away by a sense of powerlessness, disintegration, and meaninglessness of which Spinoza speaks to us with the term "sad passions" [13], which make the present crisis something different from others to which the Western countries have been able to adapt because it is a crisis of the very foundations of our civilization. With the end of theological historicism, the long list of social threats has led young people to look to the future with distrust

We live in an uncertain, insecure, and devoid of vision world.

12 // "How can we move, if we do not have the motivation of a promise?" [my traduction] A. Rousseaux and N. A. Khan, "Basta.media," Basta.media, November 8, 2010, https://basta.media/Miguel-Benasayag-Liberer-la-puissance-d-agir-des-gens.

13 // B. Spinoza, Etica, trans. S. Landucci (Roma, Italy: GLF editori Laterza, 2009).

and negativity. According to Galimberti:

> "la vera natura del disagio dei nostri giovani che, nell'atmosfera nichilista che li avvolge, non si interrogano più sul senso della sofferenza propria o altrui, come l'umanità ha sempre fatto, ma - e questa, come ci ricorda Günther Anders, è un'enorme differenza - sul significato stesso della loro esistenza, che non appare loro priva di senso perché costellata dalla sofferenza, ma al contrario appare insopportabile perché priva di senso." [14]

At this point, the phrase "in the absence of happiness, men are content to avoid unhappiness"[15] , extrapolated from the optimism that characterized the transition between the nineteenth and twentieth centuries, during which the sciences, politics, and philosophy promised man a "happiness" that he would construct, has lost its currency, because even "avoiding unhappiness" appears to be too difficult a task for contemporaries.

In this context, it is worth considering Miguel Benasayag and Gérard Schmit's analysis in their book "The Age of Sad Passions." According to the two academics, one of the most striking symptoms of the crisis is the contestation of the concept of authority. In the sense that there is no longer an asymmetry in the adult-youth relationship that can automatically establish authority and at the same time constitute a sense and context conducive to the relationship.

In such a situation, it is challenging for parents and educators to maintain their roles because they constantly feel compelled to defend their choices to the child, who either accepts or rejects what is suggested to him or her in an equal relationship, all in the name of respecting individual freedom. Even very young children, between the ages of two and four, who are regarded as despotic, violent, and untamable, are becoming the subject of counseling requests from parents, according to research. These parents are surprised that they cannot rationally convince their children to accept, almost by contract, the limits they try to impose on them.

Umberto Galimberti
philosopher, accademic, psychoanalyst.

This society, in fact, constantly oscillates between two temptations: that of coercion and that of commercial-type seduction. The basic notion of saying "You must listen to me and respect me just because I am accountable for this relationship" now appears improper, thus some professors occasionally try to attract their pupils' attention through cunning and seduction strategies. The student or child plays the part of a client who accepts or rejects what the "adult-seller" suggests to them. In reality, these two temptations are but two variants of authoritarianism inevitably provoked by the symmetrical relationship between youth and adults. The principle of authority differs from authoritarianism in that it represents a kind of common foundation for the two terms of the relationship; it is thus based on the existence of a shared goal for all: I obey you because you represent for me the invitation to head towards this

Miguel Benasayag
philosopher, psychoanalyst.

14 // "the true nature of the unease of our young people who, in the nihilistic atmosphere enveloping them, no longer question the meaning of their own or other people's suffering, as humanity has always done, but-and this, as Günther Anders reminds us, is a huge difference-about the very meaning of their existence, which does not appear to them meaningless because it is punctuated by suffering, but on the contrary appears unbearable because it is meaningless." [my traduction] U. Galimberti, "L'ospite Inquietante: Il Nichilismo e i Giovani," in L'ospite Inquietante: Il Nichilismo e i Giovani (Milano: Feltrinelli, 2010), p. 13.
15 // S. Freud, Il Disagio Della civiltà e Altri Saggi, trans. Cesare Musatti, vol. 10 (Torino: Boringhieri, 1978).

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common goal, because I know that this obedience has enabled you to become the adult you are today, as I will be tomorrow, in a society with a guaranteed future. However, in a world where the future offers no assurance, being an adult is no longer enough to ensure a position of responsibility over teenagers. And so, without paying too much attention to it, new generations have replaced the principle of authority with another principle, based on a sense of insecurity about the future, leading to a crisis in the adult-youth relationship. Effects of this crisis were noted by Miguel Benasayag and Gérard Schmit during their visits to counseling and psychiatric centers in France.

They observed how parents, teachers, educators, and social workers turn daily to specialists to seek "technical" answers capable of helping them manage and understand adolescents. But these quick and easy solutions they hope to find belong to "technique," or, Galimberti tells us, the highest form of rationality ever achieved by man, capable of making us achieve the maximum of purposes with the minimum of effort, whose values are efficiency and productivity. However, this supreme rationality does not set itself any ends to achieve, but only results to be achieved as outcomes of its procedures. Technique, in fact, does not tend to a purpose, does not promote meaning, does not open scenarios of salvation, does not redeem, and does not reveal the truth: technique works. Consistent with technique, some adults and professionals see medicalization as the answer to young people's often misunderstood and

A symmetrical relationship led to a crisis in the adult–youth relationship.

misinterpreted behaviors that would allow them to "solve" the problem with minimal effort. However:
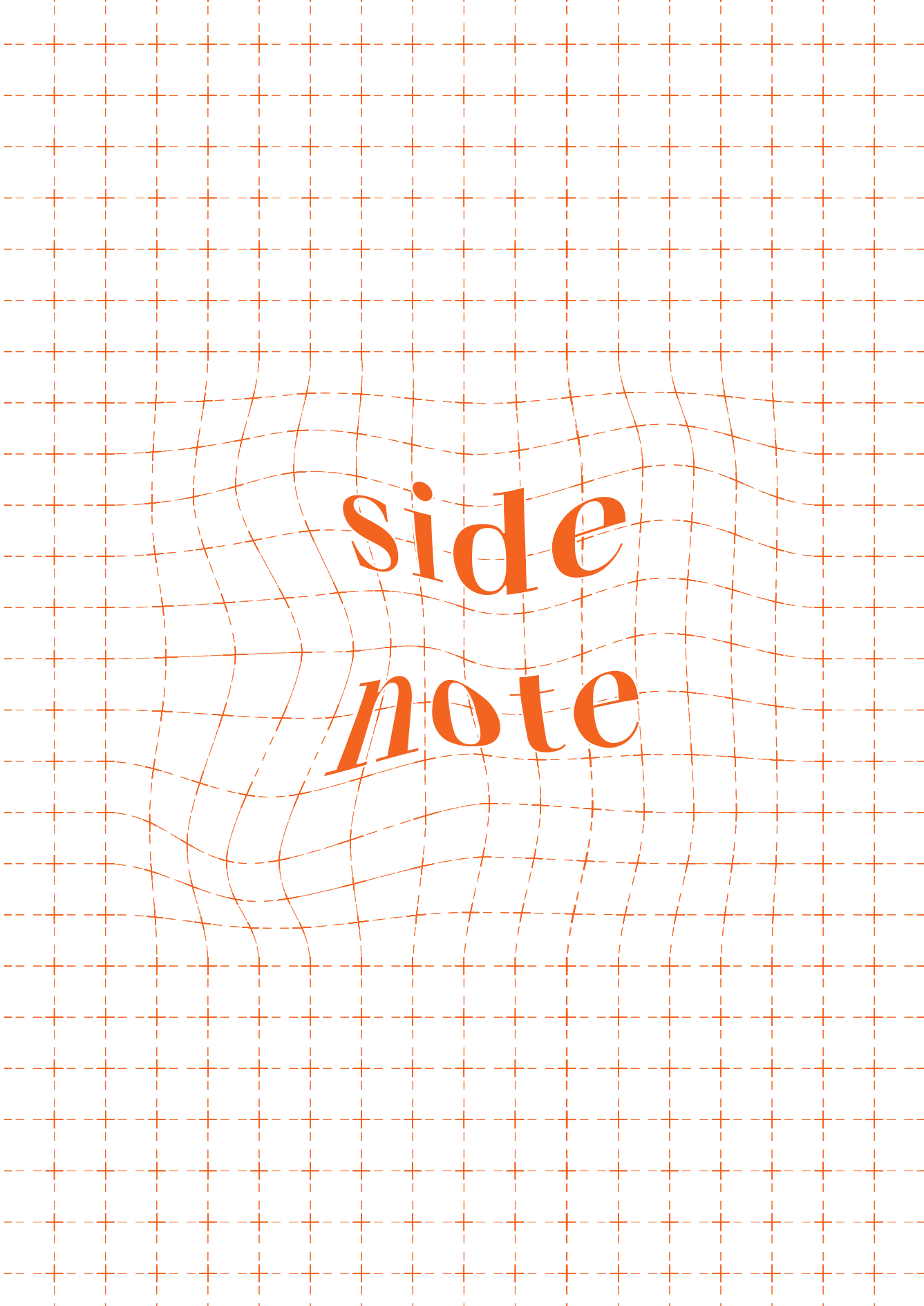
> It goes without saying that when the malaise is not of the individual, but the individual is merely the victim of a widespread lack of prospects and projects, if not even of senses and affective ties, as is the case in our culture, it is obvious that the pharmacological treatments that are resorted to today from early childhood or the psychotherapeutic treatments that cure the suffering that originates in the individual are ineffective.
> And this is because if man, as Goethe says, is a being aimed at the construction of meaning (Sinngebung), in the desert of meaninglessness that the nihilistic atmosphere of our time spreads, the malaise is no longer psychological, but cultural. And so it is on the collective culture and not on individual suffering that action must be taken, for this suffering is not the cause but the consequence of a cultural implosion of which young people, parked in schools, universities, master's degrees, and the precariat, are the first victims.[16]

Searching for the answer to meaninglessness in technique thus appears only as a mirage, a temporary solution to problems that need the attention of a different kind, but not because the technique is not yet perfected enough, but because it is not within its competence to find answers to such questions. Meanwhile, the conditions toward which society is plummeting are worsening, and every day millions of people are being pressured by the reality in which they are forced to live, surrendering to their situation permeated by inadequate mental health states. In the tradition of phenomenological psychiatry, depression is described as a condition in which the subject thinks he or she is running out of time, finds everywhere what is already known

16 // U. Galimberti, L'ospite Inquietante: Il Nichilismo e i Giovani (Milano: Feltrinelli, 2010), p. 12

to him or her, and incurs an existential stalemate. Actually, this description could be that of billions of people who in the new society devoted to economism feel as if time accelerates because the economy threatens them, but on the other hand, they find the same situation in every city, they have no place to take refuge[17]. Unfortunately, there does not seem to be a universal solution to this crisis, and apart from those who have yet to be born, there is not much that can be done for contemporary adolescents, in whom we see much higher rates of cases of depression than those who came before them, with suicide rates at an all-time high. However, according to Galimberti, it is necessary for parents and teachers not to stop communicating with them; perhaps new ground can be found on which to cultivate new forms of making connections.

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17 // M. Benasayag and G. Schmit, "L'accelerazione Del Tempo," in L'epoca Delle Passioni Tristi, trans. Eleonora Missana (Milano: Feltrinelli, 2018), p. 48.

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2.1.1 // The birth of a new coping mechanism?

> A gentleman passing through Vienna in the early years of the twentieth century was feeling enormously depressed, even suicidal—so he went to see Sigmund Freud.
>
> Freud listened to him for an hour, then said, "This is a serious and deep-seated condition not to be dealt with in an afternoon. You must seek professional help and prepare yourself for years of treatment. Meanwhile, however, you may find an evening of surcease. The great Grimaldi the Clown is in town and he has his audiences convulsed with laughter. Attend a performance. For two hours, you will surely enjoy yourself and this may have an ameliorative effect that will last for days."
>
> "I'm sorry," said the depressed gentleman, "I can't do that."
>
> "But why not?" asked Freud.
>
> "Because I am Grimaldi the Clown." [18]

This excerpt from Isaac Asimov's memoir is an important reflection the author makes on the role of humor as a response to a negative psychological feeling. Asimov, on a cruise, felt miserable about being separated from his beloved and in response to his condition became a "tummler," a person who entertains people with humor and games. Only once he got off the ship did he come to the conclusion that his behavior was a way of appearing happy when he really was not, identifying himself with the figure of the famous Grimaldi the clown.

Building upon Asimov's observation, curiosity arises to reflect on the new form of humor that has developed in recent years, thanks in part to social media: memes.

The term was invented by British scientist Richard Dawkins[19], according to whose evolutionary perspective a meme is a unit, a pattern underlying human behavior that can be perpetrated and can spread through culture.

Thus, one could effectively speak of a snapshot of thought, since the culture and philosophy of memes correspond to the attitudes of Gen Z itself: they reflect the absurdist and nihilistic approach this generation takes to everyday life.

The reason why this form of humor works lies precisely in the fact that, albeit in a twisted way, it expresses common feelings among teenagers or young adults. This method of communication also helps younger generations to de-stigmatize formerly taboo topics; in fact, topics such as sexuality, racism, politics, mental health, and bullying are not uncommon in this type of content. One can identify the creation and exposure to memes as the outlet of a generation largely subject to the constant flow of digital information in the modern world and the social, environmental, and political scourges that govern it.

There is a plethora of research[20] regarding the relationship between humor and psychological health, starting with Freud who first identified "witticisms" describing them as psychological mechanisms through which one can release

Memes express common feelings among teenagers.

18 // I. Asimov, "Cruises," in I. Asimov: A Memoir (New York: Bantam, 1995), p. 456.

19 // R. Dawkins, "Memes: the New Replicators," in The Selfish Gene (Oxford: Oxford University Press, 1976), pp. 189–201.
20 // M. Ito and E. Matsushima, "Presentation of Coping Strategies Associated with Physical and Mental Health during Health Check-Ups," Community Mental Health Journal 53, no. 3 (August 11, 2016): pp. 297–305, https://doi.org/10.1007/s10597–016–0048–9.

otherwise repressed psychic energy[21]. Humor is configured as a real coping strategy of unpleasant emotional experiences and problematic everyday situations (especially those that cannot be changed): grasping the comic elements of a situation puts a distance between oneself and the problem that reduces the experiences of anxiety, frustration, and helplessness, changing the perception of the difficulties we are experiencing.

It is therefore plausible to say that memes are the way adolescents express themselves best, the means of communicating often ineffective thoughts with words alone, to cope with an overwhelming reality, which requires, however, them to be functional and ready for anything, even if they are not prepared.

Fig. 2.1 Example of a meme showing teenagers' worry for the future

21 // Dott.ssa G. Calamai, "Umorismo e Regolazione Emozionale," IPSICO, Firenze, November 13, 2018, https://www.ipsico.it/news/umorismo-e-regolazione-emozionale/#:~:text=L'umorismo%20si%20configura%20come,il%20problema%20che%20riduce%20i.

Fig. 2.2 Example of meme coping with the malaise of teenagers

Fig. 2.3 Example of meme joking on the anxiety state and love life of teenagers

2.2 // The stigma

Many people suffering from significant mental illness face two challenges. On the one hand, they are dealing with the disease's symptoms and impairments. On the other hand, people face stereotypes and prejudice as a result of misconceptions regarding mental illness. While comprehending the disease's impacts has advanced significantly, research has only recently begun to address the stigma associated with mental illness. There is still much research to be done in order to fully understand the breadth and depth of bias against people with mental illness.

As shown in Table [2.1], stigma has a dual influence: public and self-inflicted. The broader public's reaction to those with mental disorders is known as public stigma, instead, self-stigma is a prejudice that persons suffering from mental illnesses hold towards themselves. Both public and self-stigma can be broken down into three parts: stereotypes, prejudice, and discrimination. Stereotypes are efficient social knowledge structures that represent collectively agreed-upon notions of groups of persons. They are "efficient" because people can quickly generate impressions and expectations of individuals who belong to a stereotyped group. In contrast to stereotypes, which are beliefs, prejudicial attitudes involve an evaluative (generally negative) component. Prejudice, which is fundamentally a cognitive and affective response, leads to discrimination, and when it yields anger can lead to hostile behavior.[22]

To completely grasp the concept of public stigma, it is necessary to refer to the research of Canadian sociologist Erving Goffman. According to his research, each society determines what qualities

Table 2.1

Comparing and contrasting the definitions of public stigma and self-stigma

Public stigma	Stereotype	Negative belief about a group (e.g., dangerousness, incompetence, character weakness)
	Prejudice	Agreement with belief and/or negative emotional reaction (e.g., anger, fear)
	Discrimination	Behavior response to prejudice (e.g., avoidance, withhold employment and housing opportunities, withhold help)
Self-stigma	Stereotype	Negative belief about the self (e.g., character weakness, incompetence)
	Prejudice	Agreement with belief, negative emotional reaction (e.g., low self-esteem, low self-efficacy)
	Discrimination	Behavior response to prejudice (e.g., fails to pursue work and housing opportunities)

Table 2.1 // P. W. Corrigan and A. C. Watson, "Understanding the Impact of Stigma on People with Mental Illness," World Psychiatry : Official Journal of the World Psychiatric Association (WPA 1 (February 2002).

its members must exhibit in order to be legitimized to belong to it. This mechanism is required for the formation of preconceptions and prejudices, which serve as the basis for an individual's admission or rejection into the group.

To further develop the concept of normalization it is interesting to look at the analysis conducted by Benasayag and Schmit. They explain how the emergence of stigma, also known as labeling, is dictated by the evolution of classification medicine as a reflection of the tendency of Western culture to represent reality in mathematical and systematic form in order to understand it. This Western tendency's perverse component is the conviction that reality must organize itself in accordance with grids, patterns, and notions. Once formed,

22 // P. W. Corrigan and A. C. Watson, "Understanding the Impact of Stigma on People with Mental Illness," World Psychiatry : Official Journal of the World Psychiatric Association (WPA 1 (February 2002).

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categorization with labels plays a significant role in how we interact with the environment; anything overflowing is then viewed as a disruptive aspect of reality. The label issue reminds us of the social norm and how it functions in our cultures. The norm is based on the way the gaze circulates: it is normal what does not attract the gaze, what is given to be seen, what must be seen, and what must be ignored. Not being a transparent object, in fact, forms the basis of sociability. The label can lead us to believe that we are seeing the very essence of the labeled person, which can lead to a normalizing gaze.

> È il "miracolo" dell'etichetta: produce l'impressione che l'essenza dell'altro sia visibile. A quel punto, l'altro non è più una molteplicità contraddittoria che esiste in un gioco di luci e di ombre, di velato e svelato, ma diventa immediatamente visibile e riconoscibile. Si è convinti, grazie all'etichetta, di sapere tutto sull'altro, chi è, cosa desidera e come è strutturata la sua vita, perché l'etichetta non si limita a classificare, ma stabilisce un senso, una sorta di ordine nella vita di chi la porta. Dobbiamo allora chiederci: cosa sappiamo realmente dell'altro quando conosciamo la sua etichetta? Il problema sta proprio nel fatto che il sapere (savoir) si confonde con il ciò che è dato da vedere (çà a voir).[23]

To fight mental health related stigma it is important to spread

knowledge[24], therefore it is essential to inform the population, especially young people, to enable them to create opportunities and get out of their unhealthy state. According to Giovanni Migliarese, chief of psychiatry at Vigevano Hospital and an adolescent specialist, young people are inclined to always consider themselves healthy and tend to refuse treatment of any kind. But even if they agree to treatment, they risk being bullied the moment they talk about it with their peers. Discriminatory acts prevent numerous people from seeking psychological help, or from trying to find happiness and zest for life, and lead to the state of malaise that is seen to permeate contemporary society. For example, during a study of more than 37 thousand English university students, it was found that 8 out of 10 people with diagnosed mental health problems hide their symptoms for fear of being stigmatized.[25]

It is therefore necessary for society and in psychotherapy to bring people to see each other without labels of any kind. Only in this way will it be possible to overcome social determinism to achieve the freedom to be oneself, to ask for help, and to face a frightening future. In this regard, the World Health Organization has drawn up a global-scale action plan in which mental health is valued, promoted, and protected; community services are quality, culturally appropriate, and economically available to all; and people with mental disorders can actively participate in a society free of labels, discrimination, and abuse.

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23 // "This is the "miracle" of the label: it produces the impression that the essence of the other is visible. At that point, the other is no longer a contradictory multiplicity that exists in a play of light and shadow, of veiled and unveiled, but becomes immediately visible and recognizable. One is convinced, thanks to the label, that he or she knows everything about the other, who he or she is, what he or she wants, and how his or her life is structured, because the label does not merely classify, but establishes a meaning, a kind of order in the life of the wearer. We must then ask ourselves: what do we really know about the other person when we know his or her label? The problem lies precisely in the fact that knowing (savoir) becomes confused with what is given to see (çà a voir)." [my traduction],M. Benasayag and G. Schmi, "La Dinamica Dello Sguardo Sull''Altro,'" in L'epoca Delle Passioni Tristi, trans. Eleonora Missana (Milano: Feltrinelli, 2018), p. 75.

24 // Paola De Rose, "È Giunta L'ora Di Superare Lo Stigma per Le Malattie Mentali," Fondazione Umberto Veronesi, November 11, 2020, https://www.fondazioneveronesi.it/magazine/articoli/neuroscienze/stigma-come-affrontare-il-veleno-sociale-contro-le-malattie-mentali.
25 // "Largest Survey of Its Kind Reveals Extent of University Students' Struggles with Thoughts of Self-Harm, Loneliness and Anxiety," March 5, 2019, https://www.rethink.org/news-and-stories/news/2019/mar/largest-survey-of-its-kind-reveals-extent-of-university-students-struggles-with-thoughts-of-self-harm-loneliness-and-anxiety/.

Steven's experience with stigma

My chronic anxiety started around 15 years ago, when I was studying for my law degree. I put a lot of pressure on myself to be a high achiever and set the bar so high it was at times unachievable. I had low self-worth. My anxiety got so bad it was hard to get out of bed some days. It stayed with me as I trained to become a lawyer. I couldn't tell management of my mental health struggles. I felt that I would be perceived as "weak" and "not able to do my job" and I felt I'd lose the respect of my colleagues. I didn't want to go to work anymore. I felt I was changing, becoming someone I didn't recognize or like. I tried to discuss it with my family but couldn't express how I was feeling in words. It still hurts today when I cast my mind back to this difficult period of my life. Then I had a lightbulb moment. I reached out for support from a psychologist. It was a breath of fresh air. For the first time I felt somebody understood and didn't judge me. This lifted a huge weight off my shoulders. The psychologist showed me how I could break things down which allowed me to cope better and not become so overwhelmed with life. I have used this advice in every aspect of my life, even today, running my own company promoting mental health awareness within business and law firms. I still suffer with my anxiety and feelings of low self-worth. But I have learned to manage them and I am in a happy place with a good mindset. I have also been successful in what I do, which I believe is because I have lived experience and can relate to the needs of my clients. I would like to advise anyone reading this to not let your mental health struggles define who you are. Do not feel pressured to perform or rush things: you are on your own path and you will achieve your dreams and goals in your own time.

Steven Lawlor,
United Kingdom [26]

2.3 // Adolescents in university

Because the first three decades of life have the biggest impact on future mental health disorders, the times when people are involved in school are extremely important in anticipating healthy growth free of mental diseases.

From numerous amount of studies, we are aware that today's mental health problems are widespread among college students (Auerbach et al., 2019; Rotenstein et al., 2016) and their prevalence has even increased in recent decades due to student life challenges, which can be divided into two types: college-related or non-college-related. Among the latter, several studies (Richardson et al., 2016) have found links between economic pressures and lack of social support with poorer mental health states. While, among the college-related factors that lead to worse mental health we recognize: the large amount of work, lack of feedback, negative relationships with faculty members, lack of peer support, fear of not learning the knowledge needed for future work, and lack of interest. Research conducted by Fabio Porru et al., 2022 shows that greater exposure to student life challenges in a sample of 568 Italian university students is associated with worse mental health and self-rated health states. Therefore, it is crucial that universities address student life challenges by acting on teaching methods and the academic environment, motivating and stimulating students to actively take care of their health. Change should begin with institutions since, when looking at the Italian university structure, it is quite obvious to see how the principles on which the "corporate university"[27]

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26 // S. Lewis et al., "The World Mental Health Report: Transforming Mental Health for All," World Health Organization 21, no. 3 (September 08, 2022): pp. 67-67, https://doi.org/10.1002/wps.21018.

27 // Il Severo Discorso Di Tre Neolaureate Durante La Consegna Diplomi Alla Normale Di Pisa (YouTube, 2021), https://www.youtube.com/watch?v=QFLMT_55FaQ.

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is based, which follows the logic of profit, are in direct conflict with the psycho-physical health of its students. Furthermore, the principle of merit is a trigger reason for a competitive system that rewards the strongest and penalizes the weakest, according to which students can receive benefits such as student housing, food vouchers, and scholarships, which are essential for many to face student life challenges. But the race for "merit" is not only antithetical to what education and critical knowledge are about, but it is also irreconcilable with mental health.[28]

Unfortunately, a visible tally of the mental health status of Italian students, but not only, can be observed in suicide rates. Although there is not enough updated data from recent years, the number of suicides remains very alarming. Stefano Vicari, head of the Uoc of Neuropsychiatry of Childhood and Adolescence at Irccs Children's Hospital Bambino Gesù, reported that "self-harm affects 20 percent of adolescents in Italy: suicides are the second leading cause of death among 10- to 25-year-olds. And the pandemic has worsened the situation and increased emergency room admissions for this reason".[29]

In another study conducted by researchers at Harvard Medical School, among 67,000 students from more than 100 universities, 1 in 5 students reported having had suicidal thoughts in the 12 months prior to the year of the research (2018). Of these students, 9% reported attempting suicide, and nearly 20% reported self-harm. The study found that students' suicidal thoughts are a consequence of high levels of stress and anxiety

disorders that are generated within university environments.[30]

With the aim of deepening knowledge of the mental health status of college students, three scientific reports will be summarized below.

SCIENTIFIC STUDY 1:
WHO World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders.[31]

The present study reports initial results from the first stage of the WHO World Mental Health International College Student project, in which a series of surveys in 19 colleges across 8 countries (Australia, Belgium, Germany, Mexico, Northern Ireland, South Africa, Spain, United States) were carried out with the aim of estimating prevalence and basic sociodemographic correlates of common mental disorders among first-year college students. The questionnaire respondents were 13,984 full-time students and included short validated self-report screening scales for lifetime and 12-month prevalence of six common DSM–IV mood (major depressive disorder, mania/hypomania), anxiety (generalized anxiety disorder, panic disorder), and substance (alcohol abuse or dependence [AUD], drug abuse or dependence, involving either cannabis, cocaine, any other street drug, or a prescription drug either used without a prescription or used more than prescribed to get high, buzzed, or numbed out).

28 // M. Greco and G. Ragusa, "Università e Salute Mentale: Un Problema Non Più Rimandabile," Senza Tregua, August 2, 2021, http://www.senzatregua. it/2021/08/02/7347/.
29 // Nicla Panciera, "Allarme Suicidi Tra i Giovani: Con La Pandemia Aumentati Del 20%," la Repubblica (la Repubblica, January 22, 2021), https://bit.ly/3yz4sgo.

30 // Johanna Younghans, "College Stress," College Stress | Harvard Medical School, September 10, 2018, https://hms.harvard.edu/news/college-stress.
31 // R. P. Auerbach et al., "Who World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders.," Journal of Abnormal Psychology 127, no. 7 (October 2018): pp. 623–638, https:// doi.org/10.1037/abn0000362.

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Two of the outputs from the survey are:

- Thirty-five percent of the 13,984 respondents in the main sample reported at least one of the lifetime mental disorders assessed in the survey, and 31% reported at least one mental disorder in the past 12 months.

- Major depressive disorder (MDD) was the most common of the disorders examined across all countries combined (21.2% lifetime prevalence; 18.5% 12-month prevalence) followed by generalized anxiety disorder.

It is worth noting, however, that both sets of surveys, also WMH surveys (Auerbach et al., 2016[32]), found that the majority of lifelong mental problems among college students began before enrollment and that the persistence of these diseases was quite high, implying that therapeutic treatments early in the college career may be necessary. Given the scarcity of mental health resources on most college campuses in comparison to the magnitude of the problem, there is also a need to investigate cost-effective alternatives to closing the treatment gap for this critical part of the population (e.g., group psychotherapy, and internet-based psychotherapy). The last one would be a practical response in addition to the services already offered by student mental health and counseling centers. There are a variety of internet-based interventions available for a wide range of psychiatric disorders (e.g., depression, anxiety, eating disorders) and associated problems (e.g., sleep, stress) that have been demonstrated to be effective for both prevention and treatment of these conditions; particularly guided Internet-based CBT interventions. These treatments, in addition to being low-cost, address a number of other major impediments to treatment, most notably stigma and inconvenience. Internet-based therapies might be particularly beneficial if utilized to prioritize care in campus mental health counseling facilities, with students reporting less severe symptoms getting these interventions.

SCIENTIFIC STUDY 2:
A systematic review of studies of depression prevalence in university students.[33]

A systematic literature review of PubMed, PsycINFO, BioMed Central and Medline databases was carried out to identify peer-reviewed studies, published between January 1990 and October 2010, reporting on depression among undergraduate university students. Out of a total of 2303 publications, only 24 studies satisfied all the inclusion and exclusion criteria.
According to this current review, the average depression prevalence is 30.6%, a higher rate than the 9% found in the general population rates of the US (Gonzalez et al., 2010). Moreover, a community-based cross-national survey of depression prevalence carried out in 10 countries in North America, Latin America, Europe, and Asia and using the Composite International Diagnostic (CIDI), reported a mean prevalence of 9.8%, again much lower than the weighted mean in this systematic review of studies confined to student populations. This might be due to the fact that students experienced more stresses concerning their futures and employment or that they were less satisfied with their studies. It might also indicate that being a student is one factor predisposing

32 // R. P. Auerbach et al., "Mental Disorders among College Students in the World Health Organization World Mental Health Surveys," Psychological Medicine 46, no. 14 (August 3, 2016): pp. 2955–2970, https://doi.org/10.1017/s0033291716001665.

33 // A. K. Ibrahim et al., "A Systematic Review of Studies of Depression Prevalence in University Students," Journal of Psychiatric Research 47, no. 3 (March 2013): pp. 391–400, https://doi.org/10.1016/j.jpsychires.2012.11.015.

to depression. Although there is a need for more in-depth research to confirm the findings of this review, there is accumulating evidence to suggest that depression represents a significant health concern in university populations with, on average, nearly a third of students affected. Furthermore, the weighted mean prevalence of depressive disorders in students of 30.6% is considerably higher than rates reported in general populations. This systematic review emphasizes that depression is a common mental health problem in university students. Although females are more at risk, the high rates for male students are particularly concerning since they are typically less willing to access support. The results of this review suggest that more attention should be given to identifying and managing depression in university settings. With current economic pressures, vulnerability may increase further unless research is conducted to establish effective interventions for management of depression in students. [Fig 2.4]

SCIENTIFIC STUDY 3:
Effects of COVID-19 lockdown on university students' anxiety disorder in Italy[34].

The pandemic condition produces several problems, changing health perceptions and worsening students' expectations about the future. Due to the COVID-19-related restrictions, students have experienced a new way to approach university life, with social distancing and remote learning (online lessons and exams), with a deep impact on their social life and mental health. Pathological anxiety among students is a

Fig. 2.4
Forest plot of studies on depression among college students
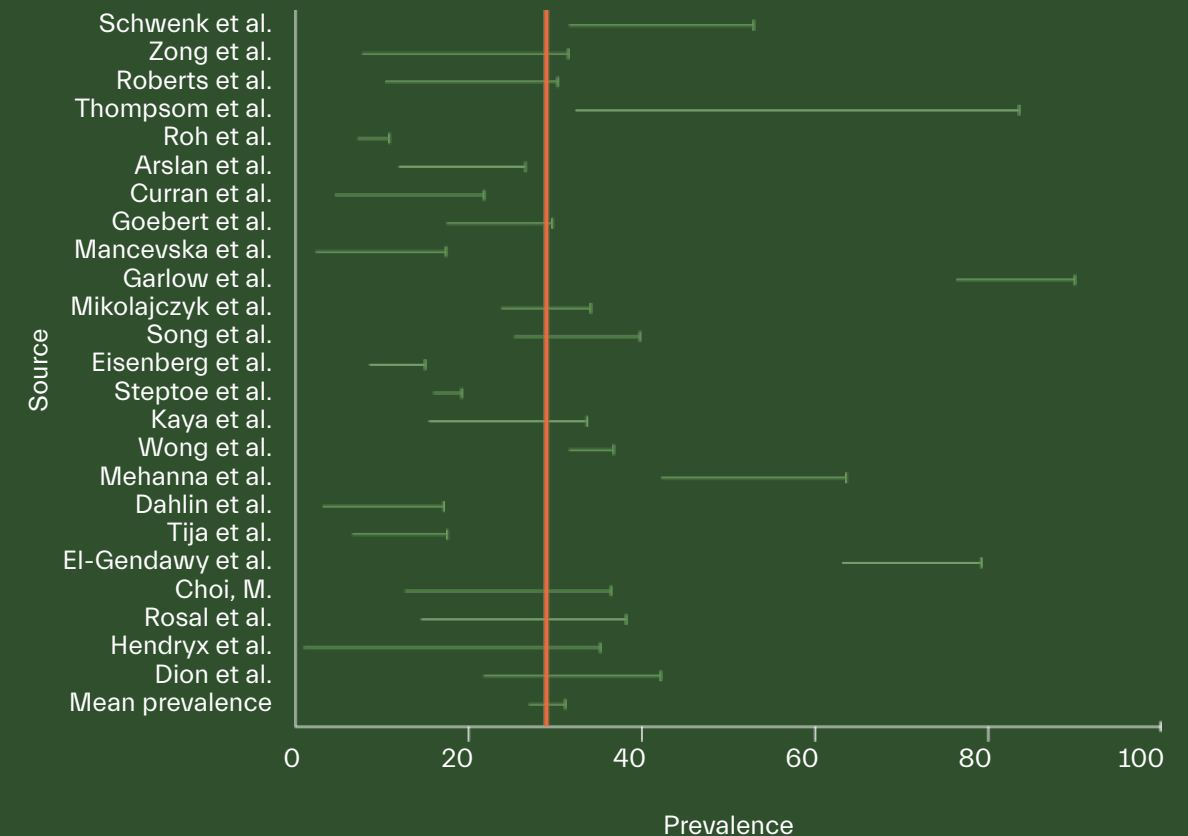
problem that needs to be faced. Our study investigates the impact of the COVID-19 outbreak on anxiety among Italian university students.
For our analyses, we use data from an ad hoc questionnaire, administered during the lockdown to the students of three Italian universities: Messina (southern Italy), Udine (northern Italy), and the Marche Polytechnic (central Italy) in Ancona. All the students from all departments of the three universities were invited to take part in the survey, which was open from

34 // G. Busetta et al., "Effects of Covid-19 Lockdown on University Students' Anxiety Disorder in Italy," Genus 77, no. 1 (October 9, 2021), https://doi.org/10.1186/s41118–021–00135–5.

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the 29th of April to the 17th of May 2020. The total number of answers to the survey was: 1228 from the students at the University of Udine (28%), 1461 from the University of Messina (33%), and 1690 from the Marche Polytechnic University (39%): in sum, 4379 answers were gathered in 19 days.

As the seasonal element is never present in the DSM-5 as a factor that influences the anxiety disorder in a significant way (American Psychiatric Association, 2013) and the period chosen for submitting the questionnaire is sufficiently far from the exam sessions, the only possible reason for this increase in anxiety level must be connected to the pandemic.

For our analyses, we estimate two Probit Models[35] (Models A and B). We aim at investigating the potential transition to a state anxiety level that is higher than trait anxiety, creating two dichotomous variables to be used as dependent. In Model A, the dependent variable takes value 1 if the State anxiety level is high and 0 otherwise. In Model B, the dependent variable takes value 1 for students who are in a high State anxiety level and with a state anxiety score higher than the trait anxiety score. [See Fig. 2.5]

We note that, among students with low trait anxiety, 347 (39.16%) start presenting a high level of anxiety during the lockdown. Among the 975 students affected by a moderate trait anxiety level, 625 (64.10%) transit to a high state anxiety level. Thus, out of the 1861 students who did not suffer from relevant anxiety problems, 972 (52.23%) start experiencing such issues. Moreover, we note that out of the 2518 fragile students (i.e., those who suffer from a high level of trait anxiety), 1600 (63.54%) have worsened their problems during the pandemic.

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35 // In statistics, a probit model is a type of regression where the dependent variable can take only two values.

Our four hypotheses are confirmed by the performed analyses. As we could expect from the literature, state anxiety during the lockdown is higher than trait anxiety. More than 50% of our sample starts suffering from anxiety during the lockdown and more than 60% of students affected by high trait anxiety have worsened their problems during the pandemic.

Fig. 2.5
Predicted probabilities for the Probit models

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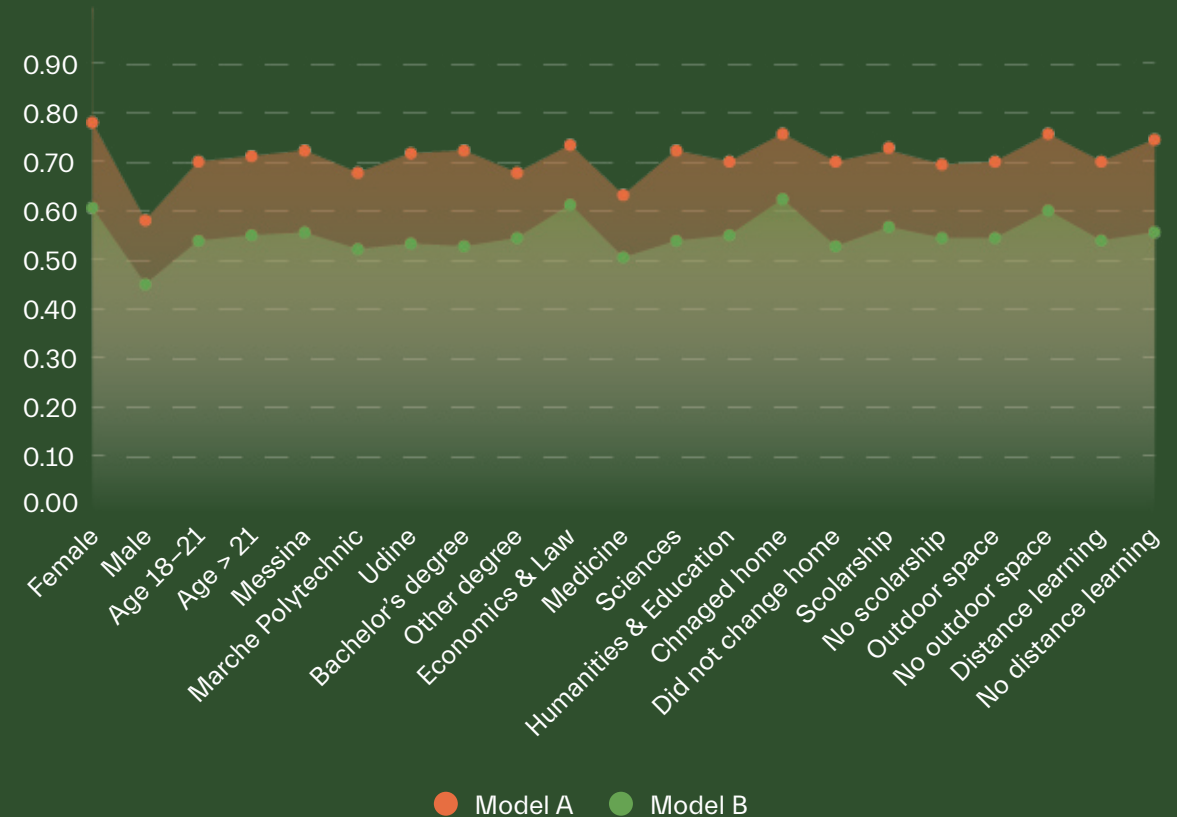
2.4 // Exploratory survey

Based on the facts obtained thus far, I became curious to learn as much as possible about the mental health of college students firsthand. An exploratory questionnaire was built for this aim, which could be completed anonymously online using the Google Forms platform. The questionnaire was available for two weeks and was administered in English so that foreign students at Italian universities could participate.

2.4.1 // Purpose and structure

The questionnaire comprised two common tests used by specialists to identify the degrees of generalised anxiety disorder and major depressive disorder through a quantitative evaluation. Spitzer et al.[36] created the GAD-7 (Generalised Anxiety Disorder 7) test, which consists of seven questions and is intended to measure the severity of early symptoms or changes in anxiety states in the two weeks preceding the test. The GAD-7 score is calculated by assigning scores of 0, 1, 2, and 3, to the response categories of 'not at all', 'several days', 'more than half the days', and 'nearly every day', respectively, and adding together the scores for the seven questions.

Scores of 5, 10, and 15 are taken as the cut-off points for mild, moderate, and severe anxiety, respectively. Further evaluation is recommended when the score is 10 or greater when used as a screening tool.

Using the threshold score of 10, the GAD-7 has a sensitivity of 89% and a specificity of 82% for

GAD. It is moderately good at screening three other common anxiety disorders - panic disorder (sensitivity 74%, specificity 81%), social anxiety disorder (sensitivity 72%, specificity 80%), and post-traumatic stress disorder (sensitivity 66%, specificity 81%).

The second test used to evaluate levels of depressive disorder is the MDI (Major Depression Index), which is a new, brief, self-report measure for depression based on the DSM-system, which allows clinicians to assess the presence of a depressive disorder according to the DSM-IV, but also to assess the severity of the depressive symptoms in the 2 weeks before[37]. As the GAD-7 also for this test scores are assigned according to the response categories of "at no time", "some of the time", "slightly less than half of the time", "slightly more than half of the time", "most of the time", and "all the time". Adding up the scores it's possible to estimate "no depression" from 0 to 20, "mild" depression from 20 to 24, "moderate" depression from 25 to 29, and "severe" depression above 30.

To filter the responses to the questionnaire between those considered of interest for the purpose of the research and those not of interest, the questionnaire opens by asking whether the participant is a college student or not. This made it possible to eliminate irrelevant responses, which turned out to be 29 (8.4%).

Three different approaches were selected as means of sharing the questionnaire: the first through direct acquaintance with friends and university colleagues, the second involved the use of QR code stickers to stick around the Politecnico University campus in Milan, and the third method took advantage of the online platform Reddit where

36 // R. L. Spitzer et al., "A Brief Measure for Assessing Generalized Anxiety Disorder," Archives of Internal Medicine 166, no. 10 (May 22, 2006), https://doi.org/10.1001/archinte.166.10.1092.

37 // P. Cuijpers et al., "Sensitivity and Specificity of the Major Depression Inventory in Outpatients," BMC Psychiatry 7, no. 1 (August 9, 2007), https://doi.org/10.1186/1471–244x-7–39.

Table 2.2
Questionnaire's question on GAD-7

Over the last 2 weeks, how often have you been bothered by the following problems?

	Not at all	Several days	More than half the days	Nearly every day
Feeling nervous, anxious or on edge	◯	◯	◯	◯
Not being able to stop or control worrying	◯	◯	◯	◯
Worrying too much about different things	◯	◯	◯	◯
Trouble relaxing	◯	◯	◯	◯
Being so restless that it is hard to sit still	◯	◯	◯	◯
Becoming easily annoyed or irritable	◯	◯	◯	◯
Feeling afraid as if something awful might happen	◯	◯	◯	◯
	0	+1	+2	+3

Table 2.3
Questionnaire's question on MDI

Over the last 2 weeks, how often have you been bothered by the following problems?w

	At no time	Some of the time	Slightly less than half of the time	Slightly more than half of the time	Most of the time	All the time
Felt lacking in energy and strength?	◯	◯	◯	◯	◯	◯
Felt less self-confident?	◯	◯	◯	◯	◯	◯
Had a bad conscience or feelings of guilt?	◯	◯	◯	◯	◯	◯
Felt that life wasn't worth living?	◯	◯	◯	◯	◯	◯
Had difficulty in concentrating, e.g. when reading the newspaper or watching television?	◯	◯	◯	◯	◯	◯
Felt very restless?	◯	◯	◯	◯	◯	◯
Felt subdued or slowed down?	◯	◯	◯	◯	◯	◯
Had trouble sleeping at night?	◯	◯	◯	◯	◯	◯
Suffered from reduced appetite?	◯	◯	◯	◯	◯	◯
Suffered from increased appetite?	◯	◯	◯	◯	◯	◯
	0	+1	+2	+3	+4	+5

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one can share one's posts within groups, called subReddit, that gather large pools of users. The first two methods resulted in a total of about one hundred responses, while through Reddit a total of 346 responses were reached, also obtaining numerous shares and comments from users of the "Universitaly" subReddit, demonstrating an interest in the topic discussed.

2.4.2 // Insights and results

The total number of responses obtained is 346, but subtracting the 29 belonging to non-college students, the total is 317. No other personal information was asked of the participants since age and nationality of membership is not information of interest for the purpose of this research. Once the data were filtered, two illustrative tables were generated: in Fig 2.8 one can see the results to the GAD-7 test, and in Fig 2.9 the results to the MDI test. The first observations that can be made are on the distribution of responses, for anxiety problems there is a more balanced distribution while for depressive disorders there is a majority split between the two ends of the spectrum. In general, the majority of students seem to present with anxiety states, confirming the statistics presented in the previous chapter and demonstrating that there is a need for institutions to intervene to improve students' quality of life. First, it would be appropriate to publicize more and better the free psychological support services provided by universities since 54.2% of the respondents to the questionnaire are not even aware of their presence.

In addition, the questionnaire was shared in

October 2022, thus far away from exam sessions, which lead students to be more stressed and anxious about the results they hope to achieve. In fact, 62% of them believe they would have given different answers during the exam period.

Fig. 2.6
GAD-7 test results

Fig. 2.7
MDI test results

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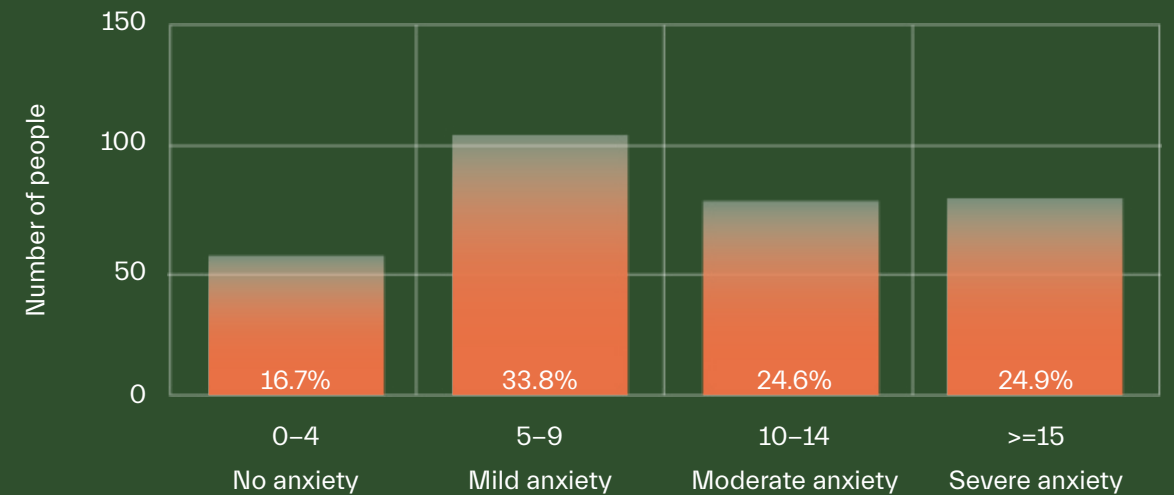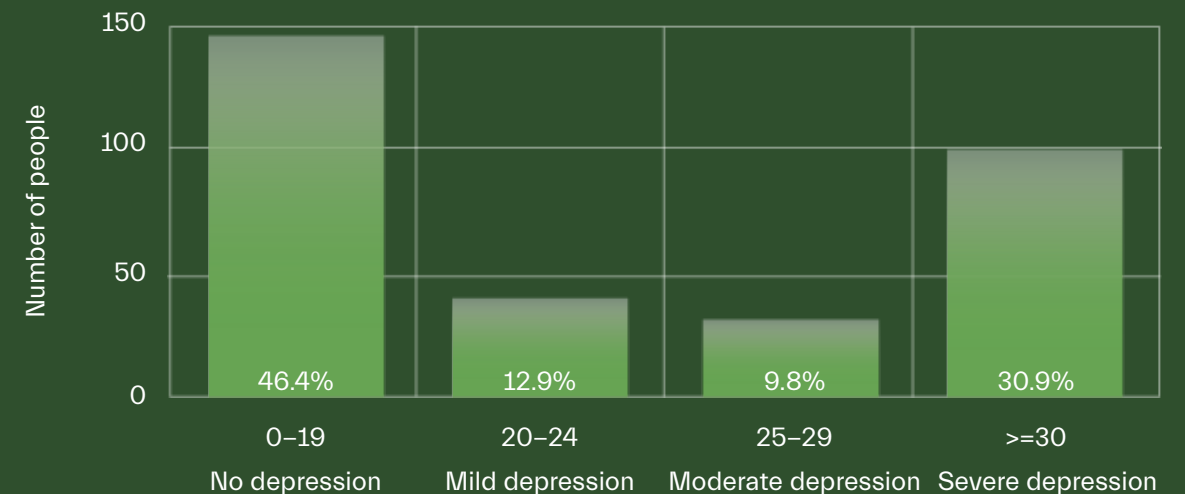
2.5 // When one door closes, another opens[38]

The name of this paragraph was chosen because of the history of optimism that in Western culture is associated with Alexander Bell's famous phrase. Until now, this chapter has discussed adolescents' mental health problems, their status within society, and their possibilities for the future. However, the topics covered did not present positive and optimistic notes, but, with this paragraph, the intent is to turn the mood around and conclude the chapter by opening new doors.
In the book "The Age of Sad Passions," the two authors lay the groundwork for a revolution in psychotherapeutic practice and implement the shift from a clinic of symptoms to what they call a "clinic of bonding". In previous therapeutic practice, the patient was identified as a group of symptoms, existing simply as a serial individual to be normalized and put in line, with no relationships or conditions that were constitutive to him or her. Instead, because people are diverse and varied, categorizing them may not always be therapeutically effective. The bonding clinic, or situational clinic begins with the assumption that the practitioner knows nothing about the patient, so does not define him or her at first glance, but establishes a relationship capable of emergence in a space of not-knowing and thus of shared discovery. This practice does not aim to bring about powerlessness, but rather to discover the potential of each person once one is freed from the uni-dimensionality of the label. What the

Because people are diverse and varied, categorizing them may not always be therapeutically effective.

patient may call a symptom is often nothing more than an element of his or her way of being so the tendency should not be to remove it as soon as possible, but more to understand its meaning within the multidimensionality of the person. If the patient says he wants to remove that something, it should not be taken literally because it consists of multiple dimensions that are, of course, contradictory; this does not mean neglecting the embarrassment produced by the symptom. "A clinic of the situation is thus a work of liberation of power, of those powers that Spinoza calls joyful passions"[39].
Thus, just as Benasayag and Schmit call on therapy professionals to seek new clinical practices to respond to youth distress, the World Health Organization also proposes new tools to effectively intervene in the tough fight against mental health in the younger generation. For example, interventions through the web could address this need as they have been shown to be effective for the prevention and treatment of anxiety disorders, stress and depression, and particularly with CBT[40].
Since young people are highly connected to digital technologies, such as precisely the Internet and related devices, taking advantage of these means proves necessary. This is evidenced by a study of 37,654 students in the United Kingdom, 63 percent of students who did not seek help said that if they had a way to get in touch with a mental

Interventions through the web have been shown to be effective.

38 // "When one door closes, another opens", quote from Alexander Graham Bell.

39 // M. Benasayag and S. Gérard, "Etica Ed Etichetta," in L'epoca Delle Passioni Tristi, trans. Eleonora Missana (Milano: Feltrinelli, 2018), p. 90.
40 // R. P. Auerbach et al., "Who World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders.," Journal of Abnormal Psychology 127, no. 7 (October 2018): pp. 623–638, https://doi.org/10.1037/abn0000362.

health professional online they would have done so[41].

In an effort to bring attention to new tools for mental therapy, the next chapter will introduce a new device for the prevention and treatment of some mental disorders.

41 // "Largest Survey of Its Kind Reveals Extent of University Students' Struggles with Thoughts of Self-Harm, Loneliness and Anxiety," March 5, 2019, https://www.rethink.org/news-and-stories/news/2019/mar/largest-survey-of-its-kind-reveals-extent-of-university-students-struggles-with-thoughts-of-self-harm-loneliness-and-anxiety/.

// 3

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Since the smartphone revolution, identified in 2007 with the release of the first iPhone, electronic devices have become increasingly useful, necessary, and part of our individuality. Although there are numerous scientific studies regarding the impact that screens and social networks have on people's mental and physical health, the time we use devices is increasing year by year. On average, we spend 4.2 hours a day on our phones[42], a steady 20% increase annually. This trend has been particularly influenced in the last period by the COVID-19 pandemic, which during the various quarantines has forced many people to need smartphones and computers to carry out daily activities such as working, talking to family and friends, buying necessities, etc. In recent years we are also witnessing the development of new technological devices that seem to promise a more connected and practical future, and given the rapid evolution of these technologies, the possibility of wearable devices, such as VR (Virtual Reality) and AR (Augmented Reality) helmets, replacing smartphones cannot be ruled out. There are many, including Apple CEO Tim Cook[43], who are convinced that a significant portion of the population around the world will have AR and VR experiences every day. In the future we will increasingly experience a virtual reality, where real and virtual are interconnected and one exists only in relation to the other, while wearable devices will allow us to immerse ourselves in new dimensions

> **On average, we spend 4.2 hours a day on our phones, a steady 20% increase annually.**

and travel without limits in time and space. Many believe that the current Internet will give way to the metaverse[44], a three-dimensional and immersive derivation of it that requires wearable devices to be experienced in the most experiential way possible. It is then necessary to accept this eventuality in order to try to prevent the phenomenon and not be caught unprepared; the challenge is therefore to develop strategies and services capable of taking advantage of future technologies to enact change for the better. For this reason, the following chapter introduces, describes, and provides practical examples of a new frontier in mental health care; it is intended to bring attention to how new technologies can create value and bring benefits, especially to those generations that use them most and need them most.

42 // " The State of Mobile 2021," Data.ai, accessed September 23, 2022, https://www.data.ai/en/go/state-of-mobile-2021/.
43 // "Watch Apple's Tim Cook Do a Q&A at the Utah Technology Council," The IT Nerd, October 4, 2016, https://itnerd.blog/2016/10/04/watch-apples-tim-cook-do-a-qa-at-the-utah-technology-council/.

44 // "A massively scaled and interoperable network of realtime rendered 3D virtual worlds that can be experienced synchronously and persistently by an effectively unlimited number of users with an individual sense of presence, and with continuity of data, such as identity, history, entitlements, objects, communications, and payments." M. Ball, "A DEFINITION (FINALLY) ," in The Metaverse: And How It Will Revolutionize Everything (New York, NY: WW Norton et Co, 2022).

3.1 // VR

> Any sufficiently advanced technology is indistinguishable from magic. [45]

3.1.1 // Definition and history

Although the immersivity principles underlying VR can be traced as far back as Robert Barker's Panorama Rotunda, the first virtual reality simulator was due to Morton Heilig who developed the Sensorama in 1962 [fig. 3.1] [fig. 3.2]. The system was capable of recreating the experience of a motorcycle ride along the streets of New York City using: a screen, stereophonic speakers, a tilting vibrating seat, and devices capable of reproducing temperature changes. The Sensorama, with the ability to artificially stimulate sight, hearing, touch, and smell, reproduced all the properties of a modern VR system, its limitation, however, was the limited interaction. A few years later, one of the pioneers of computer graphics, Ivan Sutherland, developed a display device called The Ultimate Display [fig. 3.3], also known as the "Sword of Damocles," which can be regarded as the first virtual reality viewer. Sutherland's creation introduced three key innovations: head movement tracking, the use of interactive computer-generated images, and stereoscopic viewing. In particular, the revolution involved the implementation of the principle of stationarity: the images represented are automatically "adjusted" when the user turns his or her head, just as real objects do not change position as we move. In the following decades, there were numerous innovations due to the participation of the U.S. military and NASA, the most noteworthy being

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45 // A. C. Clarke, Profiles of the Future (Gateway, 2020).

Fig. 3.1 SENSORAMA system

Fig. 3.2 SENSORAMA system
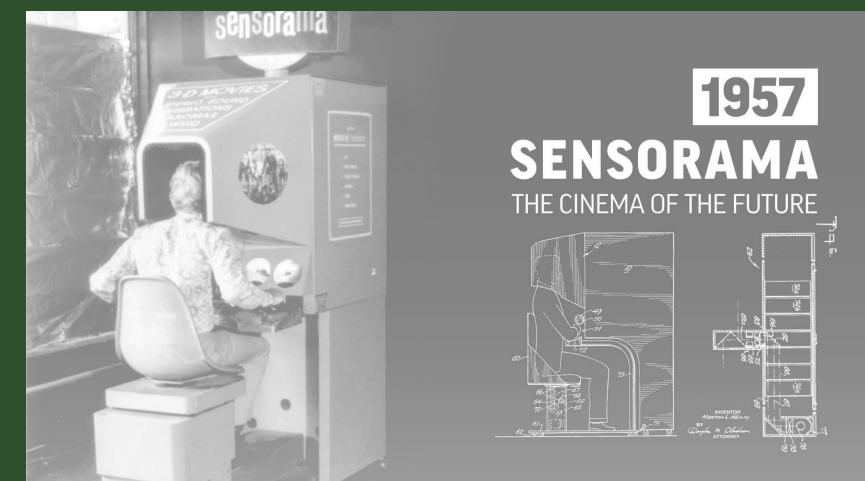
Fig. 3.3 Spada di Damocle
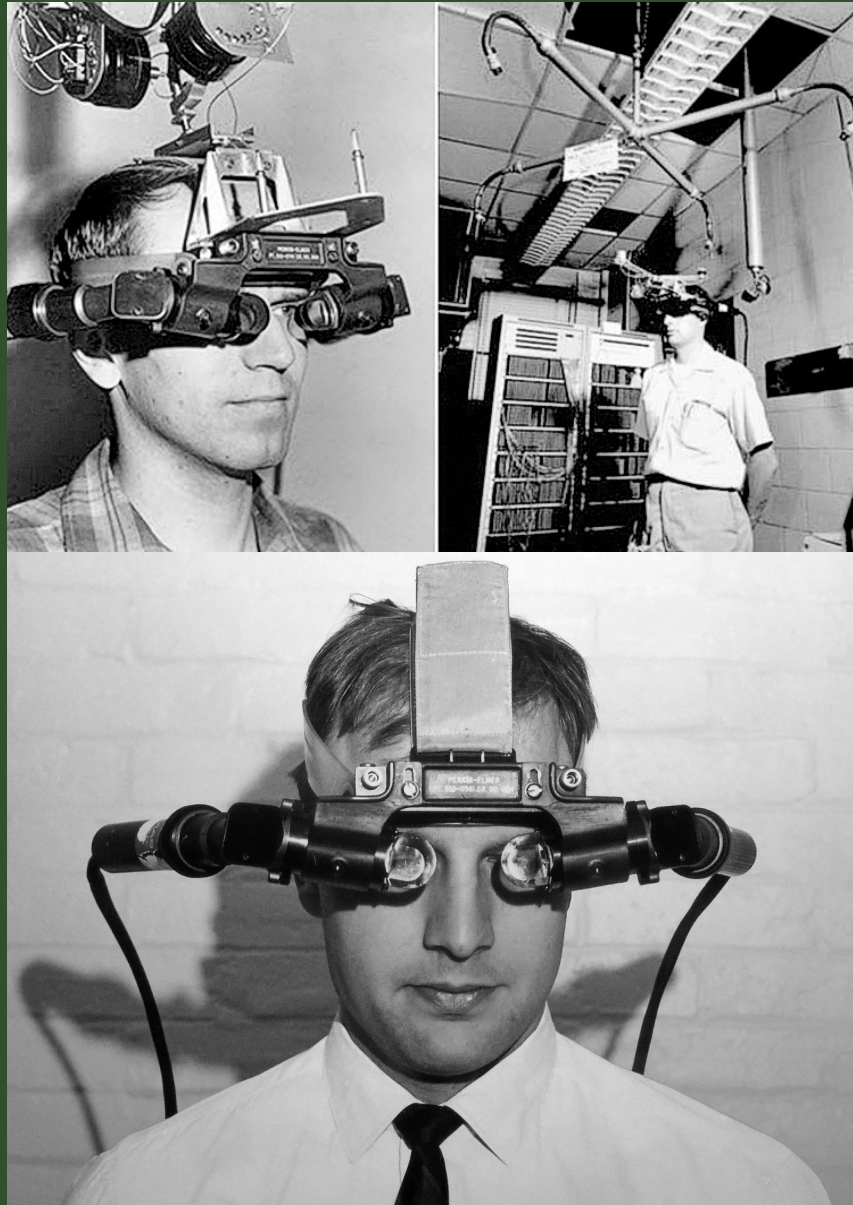
the implementation of a helmet that used LCD screens instead of the old cathode ray tubes so as to allow greater freedom of movement for the user. Another important event occurred in 1981 when Tom Zimmerman invented the first virtual glove (data glove)[46], which represented a fundamental step toward human-computer interaction in that it allowed interaction with the virtual environment. Later Zimmerman collaborated on the development of the virtual suit with Jaron Lanier, founder of VPL Research and the one who first used the term "virtual reality" in 1989. In the years to come, after an initial boom in popularity, the public lost interest due to the high cost of the devices, the low perceptual quality of the virtual experiences, and the limited amount of content. It was only in 2014 that investment and enthusiasm for the technology resumed following Facebook's purchase of Oculus, a start-up engaged in developing VR helmets. The social media giant again focused the market's attention when it announced in October 2021 that the company would change its name to META to more clearly reflect the company's new focus, the "METAverse." Nowadays, there is no single definition for VR, however, it could be said that a virtual reality system is, essentially, a combination of hardware and software devices that generate synchronized multisensory stimulation, capable of creating in the user the illusion of being physically located in a three-dimensional space and being able to interact with the objects and agents that are placed in it.[47]

In 2021, everyone's attention has focused once again on VR.

46 // G. C. Burdea and P. Coiffet, Virtual Reality Technology, 2nd ed. (Wiley & Sons, Limited, John, 2011).

47 // G. Riva, Brenda K. Wiederhold, and F. Mantovani, "Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine," Cyberpsychology, Behavior, and Social Networking 22, no. 1 (January 1, 2019): pp. 82–96, https://doi.org/10.1089/cyber.2017.29099.gri.

The main components that go to make up a virtual reality system are the software, that is the 3D space, the computer, the input peripherals that are used to provide information to the computer about the actions the user takes in the virtual space, and the output peripherals that transmit the sensory stimuli processed by the computer to the user. Virtual reality experiences are distinguished according to the level of immersion they provoke. Generally, they are classified:
- Immersive, they create in the user the impression of being surrounded by the virtual environment, isolating him completely or partially from the real environment where he is. The most popular systems are represented by virtual helmets that integrate a head-tracking sensor.
- Non-immersive, they use normal monitors and have no head movement tracking sensors.
- Of telepresence, they allow users to perform manual operations using cameras or robotic peripherals, such as interplanetary operations or microsurgery.
- Of augmented/mixed reality, they allow virtual images to be superimposed on the real environment through glasses or screens equipped with cameras. A famous example is the Glass developed by Google in 2013.

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Fig. 3.4
Reality – Virtuality continuum

The physical reality
of the real world

A virtual reality that presents a synthetic world in which the participant is totally immersed

Mixed reality

Real
Environment

Virtual
Environment

Augmented
Reality

Augmented
Virtuality

A form of physical reality in which participants also see virtual elements

A form of virtual reality in which participants also see real elements

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3.1.2 // Virtual environments

The parallel world into which one is transported during a VR experience is known as a virtual environment (VE), and the level of quality is extremely important to achieve compelling experiences. VE is software that generates interactive three-dimensional models with varying degrees of complexity. The detail of the scene, in the case of realistic environments is identified as the degree of reality, varies according to the number of polygons used to represent the geometric surfaces of objects. The higher the number of polygons, the more computing power is required to process the representation of the scene in the unit of time. For a quality experience, a computer with good graphics performance and a 3D model that is simplified as much as possible are essential. The reproduction of the visual image stream must be continuously updated with an appropriately high frequency to prevent the human eye from perceiving a snap between two contiguous images. In addition, the continuous flow of images must be recalculated and synchronized with the user's movements. In the case where synchronization does not occur smoothly enough, the immersive experience not only lacks credibility but can also cause unpleasant feelings of nausea, slangily known as simulation sickness or cyber-sickness. Therefore the same programming languages and professional skills are used to make a VE as in the video game world: the complexities and challenges faced are extremely similar. Other types of virtual reality environments are:
- Semi-immersive VE: the user is partially immersed.
- CAVE VE: means CAVE Automatic Virtual Environment and the user is fully immersed

in a virtual reality generated by images projected on the walls of a square room.
- Collaborative VE: environments in which multiple people can interact with each other.

Using a VR visor, it is also possible to watch photographs or movies in 360 degrees. This content is no longer 3D but is captured by traditional methods using special cameras and microphones that capture images and sounds from every direction. While these solutions provide realistic environments at a more modest cost, they offer no interactivity.[48]

3.1.3 // Headsets

> All men by nature desire to know. An indication of this is the delight we take in our senses; for even apart from their usefulness they are loved for themselves; and above all others the sense of sight. For not only with a view to action, but even when we are not going to do anything, we prefer seeing (one might say) to everything else. The reason is that this, most of all the senses, makes us know and brings to light many differences between things.[49]

Aristotle as early as the 4th century B.C. intuited the superiority of sight over the other senses. His theories are now confirmed by neuroscience, which shows that a large part of brain activity (30 percent) is devoted to processing vision, compared with 8 percent of activity devoted to touch and 3 percent devoted to hearing[50]. It is

48 // L. Cappannari, Futuri Possibili: Come Il Metaverso e Le Nuove Tecnologie Cambieranno La Nostra Vita (Firenze etc.: Giunti, 2022), p. 56.
49 // Aristotle, Metaphysics, trans. W. D. Ross (Sioux Falls, SD: NuVision Publications, 2009).
50 // Denise Grady, "The Vision Thing: Mainly in the Brain," Discover Megazine, June 1, 1993.

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perhaps for this reason that the visual peripherals of most common use in virtual reality systems are virtual helmets, which have two characteristics: they impede the view of the real world, and they are omnidirectional, i.e., they allow one to see in all directions. Modern viewers can be stand-alone, having a built-in computer that makes them completely portable and versatile, while those that enable high standards of graphics quality must be connected to a computer that enables them to achieve smooth synchronizations. They usually consist of two small integrated displays, LCD or OLED, in a wearable frame, like a helmet with glasses. In addition to the displays are sensors that allow them both to recognize the surrounding space and to track body movements and then reproduce them in copy in the virtual space. Older viewers presented 3DOF (Degrees of Freedom) [Fig 3.5] and allowed only head movements to be recognized. While the newer ones present 6DOF [Fig 3.6] and in addition to being omnidirectional also allow for movement in space.[51]

Fig. 3.5 shows the 3DOF illustration
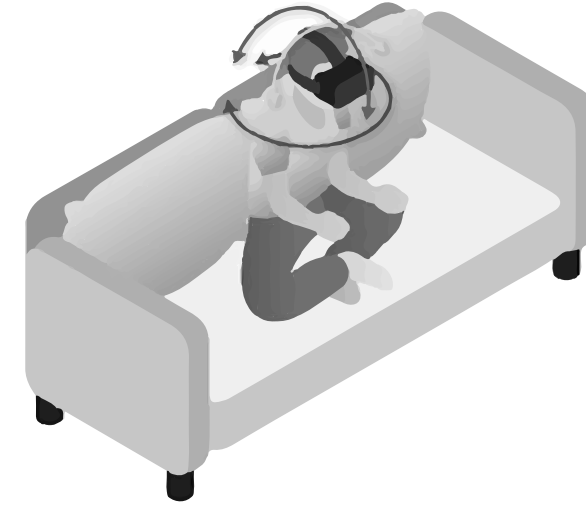
Fig. 3.6 shows the 6DOF illustration

51 // L. Cappannari, "Tecnologia Indossabile," in Futuri Possibili: Come Il Metaverso e Le Nuove Tecnologie Cambieranno La Nostra Vita (Firenze etc.: Giunti, 2022), pp. 52–54.

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To date, there are numerous companies engaged in developing and innovating VR viewers; only a few of the most popular ones will be described below.

HP Reverb G2: In the price range of $599 it has the best video resolution with 2160 x 2160 pixels per eye and a field of view of 114 degrees making it particularly suitable for gamers. [Fig 3.7]

Fig. 3.7 The HP Reverb G2 and touch controls

META QUEST 2: currently the best and most versatile viewer on the market despite the price tag being raised to $400/500. The graphics quality is high with a resolution of 1832 x 1920 pixels per eye and allows for virtual boundary marking in real space to ensure user safety during use. [Fig 3.8]

Fig. 3.8 The META QUEST 2 headset and touch controls

HTC Vive Pro 2: With a graphics quality of 4896 x 2448 pixels per eye it ranks high, however the cost of $1399 does not make it competitive in the market. In addition to the high cost, the set-up is not immediate and simple. [Fig 3.9]

Fig. 3.9 The HTC Vive Pro 2 and touch controls

Google Cardboard: is a viewer made of cardboard that drastically lowers the cost in that one only needs to be in possession of a smartphone to use it. The purpose of this "visor" is not to compete with real ones but to introduce a large segment of the population to VR technology. [Fig 3.10]

Fig. 3.10 The Google Cardboard VR viewer

3.2 // VR treatment

VR technology has potentially an infinite number of applications for use, among them mental health appears to be a favorable area for the development and research of virtual reality treatments. In the article "Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine"[52] a meta-analysis of the most recent studies on the topic of mental health and virtual reality is made, concluding that VR can be used effectively for the diagnosis and treatment of mental

disorders. More specifically, when compared with existing treatments, the results obtained are very positive for anxiety disorders, pain management, eating disorders, post-traumatic stress disorder (PTSD), phobias, and addiction, with long-lasting effects. Regarding depressive disorders, the literature is still scarce to be able to say with certainty about their effectiveness, however, it is to have the user have simulated experiences that recall real-life situations, either perceived as critical and threatening to promote the management of negative emotions, in this case with the help of a therapist, or relaxing and peaceful experiences as in natural settings.

3.2.1 // How VR treatment works and why it works

With the previous paragraphs I wanted to provide the basis for understanding virtual reality according to the technological, functional, and practical point of view, however, to fully understand the potential of this technology it is necessary to talk about how the experience is generated by merging interactivity with the perceptual component. What is created is VR's ability to induce the "sense of presence," that is, the feeling of being "inside" the simulation even though one is not really[53], which is why virtual reality succeeds as a transformative technology, that is, one that is capable of triggering in our brains a real process of change. In reality it is easier said than done; Giuseppe Riva explains that to do this one can start from knowledge (top-down approach) or from experience (bottom-up approach) but given

52 // G. Riva et al., "Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine," Cyberpsychology, Behavior, and Social Networking 22, no. 1 (January 16, 2019): pp. 82–96, https://doi.org/10.1089/cyber.2017.29099.gri.

53 // G. Riva et al., "Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine," Cyberpsychology, Behavior, and Social Networking 22, no. 1 (January 16, 2019): pp. 82–96, https://doi.org/10.1089/cyber.2017.29099.gri.

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how our brain works the most effective method is the one that starts from practice and then conceptualizes the theory. And this is how the simulative capacity of virtual reality lends itself to the purpose. In fact, the reason we feel "present" is because VR employs simulative mechanisms very similar to those used by our brains. Specifically, VR hardware tracks the user's movement, while VR software adjusts the images on the user's display to reflect the changes produced by movement in the virtual world. To achieve this, like the brain, the VR system maintains a model (simulation) of the body and surrounding space. This prediction is then used to provide the expected sensory input using the VR hardware. Obviously, to be realistic, the VR model tries to mimic the brain model as closely as possible: the more similar the virtual model is to the brain model, the more present the individual feels in the virtual world. By exploiting these properties, researchers are studying how VR technology can create value and improve people's mental health by going about correcting the wrong simulations of our brains. Indeed, neuropathologies are ultimately nothing more than that: wrong simulations that are repeated over time, creating bad habits[54].

3.2.2 // VR treatments for university students

The goal of this thesis research remains to seek innovative solutions to improve mental health in college students by identifying virtual reality as such an opportunity. As seen in the previous chapter, students are especially affected by

anxiety disorders, depression, and stress, which in the greatest of cases also negatively affect their academic performance by going on to further fuel those unhealthy conditions. To demonstrate the potential of this technology in the university setting, four scientific research were selected that tested the impact of virtual reality on students and verified the positive effect on mental health.

SCIENTIFIC STUDY 1:
Validity of virtual reality as a method of exposure in the treatment of test anxiety.[55]

This research aims to test the effectiveness of a set of virtual environments to produce emotionally meaningful responses in students with high levels of exam anxiety to later implement them in treatment.
VR offers several advantages over in vivo[56] exposure treatments in that exams can be simulated at any time of the year, and a negative outcome would not impact the student's true academic performance. Twenty-one students were selected for the test; 11 had high levels of anxiety and 10 had low levels of anxiety. Each of them during the VR experience was exposed to three environments that on average anticipate a test in a typical day: the house, the subway, and university's campus. The results showed that the average level of state anxiety and depression did not increase as the exam approached but peaked in the subway environment, while the level of subjective anxiety varied depending on the environment.

54 // L. Cappannari, Futuri Possibili: Come Il Metaverso e Le Nuove Tecnologie Cambieranno La Nostra Vita (Firenze etc.: Giunti, 2022), p. 132.

55 // I. A. Jurnet, et al., "Validity of Virtual Reality as a Method of Exposure in the Treatment of Test Anxiety," Behavior Research Methods 39, no. 4 (November 2007): pp. 844–851, https://doi.org/10.3758/bf03192977.
56 // In vivo means directly facing a feared object, situation or activity in real life, https://bit.ly/3CCUVGo.

In conclusion, there is evidence that VEs that reproduce the situations of preparing for and taking an exam can cause higher levels of subjective and state anxiety, and higher levels of depression in students with high levels of exam anxiety. This study shows that virtual reality is a valuable tool for simulating the exam situation and can provoke emotional responses in students with high exam anxiety.

SCIENTIFIC STUDY 2:
Using virtual reality to reduce state anxiety and stress in university students: an experiment.[57]

This research investigates the possibility of using relaxing iVR (immersive VR) environments to reduce and improve anxiety disorders in college students.
For the test, 30 college students were assigned to two groups: one experimental group with VR and the other a RT (Reading Task) control group. All participants first completed DASS-21 questionnaires assessing levels of depression, anxiety and stress and other tests for understanding their mental health states. Depression was also checked to identify and isolate effects on anxiety in the study sample, as these two neuropathologies often appear together; specifically, 90 percent of patients with anxiety disorders also have states of depression[58]. At the end of the test, participants were asked to respond again to the STAI-Y confirming the hypothesis that VR would be more effective in reducing anxiety than the RT approach.

90

57 // D. Camara and R. E. Hicks, "Using Virtual Reality to Reduce State Anxiety and Stress in University Students: An Experiment," Global Science and Technology Forum (GSTF) Journal of Psychology 4, no. 2 (January 2019), https://doi.org/10.5176/2345–7929_4.2.100.
58 // J. W. Tiller, "Depression and Anxiety," Medical Journal of Australia 199, no. S6 (October 29, 2013), https://doi.org/10.5694/mja12.10628.

Fig. 3.11
Change in state anxiety levels (pre/post) between the two conditions (VR and RT)
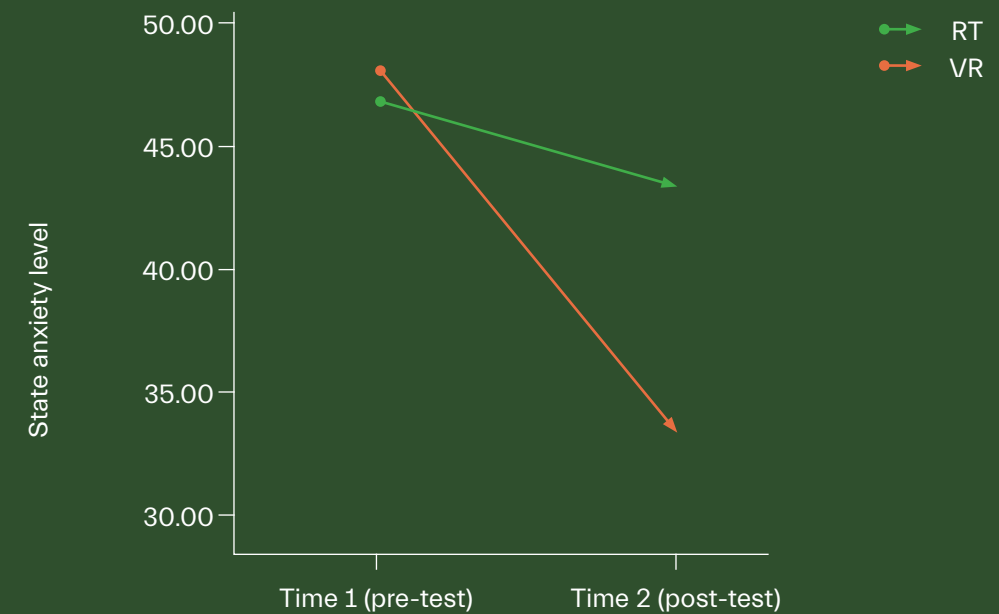
In conclusion, VR is more effective in reducing state anxiety than reading while controlling depression by offering an alternative approach for anxiety control. In addition, VR is a cheaper and more accessible tool than traditional therapy, not to mention that costs for the devices will decrease as time goes on, as it has been for smartphones.

SCIENTIFIC STUDY 3:
Efficacy of a mindfulness-based program with and without virtual reality support to reduce stress in university students: A randomized controlled trial.[59]

59 // M. Modrego-Alarcón et al., "Efficacy of a Mindfulness-Based Programme with and without Virtual Reality Support to Reduce Stress in University Students: A Randomized Controlled Trial," Behaviour Research and Therapy 142, no. 103866 (April 26, 2021), https://doi.org/10.1016/j.brat.2021.103866.

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The purpose of this RCT (Randomized Controlled Trial) is to evaluate the effectiveness of mindfulness-based programs (MBP) to reduce perceived stress by college students and to explore the possibility of improving program constancy and adherence through VR exposure. The test included assessments at the beginning, post-treatment, and six months after the test on a sample of 280 students.

The results obtained allowed the researchers to conclude that mindfulness exercises are much more effective than simple relaxation in reducing perceived stress and disorders such as anxiety in the sample of students analyzed, with medium to large effects both post-intervention and in the follow-up after six months. In addition, it was verified that VR exposure improved program participation, especially in subjects who were not consistent in following the program. As a result of the findings, other institutions are also encouraged to introduce new initiatives, such as MBP+VR, to help students' mental health.

SCIENTIFIC STUDY 4:
Effects of an Immersive Virtual Reality Exergame on University Students' Anxiety, Depression, and Perceived Stress: Pilot Feasibility and Usability Study.[60]

The objective of this study was to evaluate the usability and acceptability of an iVR exergame for college students. The researchers also wanted to examine the feasibility and usability of the iVR exergame by conducting a 6-week pilot study on the reduction of anxiety, depression, and

perceived stress levels among college students. Thirty-one students participated in the test, but only 15 completed the six-week program in which they had to play FitXR twice a week. To verify the test results, anxiety, depression, and stress levels were measured before and after the six weeks.

The results of this pilot study show that FitXR was perceived as a game of easy usability and enjoyment, and that playing two 30-minute sessions per week for six weeks can reduce levels of depression, anxiety and stress in students.

3.3 // Conclusions

In the previous chapters, a definition of mental health and the state of people's mental health—more especially, that of college students—was provided. By introducing virtual reality as a possible alternative solution to cope with the problems of MH (Mental Health) we have understood the potential of this technology taking in consideration contemporary research, but who knows what opportunities will arise as technological progress advances. It is precisely based on those research that we want to develop a spatial design project capable of creating opportunities for the mental well-being of college students, promoting mental health and consequently fighting discrimination, leading to the development of a college campus where anxiety, stress and depression are no longer the silent protagonists of youth distress.

60 // W. Xu et al., "Effects of an Immersive Virtual Reality Exergame on University Students' Anxiety, Depression, and Perceived Stress: Pilot Feasibility and Usability Study," JMIR Serious Games 9, no. 4 (November 22, 2021), https://doi.org/10.2196/29330.

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4.1 // Concept introduction

The basis for the design of the project proposal can be found in the intentions and hopes that Benasayag and Schmit placed for their readers. With this project, the aim is to propose a revolution in the practice, means, and perception of therapy treatments to achieve a balanced state of mental health without having to worry about the social response. For this purpose, it appeared necessary to reconsider the areas of interest present on university campuses, taking as a reference for this thesis paper the POLIMI campus in Bovisa

Aim to achieve a balanced state of mental health without having to worry about the social response.

as it is more familiar to me. In the spaces of the campus, there are many areas for socialization, recreation, and rest, however, considering the goal of proposing a therapy service in VR it is necessary to create new dedicated environments to make them usable. For this reason, I decided to think of the project by placing it in the green areas of the new campus soon to be built, the Bovisa Goccia. The forest that will surround the university buildings favors the creation of small environments, detached from each other, and surrounded by vegetation. The latter is the major contributing factor for the choice of placement since, as mentioned in previous chapters, we have more and more reasons to be in contact with electronic devices, however, the positive effects of nature are not to be overlooked[61]. It may seem paradoxical to develop a project in which the

protagonist is VR technology and at the same time force users to take a walk in the woods in order to use the services offered, however, looking for solutions to make the most of the positive effects of both worlds seems to be the most effective solution. With this project proposal, students on the new campus will have a reason to get away from the classrooms and into the vegetation, away from the "noise" of the physical world.

4.2 // Project site location

Almost the size of Sempione Park, Parco Goccia is home to more than twothousand priceless trees and is situated between the Bovisa and Villapizzone neighborhoods. It is known as the area of the gasometers and is called "Goccia" because of its characteristic shape, enclosed as it is by the railroad tracks that completely surround it. Part of the park has already been largely built up and has a deserted and desolate appearance, despite the presence of the Mario Negri Institute and the Engineering Section of the Milan Polytechnic. The part dominated by the striking gasometers, on the other hand, consists of fenced-in woods and abandoned industrial archaeology buildings. This large green area was, decades ago, occupied by factories that are now gone, and it has been waiting since time immemorial for the cleanup of pollutants produced by industries.[62]

61 // "L'effetto Benefico Della Natura Sulla Mente: 10 Studi Scientifici," Psicologo Milano, July 10, 2016, https://www.psicologo-milano.it/newblog/effetto-natura-mente/.

62 // "Parco La Goccia Milano |," Parco la Goccia Milano, accessed January 6, 2023, http://www.parcogoccia.com/#.

Duomo

Parco Goccia

Politecnico di Milano Via Candiani

Area: 420.000m²

Distance from Duomo:
6.8km

Fig. 4.1 Illustrated plan of Milan

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4.2.1 // Site analysis

The project site refers to the green areas of Parco Goccia in anticipation of the future construction of the new university campus. Fig 4.2 shows the important presence that the park's tree vegetation has, but more importantly will continue to have, in relation to the urban fabric and infrastructure that has developed around it. To date, the area has about 2,500 trees including plum, walnut, ailanthus, sycamore, locust, poplar, linden, and many others that together provide shelter for numerous animals, including the eagle owl. To make it easier to understand, the image has been specially modified so as to highlight the contrast between what is green and what is not, for example, roads, buildings, and railways. Concerning connections with the city and the suburbs, the Parco Goccia area is easily accessible by the Trenord line railways getting off at the Milano Bovisa and Villapizzone stations. [Table 4.1].

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Table 4.1
List of train lines serving Parco Goccia

Milano Bovisa	R16	R17	R22	R27	R28
	RE1	RE7	S	S1	S2
	S3	S4	S13	XP1	XP2
Villapizzone	R6	RE2	S5	S6	S11

Forested area
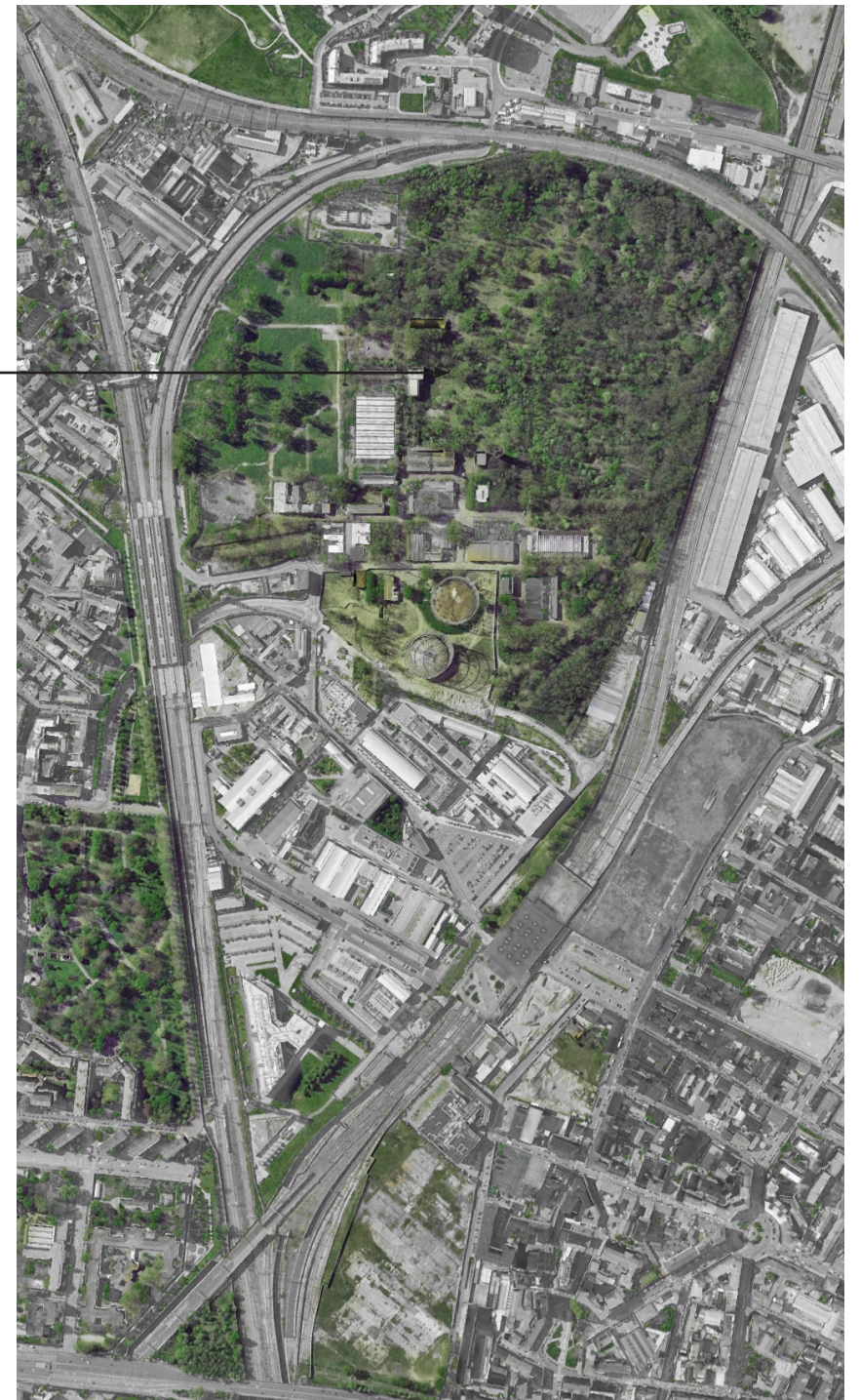
Fig. 4.2 Top view of the Parco Goccia highlighting green zones

Villapizzone

Bus 82

Milano Bovisa

Bus 92

Tram 2
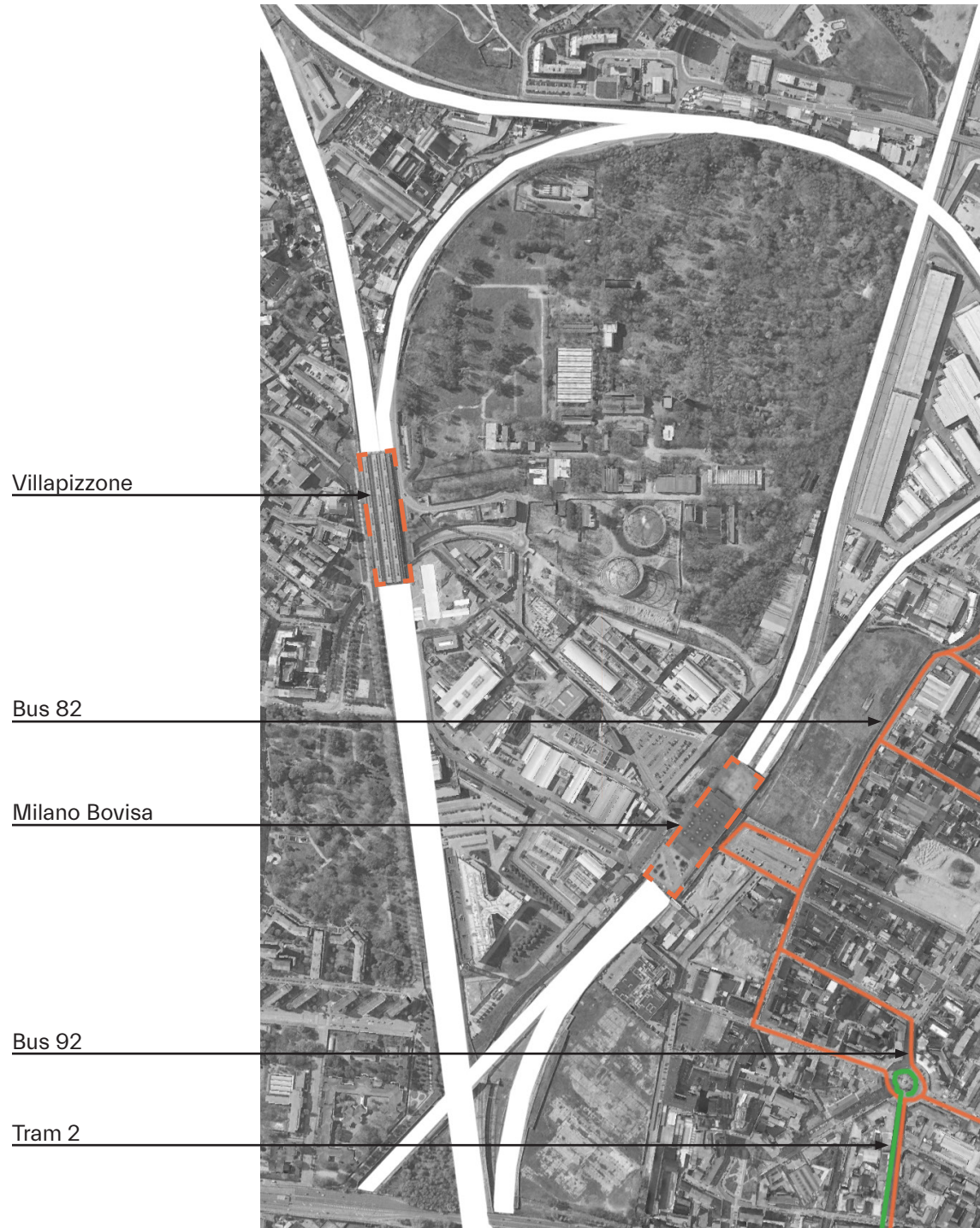
Fig. 4.3 Top view of the Parco Goccia highlighting public transportation
lines

Vehicle underpass

Vehicle underpass
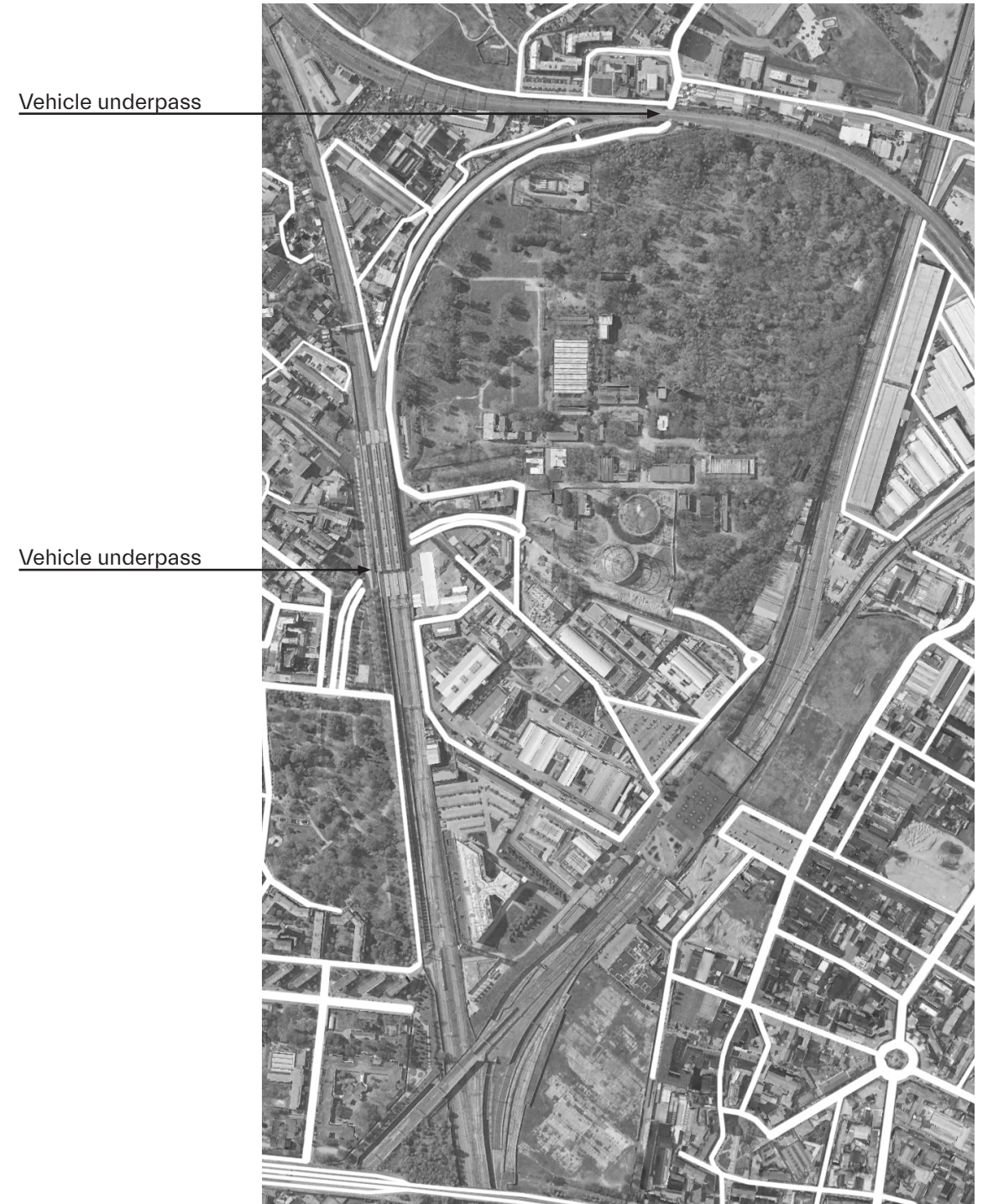
Fig. 4.4 Top view of the Parco Goccia highlighting streets

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Despite the presence of multiple connections, surface transportation does not allow the park to be reached quickly because the railways impede road connections. However, it is possible to take advantage of the buses and tramways serving the two neighborhoods to approach the park area and then walk about five hundred meters, with the hope that more efficient public connections will be added along with the new university campus. Depending on the direction of origin, reaching the park by car may not be easy since there are only two road accesses and from the Bovisa neighborhood, there is no way to get there. Considering that access to the future campus of the Politecnico di Milano will not be constricted to vehicles, or at least it will be allowed but only in the perimeter parts, the analysis for the identification of suitable spaces for the placement of the therapy environments revealed multiple possibilities. In Figure 4.5 areas with favorable characteristics for the placement of the thesis project are identified on the map. The choice of areas is based on simple criteria identified by the physical and practical needs for the purpose of the project: the presence of vegetation, a minimum distance from university buildings, and a minimum area available for the placement of three therapy environments.

Possible placement

Possible placement
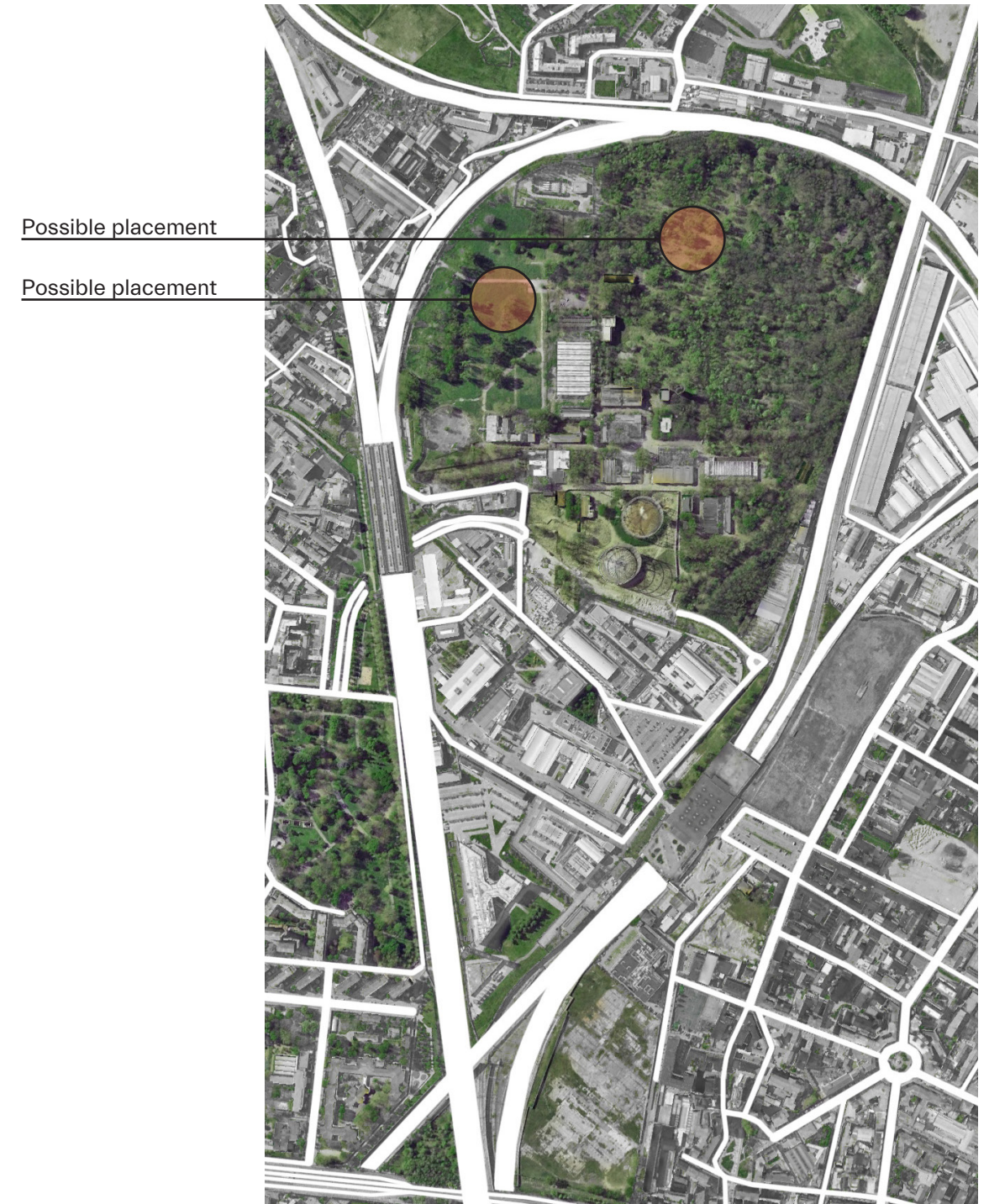
Fig. 4.5 Top view of the Parco Goccia highlighting possible site placements for the project

4.2.2 // RPBW masterplan

By making Goccia Park "open, green, and permeable"[63] by 2026, Renzo Piano's new master plan seeks to reconnect the area to the city and the surrounding area. The intervention spans 32 hectares, of which 23.4 belong to the City of Milan and 9.1 to Politecnico di

"Open, green and permeable"

Milano, which will enlarge its campus by building a research park and an innovation hub with spaces designated for services for students, businesses, and citizens. Twenty new, four-story buildings totaling around 105,000 square meters will be built as part of the project, and civic schools will be added to them. These buildings will be connected by pedestrian streets lined with trees, creating a variety of uses that will turn the area into a vibrant community. The two stations, Bovisa and Villapizzone, which will be refurbished and connected to the entire campus, will be joined by a large pedestrian and bicycle axis to the south, between Gasometri and the Lambruschini complex. The Politecnico's classrooms and laboratories will be accompanied by student housing and a startup-focused area that will adhere to the highest international standards for bridging the gap between academia and business: 35,000 square meters devoted to deep tech innovation and the problems of digital and sustainability. All of this is done under the guise of a campus that is open to the public and encourages communication and function exchange. The buildings will rise on a strip of land identified between the gasometers and the large thermal power plant, an example of industrial archaeology

63 // Campus Nord Bovisa, RPBW, YouTube (PoliMi, 2022), https://www.youtube.com/watch?v=RZbJqkGZ_h4&t=2s&ab_channel=PoliMi.

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Fig. 4.6 RPBW render of Bovisa Goccia campus

Fig. 4.6 RPBW render of Bovisa Goccia campus

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and an impassable limit beyond which the 24-hectare forest will be preserved, enhanced, and open to citizens. The buildings will cover the same area of land already occupied by the factory. They will be white factories, places of knowledge and learning, respecting tradition and history. The project, which aims for energy independence and zero CO2 emissions, will include the construction of three classroom buildings, five startup buildings, a hypogenous conference hall, two university residences of about 500 lodging places as well as the

redevelopment of a historic industrial building for food and beverage to serve campus guests. Large trees will creep between the new volumes creating connective tissue. The ground level of the campus buildings will be totally transparent so that people can have an immersive experience in nature.[64]

64 // "Rigenerazione Urbana. Bovisa-Goccia, Il Masterplan Di Renzo Piano per Ricucire Il Quartiere," Comune di Milano, November 25, 2022, https://www. comune.milano.it/-/rigenerazione-urbana.-bovisa-goccia-il-masterplan-di-renzo-piano-per-ricucire-il-quartiere.

Fig. 4.7 RPBW masterplan sketch of Bovisa Goccia campus

Fig. 4.8 RPBW masterplan sketch of Bovisa Goccia campus

4.3 // Case studies

The next paragraphs break down the case studies researched in order to develop the project. The first paragraph collects case studies related to currently available VR therapy services. Some of these accessible easily, while others require the presence and guidance of a professional, such as a therapist or psychologist specializing in virtual reality technology.

The latter will not be of reference for the project developed with this paper but are nonetheless important for understanding how these services work and for bringing practical, real-world testimonies about virtual reality therapy. Next are case studies for the design of a user model for VR services, that is, those that influenced the aesthetics of the project and also the users' experience of it.

VR-therapy services & existing model

BECOME[65]:

BECOME is a multidisciplinary hub for the innovation of psychological practices in clinical, organizational, sports, schoovl, and wellness settings, consisting of a Staff of psychologists, physicians and psychotherapists, developers and designers, visual and sound artists, neuroscientists, and storytellers.

BECOME provides innovative courses on the contemporary topics of Technopathologies and Psychotechnologies and designs and implements applications and protocols for Mental Health using new digital technologies-primarily Virtual Reality, Augmented Reality, and biosensor technology-designed for professionals and aimed at active learning, psychological well-being, and promoting positive change in people.

BECOME has signed agreements with professional bodies, universities, and research centers, with the aim of offering digital tools for psychological support, psychotherapy, empowerment, relaxation, and training through accessible and increasingly effective evidence-based psycho technologies.

BECOME offers numerous innovative virtual reality and biosensor services for mental health professionals, including Augmented Psychology, Augmented Exposure, Augmented Therapy, and many others. Among the innovative tools they have developed Augmented Wellbeing is the one that is best suited for the purpose of this thesis because it can be used independently without the guidance or supervision of a professional.

BECOME.
AUGMENTED
LIFE
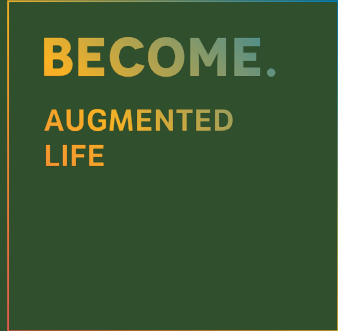
Augmented Wellbeing is a Virtual Reality app that allows users to immerse themselves in virtual pathways- accompanied by a specially designed voice guide -designed and sounded by psychological wellness professionals. The immersive relaxation experiences are designed with a methodology called "Augmented Design," which makes use of the latest theories and the most advanced neuroscientific research through specific Design and Sounding processes. The experiences, lasting about ten minutes, are currently available in Italian. Become periodically releases new Virtual Reality relaxation pathways in line with innovative Wellbeing-themed research.

Fig. 4.9 BECOME VR therapy example

65 // "Become. Corsi e Strumenti Digitali per Psicologi e Medici.," BECOME., accessed January 18, 2023, https://www.discoverbecome.com/.

COVID FEEL GOOD[66]:
Year: 2021
Creator: Giuseppe Riva, Brenda K. Wiederhold, BECOME

COVID Feel Good is a self-help protocol against the effects of the COVID-19 pandemic, which has caused extreme psychological stress by straining our identity and relationships. The idea came about because easy-to-use, inexpensive, and scientifically validated self-help solutions could be the key to helping people cope by reducing the psychological burden of the coronavirus. COVID Feel Good is a FREE, weekly virtual therapeutic self-help experience that takes only twenty minutes a day and helps relieve anxiety and stress and improve well-being and social connectedness. The heart of the self-help protocol is a 360-degree video called Secret Garden. To experience it, you need a smartphone and a cardboard VR viewer, like the Google Cardboard, otherwise, just move the device's screen, but it won't be an immersive experience because this protocol uses the power of virtual reality to provide a transformative experience that can help in two ways:
- By providing a digital place to relax and reflect;
- By facilitating a process of critical examination and possible revision of our basic assumptions, beliefs, and worldview.
How it works:
First step: open the secret garden video in the YouTube app and put the smartphone in the cardboard headset.

Second step: follow the 7-day protocol.
Day 1: Fight Rumination
Day 2: Awaken your Self Esteem
Day 3: Awaken your Autobiographical Memory
Day 4: Awaken your Sense of Community
Day 5: Awaken your Goals and/or Dreams
Day 6: Boost your Empathy
Day 7: Plan your change.

Fig. 4.10 Frame from the secret garden VR environment

Fig. 4.11 Frame from the secret garden VR environment

66 // "Feeling Good During and After the COVID19 Epidemic," COVIDFeelGood, accessed November 2, 2022, https://www.covidfeelgood.com/home.

XRHealth [67]:

XRHealth is a virtual clinic that provides medical and therapeutic treatments via telehealth. They are leading the healthcare revolution in the metaverse by combining FDA-registered VR/AR applications with telehealth. They offer the ability to receive personalized care conveniently in virtual treatment rooms with licensed therapists, making the experience more game-like and fun.
Treatment rooms in the metaverse are divided by

service category:
- VRCogni Series use game-like medical applications to support memory, attention, reaction time, and more.
- VRPhysio Series leverages fun and engaging games to train mobility and range of motion
- VRReliever Series helps improve negative thoughts and unhealthy behaviors with therapeutic applications inspired by CBT.
In the area of mental health, XRHealth offers telehealth services led by trained therapists. At the beginning of therapy, the patient's history, condition, needs, and goals are discussed and then a personalized treatment plan is established and regularly updated as progress is made. Next, the patient is sent the virtual reality kit so they can access treatment, divided into a dual approach between VR and proven therapies such as CBT to optimize treatment outcomes.

Fig. 4.12 XRHealth patient using a VR headset

Fig. 4.13 XRHealth advertising for VR therpay treatments
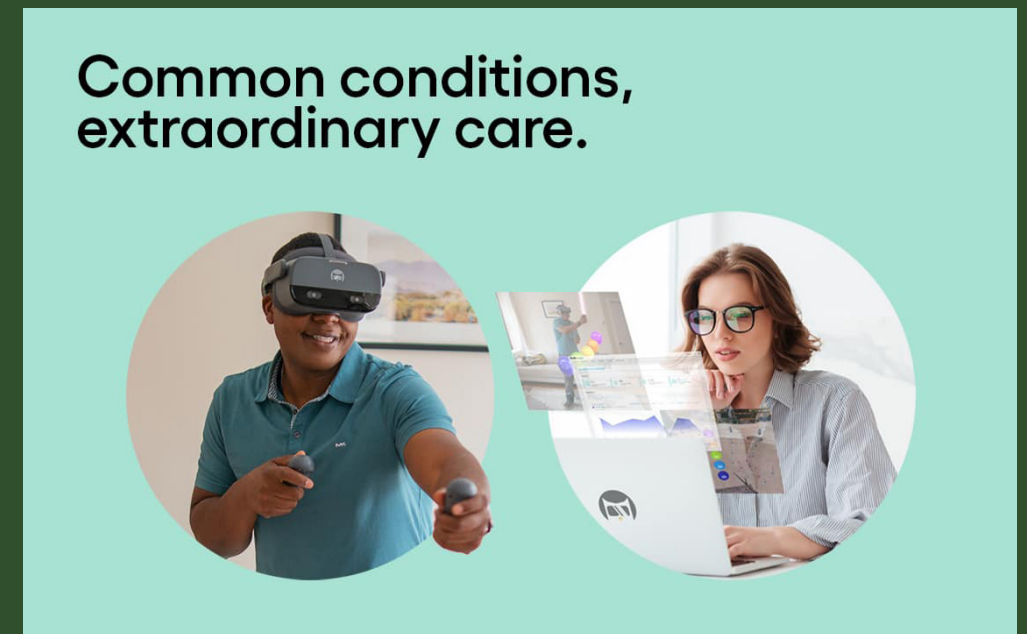
67 // "XRHealth Virtual Clinic: At-Home Virtual Reality Therapy," XRHealth, accessed December 7, 2022, https://www.xr.health/.

The 72 Hour Cabin[68]:

"The 72 Hour Cabin" is a project devised by researchers at the Karolinska Institute in Stockholm, a sociological experiment sponsored by the Swedish Tourism Board to combat stress and regain physical and mental health. The cabin is located on the private island of Henriksholm on Lake Ånimmen in southeastern Dalsland, Sweden, where unusual glass and cherry wood houses were built to isolate themselves from the rest of the world, completely immersed in beautiful landscapes among dense forests, large lakes, mountains, and glaciers.

The experiment involved five people with strenuous jobs: a Parisian taxi driver, a German policeman, a British journalist, a British TV presenter, and a New York event organizer. Deprived of any technological devices and isolated from the rest of the world, the participants spent their time plying the waters of the lake in a canoe, learning to recognize medicinal plants, and cooking game and fish over an open fire. After 72 hours, the stress level of the "examined" patients dropped by 70 percent, and each of them showed an improvement in blood pressure and a sharp increase in creativity.

The glass houses of the 72 Hour Cabin, scattered throughout the island, are now available to anyone who wants to spend 3 days totally disconnected from the world to regain their mental and physical balance. A "natural detox" stay that has become a tourism initiative under the supervision of the "Tourism Board of Western Sweden" and "Visit Sweden." Closed during winter, the "transparent cabins" reopen in spring.

68 // "The 72 Hour Cabin," Visit Sweden, accessed December 19, 2022,https://visitsweden.com/where-to-go/southern-sweden/vastsverige/72hcabin/#:~:text=The%2072%20Hour%20Cabin'%20is,small%20cabins%20made%20of%20glass.

Ziedlejas[69]:

Ziedlejas is a wellness resort or "Latvian natural spa" in the Krimulda region of Latvia, created for a slow, immersive break away from the crowds. The owners aspire to keep the tradition alive by adapting it to modern needs. Thus, for example, the saunas are basically true to tradition but improved aesthetically and ergonomically. The choice of materials - linen, wood, metal - is guided by nature and local heritage.

In keeping with modern architectural trends and authentic traditions, they have created three different Pirts, where one can experience rituals, sessions, and events:

The Glass Pirts boasts a contemporary design with a relaxing view of the surrounding nature.
The Smoke Pirts exudes ancient traditions in a secluded spot of nature.
The Woollen Pirts, with its unique structure and spiral design.

The buildings are called Pirts because it has a special meaning in Latvia. Pirts is a source of strength where consecutive and thorough steps are taken to purify the body and mind.

69 // "A Place to Gather Strength and Inspiration, and Share the Joy with Your Loved Ones.," Ziedlejas, accessed December 19, 2022, https://ziedlejas.lv/en.

FRILUFTSSYKEHUSET – the Outdoor Care Retreat[70]:

In the tranquil environment of the forests, just a stone's throw from two of Norway's largest hospitals, Snøhetta has designed two secluded wooden retreats that aspire to facilitate shelter for patients and their families. Designed on behalf of the Friluftssykehuset Foundation, the Outdoor Care Retreats offer visitors a physical and psychological respite from the rigorous care regimens and isolation that often follow lengthy hospitalization.

Stretching out into the lush forest and the Sognsvann stream, Outdoor Care Retreat is only a hundred meters from the entrance to Norway's largest hospital, Oslo University Hospital, Rikshospitalet. The sister building is located in the deciduous forest of Kristiansand's Sørlandet Hospital in southern Norway, among oak and birch trees, overlooking a nearby pond. Originally developed in collaboration with the Department of Psychosomatics and Child Psychiatry at Oslo University Hospital, the Outdoor Care Retreat offers a quiet space where visitors can benefit from the therapeutic qualities of nature.
The space can be used for treatment and contemplation, as well as for spending time with family and friends away from the hospital corridors. The cabins are open to all hospital-connected patients, regardless of disease group, and reservations are handled through a booking system.

70 // "Friluftssykehuset – the Outdoor Care Retreat," Snøhetta, accessed December 11, 2022, https://snohetta.com/project/419-friluftssykehuset-the-outdoor-care-retreat.

'Hermitage for meditation': an escape from a bleak two years[71]:

Located in the mountainous area of Lam Ha, Vietnam, the "Hermitage for meditation" is a uniquely built retreat for a group of Theravada meditation practitioners who wish to escape from urban life after more than two years of dreary quarantined living.

Cam To Quand and Nguyen Huu Quy's "Hermitage for meditation" consists of three zones; each zone has its own kitchen and dining area, a communal meditation space with a Buddha statue inside, and private rooms for rest and practice. To minimize interruptions during meditation, the mentioned functions are separated into blocks that connect to each other through a central terrace

Each of these blocks has pre-engineered steel frames finished with transparent double-walled polycarbonate sheets that provide insulation and illuminate the entire retreat complex when night falls, making the buildings look like garlands of flowers and colorful lanterns set in the middle of the forest.

71 // "Translucent White Volumes Compose the 'Hermitage for Meditation' Retreat in Vietnam," Designboom, July 16, 2022, https://www.designboom.com/architecture/hermitage-for-meditation-cam-to-quang-quy-nguyen-huu-vietnam-06–14–2022/.

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4.4 // Elements for designing

This section presents the design elements that will form the basis for the implementation of the project. As mentioned in the previous paragraphs, the goal is to design environments that lend themselves to accommodate university students to promote and offer virtual reality treatment for mental health, however, designing spaces for VR is a new challenge introduced only in recent years, so it seemed necessary to research and formulate basic principles for proper design.

The other very important factor concerns the construction of the environments, which in order to go along with the objectives should be something quick, sustainable, impressive and with the possibility of moving it when necessary. For this purpose, the approach to dry construction of the Scaffsystem company, one of the top players on the national and international market in the production of steel solutions for logistics and architecture, seemed very interesting. The solutions offered by Scaffsystem lend themselves well to the purpose of the thesis, particularly the Mechano Steel Frame system. Fortnuously, having a partnership with the Polytechnic University of Milan they were interested and willing to help me in the design of the structures, with the help of their engineers it was possible to design a structure that would accommodate my project in a conscious, responsible but above all also sustainable way. The drawings and the project will be presented in the next paragraphs, now I introduce the elements for the design.

4.4.1 // What you need to know when designing rooms for VR

> Virtual reality is the ultimate empathy machine. These experiences are more than documentaries. They're opportunities to walk a mile in someone else's shoes.[72]

When designing spaces for VR experiences there are some features that need to be considered. While using a wireless headset like the Oculus Quest 2 or a "tethered", PC-only wired VR headset like the HTC VIVE Pro 3, you're likely going to spend most of your time with the headset either at a computer desk or in a room with as much space as possible, such as the living room. Though a park or a garden may be the most spacious area available, VR headset manufacturers encourage users to stay inside when using their devices. Tracking can be adversely affected by bright sunlight, and uneven flooring can be dangerous. Whichever area you settle down into, VR experiences will fall into one of three categories:
- Seated: Games and experiences that expect you to take a seat, either looking straight ahead or on a swivel chair for a 360-degree look at your surroundings. Though some can still prove quite active, these tend to be less strenuous titles, and require less space in your room to play.
- Standing: Experiences that expect you to stand while you play. You may need to turn on the spot, or duck and weave while you play. These might need a little more room than seated experiences... at least vertically.
- Room-scale: Free-roaming VR experiences that let you walk around digital game spaces

72 // C. Milk, "Virtual Reality Design (VR): A Beginners Guide to VR Apps Development," Marvel Blog, February 11, 2021, https://marvelapp.com/blog/designing-vr-beginners-guide/.

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in all directions. The more space you have, the better, and a 2 m by 2 m square is often considered the minimum space requirement, the maximum area recommended is 3m by 3m.[73]

As most VR therapeutic experiences don't need the user to stand up, walk, or move around, and since it ensures a higher degree of safety, the "Sitting" category is the one that is mostly taken into consideration for the project. Being able to extend the arms in all directions without running into anything is essential, especially if the user is sitting in a swivel chair that can rotate 360 degrees. This is true even when the user is seated since the nature of VR immersive experiences promotes movement. Furthermore, be sure the space is safe and free of obstacles and other things that might affect tracking. Make sure that the experience area is completely clear of anything that might get in the way and cause an injury.

Other important things to consider when designing spaces for VR are:

- Height requirements, which aren't exactly set because they vary according to the device, but in general, it's good to have a certain amount of space above the user free from obstacles. Low ceiling fans can be a real problem when people are flailing their arms and such in VR.

- Network requirements, ideally a wired ethernet connection would be the best option, in case that is not feasible make sure to have a strong Wi-Fi connection.

- Get rid of (or cover) items that may cause VR tracking interference, mirrors and windows may obstruct your VR HMD's and/or controllers' ability to monitor motion. If these objects can't be

moved, think about covering them with a cloth or something similar to prevent them from reflecting light from the motion-tracking equipment.

- Manage head-mounted display cables, and make sure cables are as unobtrusive as possible. Some moved the computer into a closet or a completely different room, while some constructed intricate ceiling-mounted wire management systems. Wireless cord alternatives are currently available and may soon eliminate the cable-tripping issue.

- Type of flooring. Flooring is critical when designing a virtual reality space for various reasons. The first reason is for your own protection. There are several options for exercising in VR. Some games involve crawling, leaping, running in place, shooting, and a variety of other actions. You'll need a comfy surface to carry out these tasks. A carpet with a thick pad below would be an excellent starting point. The second reason flooring is essential is that it lets you to add a "VR warning track," which is an extra safety element. Ideally, a warning track, similar to those used in baseball stadiums to notify outfielders when they are about to strike a wall, would be beneficial in VR (for basically the same reason). Putting foam-padded tiles in the play area but not all the way to the perimeter of the room would offer a subtle tactile message to the person in VR, letting them know, through the change in floor textures, that they are approaching the edge of their safe region. These subtle cues help to maintain immersion

Flooring is important because it lets to add a "VR warning track", which is an extra safety element.

73 // G. Lynch, "How to Set up Your Room for VR," Space.com, September 13, 2021, https://www.space.com/how-to-set-up-your-room-for-vr.

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while also telling the user to turn around and
continue in the opposite way, or at the very least
proceed with caution.[74]

Fig. 4.13 Scheme for a VR room of safe dimensions with VR warning track

130

300cm

131
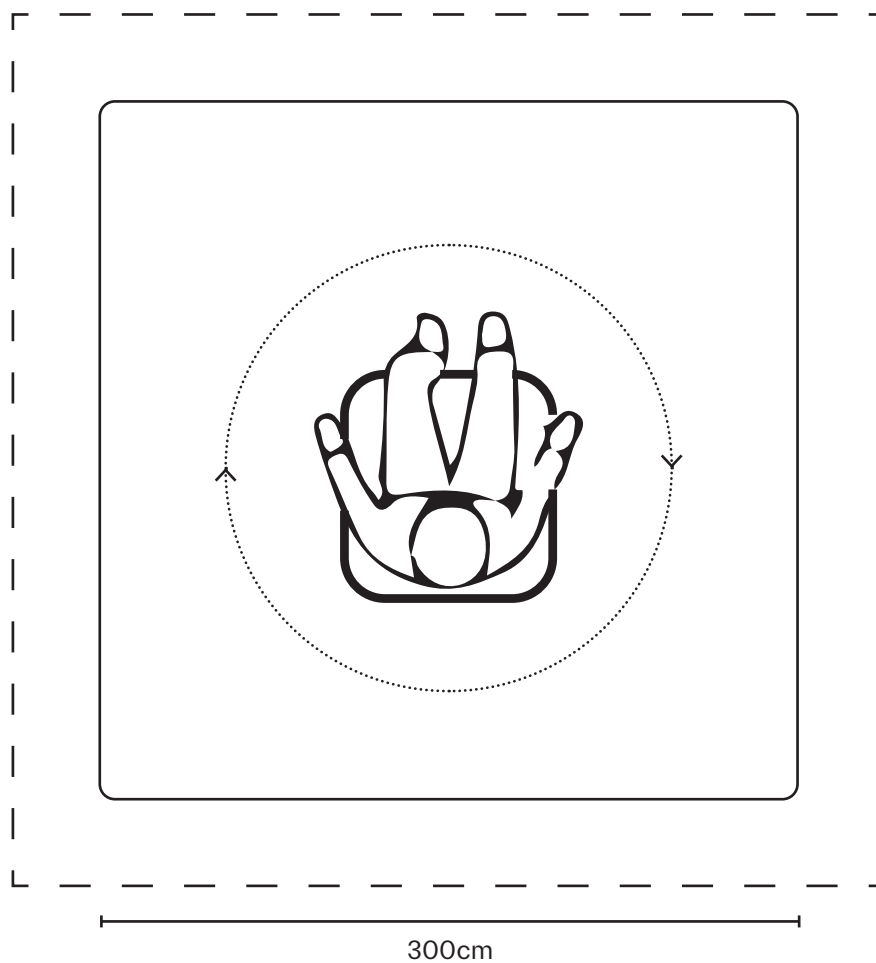
4.4.2 // Scaffsystem, steel solutions for architecture

Scaffsystem[75] is an industrial company founded in
Ostuni in 1957 that has positioned itself as a leader
in the manufacturing of steel solutions for logistics
and architecture on the national and international
markets. Their technical department satisfies
the demands of designers and consumers by
researching effective and cutting-edge solutions
in terms of technical qualities and value for money
for the world of logistics and construction project
execution.

The Logistics division
provides its clients with
options for making the
most of available space in
warehouses and for better
control over the movement
of items throughout
storage. The other branch
of Scaffsystem is devoted
to the building industry and
deals with the design and
production of structural steel
systems for commercial
and residential architecture.
The revolutionary qualities
of the dry construction system created by
Scaffsystem are embodied in its overall lightness
of construction, eco-sustainability, speed of
assembly, cyclicity of usage, and earthquake
safety. One of the most avant-garde residential
building projects to date is Mechano Steel
Frame, a seamless integration of construction
and sustainability. Unlike traditional construction

Scaffsystem

74 // A. O'Donnell, "Tips for Creating a Virtual Reality Room," Lifewire, December 2,
2020, https://www.lifewire.com/create-a-virtual-reality-room-4121179.

75 // Scaffsystem and Admin, "Scaffsystem, Soluzioni Strutturali per Logistica
Architettura," Scaffsystem, March 8, 2023, https://www.scaffsystem.it/.

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methods, Mechano Steel Frame perfectly realizes the idea of sustainable architecture through its ability to meet high-performance standards. Its fields of application are multiple:
- seismic safety;
- durability and architectural sustainability;
- optimization of construction time;
- optimization of site management;
- reduced use of resources;
- partial recyclability of end-of-life materials.

The safety of metal constructions is closely related to the very characteristics of steel: elasticity, strength, lightness, and ductility. These imply a seismic-resistant construction system that can achieve a high level of energy dissipation under the effect of seismic actions. Complementing the advantages in the seismic field of dry steel construction are the mechanical connections between the metal elements. These in fact have the function of transferring stresses to the point of limiting, or even canceling, the displacements of the structure under the effect of horizontal actions. This ability is also aided by the counter-vertical systems that characterize Mechano's production.

Fig. 4.14 Close up picture of Mechano Steel Frame structures

Fig. 4.15 Example use of Mechano Steel Frame systems

4.4.2.1 // The Light Delight – Scaffsystem project[76]

Scaffsystem presented to the public its project called "The Light Delight" during Milano Design Village from April 17–22, 2018, a building with a steel load-bearing structure that was used as a lounge area where media partners and international professionals worked, relax and at the same time enjoy the various construction methods and solutions introduced by the company. "Structura" line of cold-formed profiled beams derives from a fruitful combination of design, architecture, and engineering and allows the cost-effective and fast construction of mezzanines, canopies, industrial buildings, bungalows, residential buildings, and special projects such as roof-truss, booths, and similar installations.

This cutting-edge building technique enables users to go beyond conventional carpentry profiles and traditional concrete-based construction techniques and their site-specific limitations because it is focused on a very straightforward mechanical process: all the components are produced off-site, and on-site assembly requires only dry methods and bolted connections, including for cladding.

Scaffsystem essentially offers a Meccano system where aesthetic and modular values are kept and highly prized. Due to ongoing study and development, it also turns out to be a live arrangement, just like a house or workplace should be.

76 // "Delight the Light," Scaffsystem, April 11, 2018, https://www.scaffsystem.it/en/case-histories/delight-the-light/.

Front view

Mechano steel beams

Cork flooring Granorte

honeycomb
polycarbonate

laser perforated
metal sheet

5.92m

Types of brackets used

Corner bracket

Ridge bracket

Base plate bracket

Base plate bracket
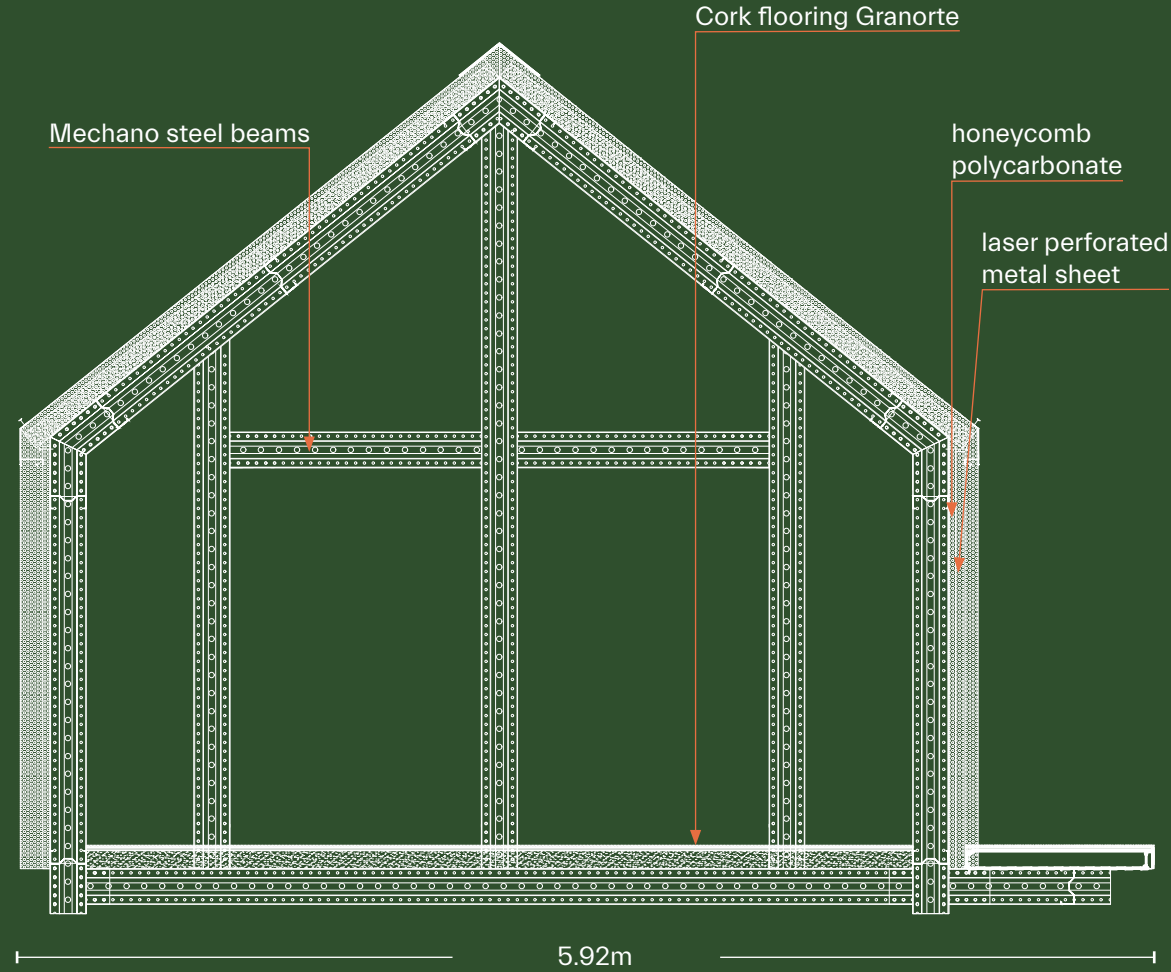
Left view

Right view

Plan

15.35m
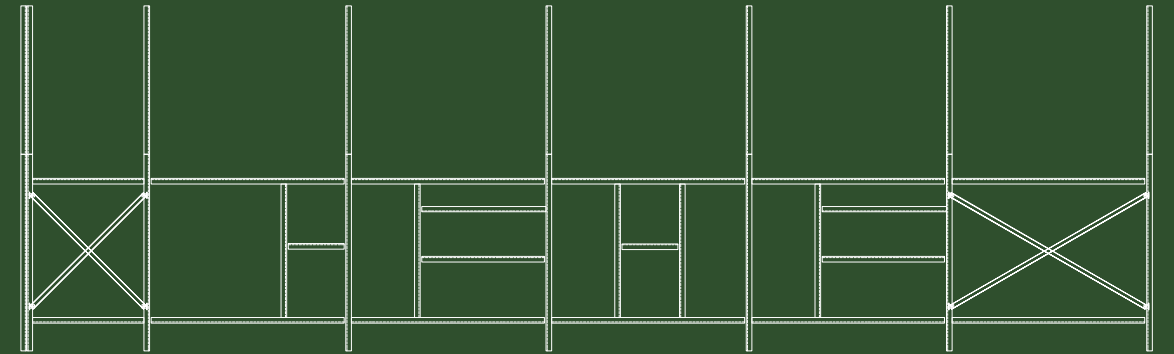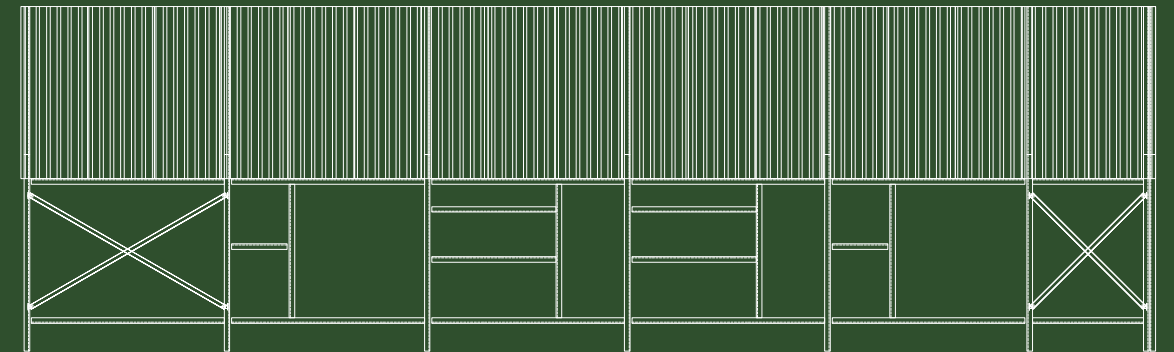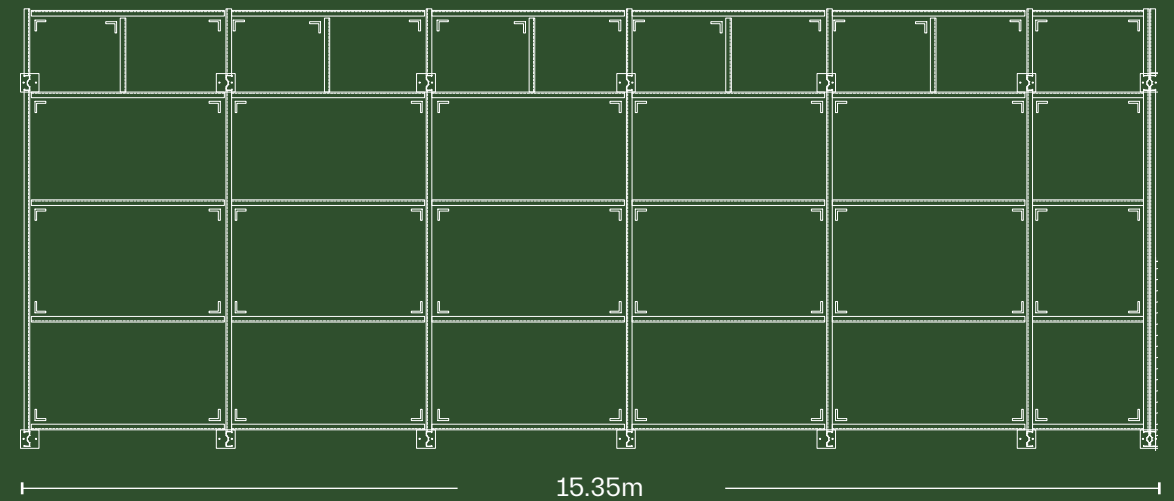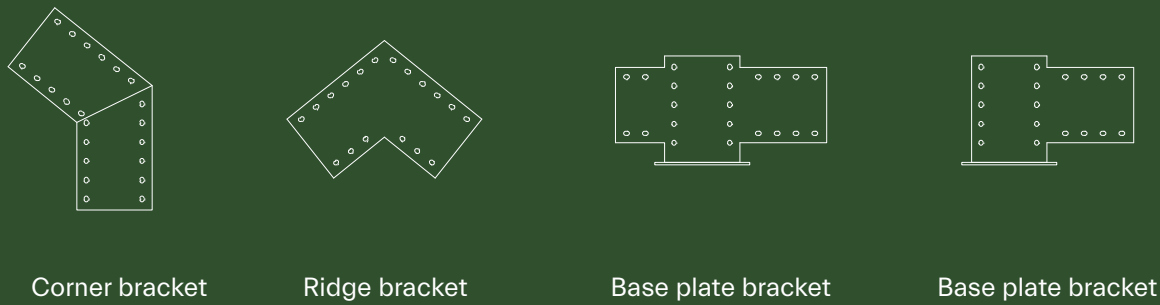
// 5

Project proposal

5.1 // Project partners

Collaborating with the right partners is essential for any successful project, and based on my project's goals, it is important to collaborate with partners who have relevant expertise and experience in the fields of mental health, technology, and design.

For example, partnering with mental health professionals who specialize in virtual reality therapy can provide valuable insights into how to design effective and engaging VR therapy sessions. Working with technology experts can help ensure that the VR technology used in the project is up-to-date and optimized for mental health therapy. And collaborating with professionals who have experience developing micro-architectures suitable for my ideas can help ensure that the small houses designed for the project are well thought out.

The partners:

- Partnering with Politecnico di Milano and Comune di Milano provides the area for the project placement ensuring they are located in a way that is both functional and aesthetically pleasing, and the support needed to run the mental therapy experience efficiently and productively.

- Partnering with Become Hub for mental health experience in VR provides access to valuable expertise in the field of mental health therapy and virtual reality. Their expertise in developing effective and engaging VR therapy sessions can help ensure that the project's virtual reality experiences are effective in providing mental health therapy for anxiety, depression, and stress.
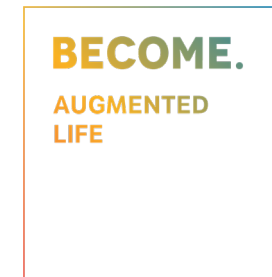
Fig. 5.1

Fig. 5.2

Fig. 5.3

Fig. 5.4

Fig. 5.5

Fig. 5.6

Fig. 5.1, 5.2 5.3, 5.4, 5.5, 5.6 Selected partners

- Scaffsystem's expertise in modular construction and prefabricated building components can provide a cost-effective and efficient way to construct the small houses. Additionally, partnering with Covestro for materials like polycarbonate allows for the use of a lightweight, sustainable and durable material that is ideal to create a suggestive but simple environment.

- Finally, partnering with Lovecement for the outdoor furnishing can provide aesthetically pleasing and durable outdoor furniture that complements the design of the small houses and provides a comfortable and calming outdoor environment where students can hang out and pass their time.

5.2 // What it will look like

This section of the thesis is dedicated to showcasing the final design of the virtual reality therapy small house project. Throughout this section, a comprehensive overview of the design process will be presented, highlighting the key considerations and factors that informed the final design. This will include a detailed examination of the aesthetic, functional, and experiential aspects of the design, as well as the technical and practical considerations that were taken into account.

A combination of 2D and 3D representations, including drawings, illustrations, and render images will be presented in this section, offering readers a visual depiction of the design elements and how they work together to create an immersive and therapeutic experience.

One of the critical design elements that will be explored is the choice of materials used. The selection of materials was carefully considered to create a suggestive, warm, inviting, and calming atmosphere that encourages relaxation and introspection. The lighting is also an integral component of the overall design, as it creates a tranquil and soothing environment that complements the virtual reality experience.

Another important design aspect that will be presented is the selection of furniture. The furniture chosen for the virtual reality therapy houses was carefully curated to promote comfort, relaxation, and a sense of security. The arrangement of furniture within the space was also carefully considered, as it contributes to the overall flow and atmosphere of the virtual reality therapy house.

Finally, the context of inclusion is a fundamental aspect of the design that will be explored in this section. The virtual reality therapy house project was developed with university students in mind, aiming to provide them with a safe and supportive environment to explore their mental health in a new and innovative way. The design was developed to ensure that it is inclusive and accessible to all, regardless of their background, experiences, or abilities.

3.50

3.20

2.50

2.50
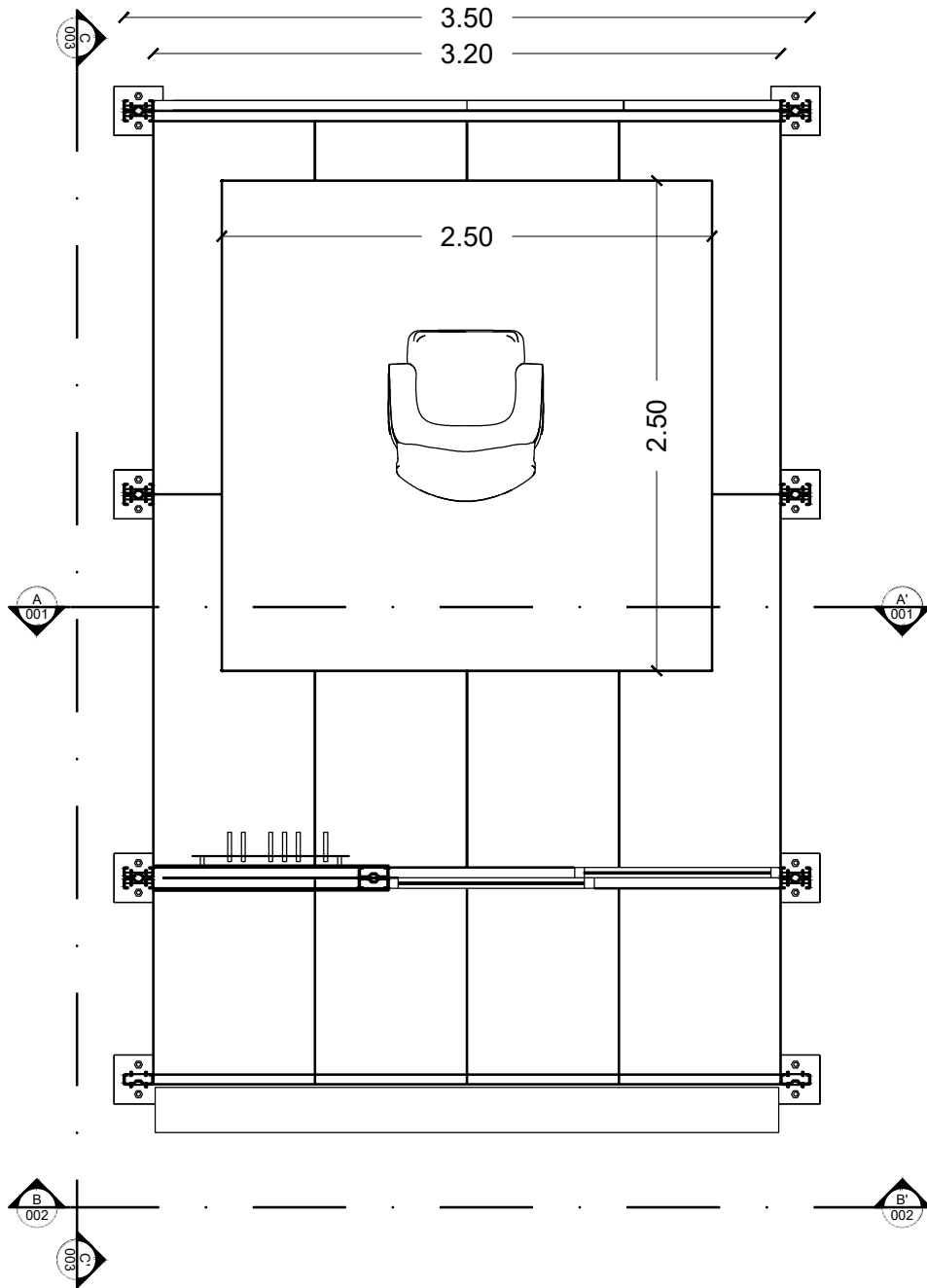
+4.63m

+0.39m

Plan (dimensions are in meteres)

Section A-A'

148

149
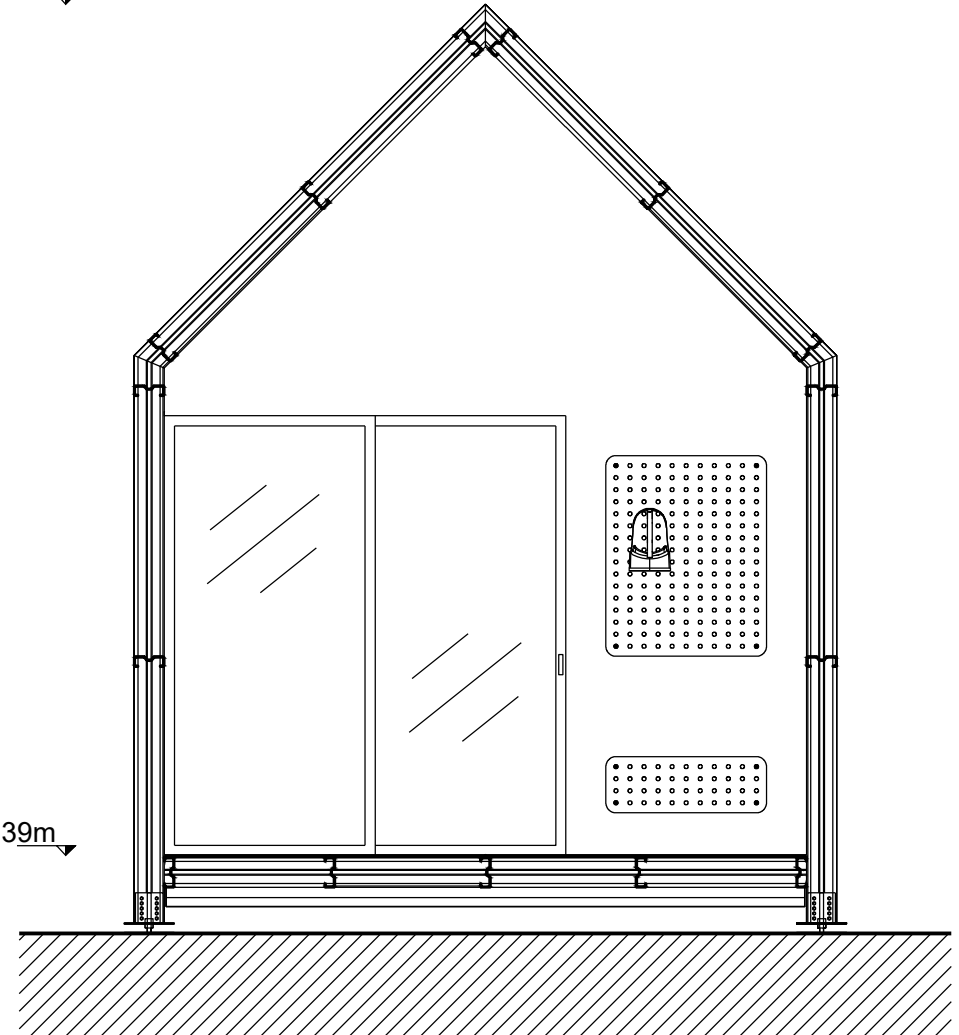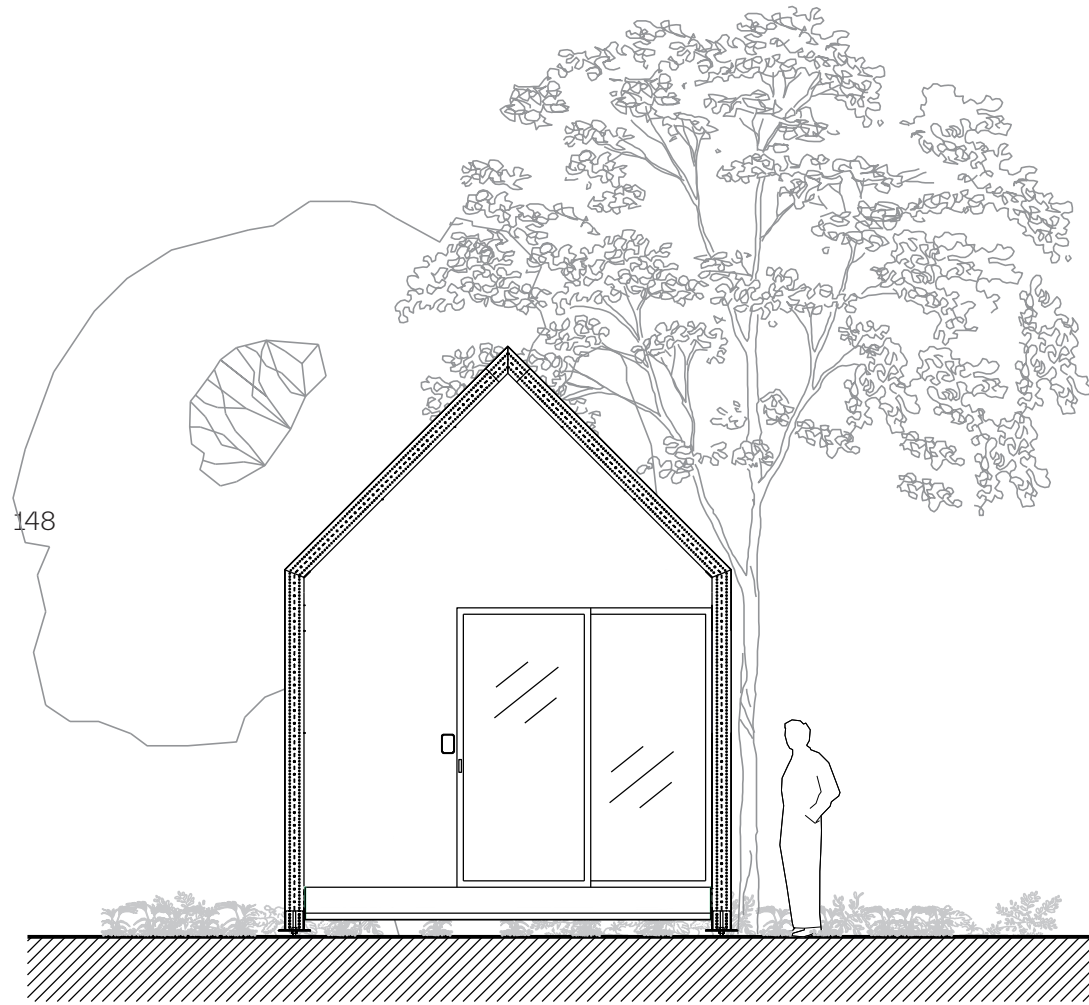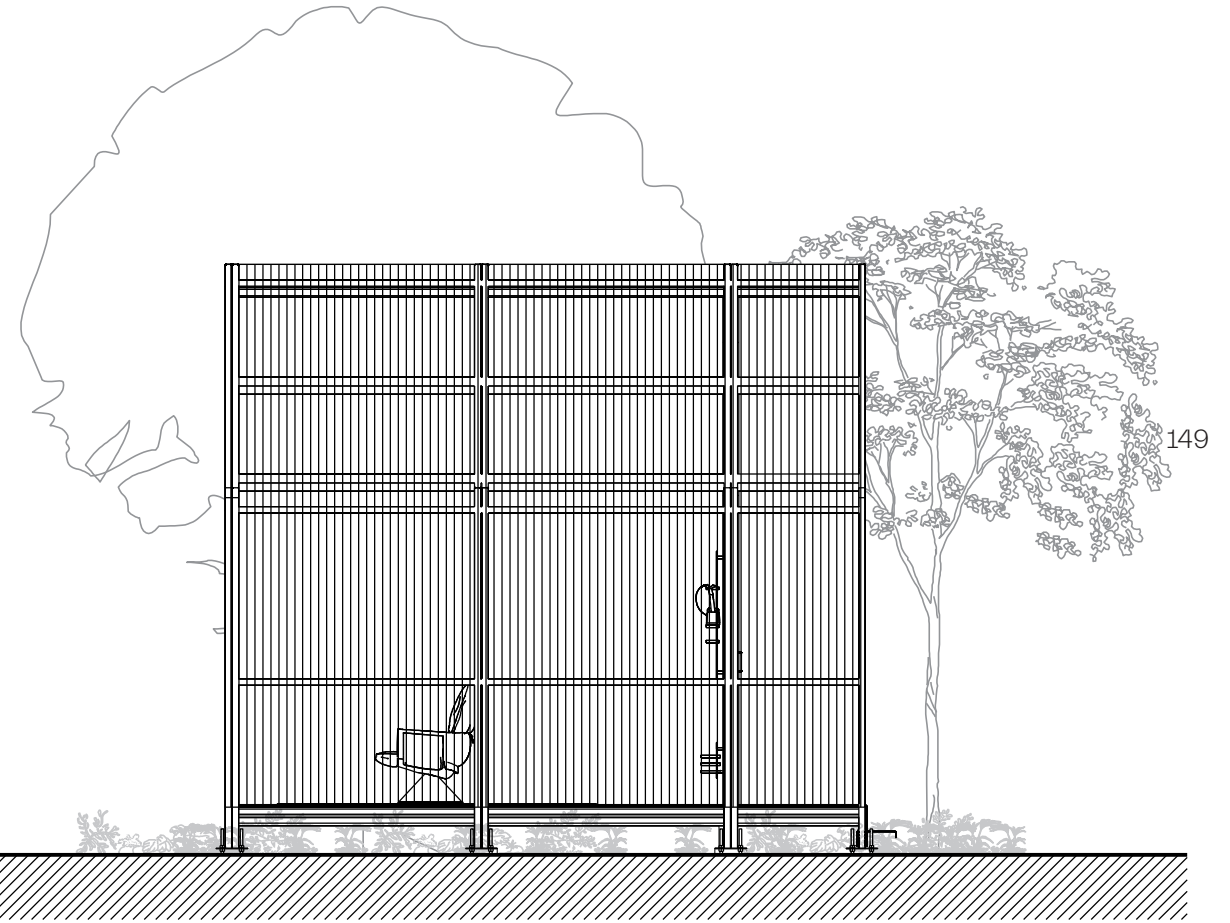
Elevation B-B'

Elevation C-C'

The structural system comprises of steel beams that are connected using a range of different fittings, allowing for easy customization and modification to suit specific project requirements. The beams used by the Scaffsystem Mechano are typically made from high-strength steel, which is known for its excellent load-bearing capacity and resistance to deformation. These properties make the beams ideal for use in building structures that require high levels of strength and stability, such as the small houses designed for the virtual reality therapy project.
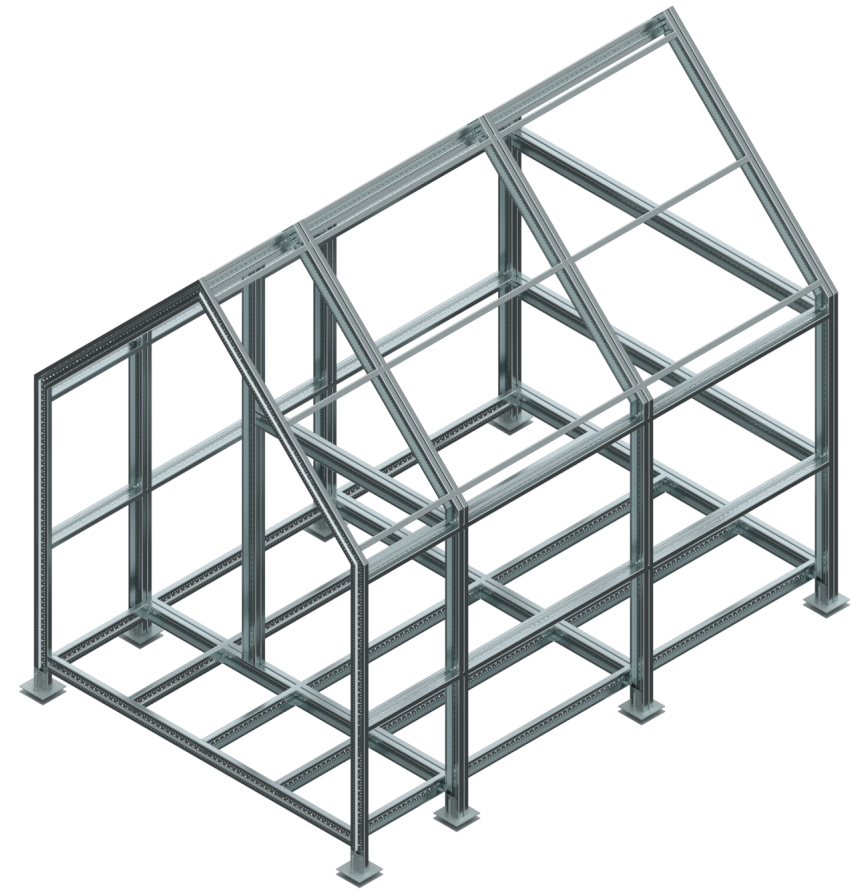
The fittings used in the Scaffsystem Mechano steel frame system are designed to connect the steel beams together securely and efficiently, while also allowing for easy adjustment and modification. The fittings come in a range of different types, such as couplers, swivels, and clamps, which are used to connect the beams in different configurations depending on the needs of the project.

For example, couplers are used to connect two beams end-to-end, while swivels are used to connect beams at angles. Clamps, on the other hand, are used to secure the beams in place, preventing them from moving or shifting.

The fittings are typically made from durable materials such as steel or aluminum, which provide excellent strength and resistance to wear and tear.

Connection brackets
3 mm thick

Secondary beam attachment detail on main beams single and/or breaker

50

150

Beams detail in mm

Outer bracket plus
inner bracket
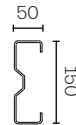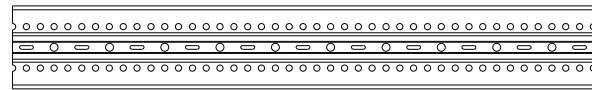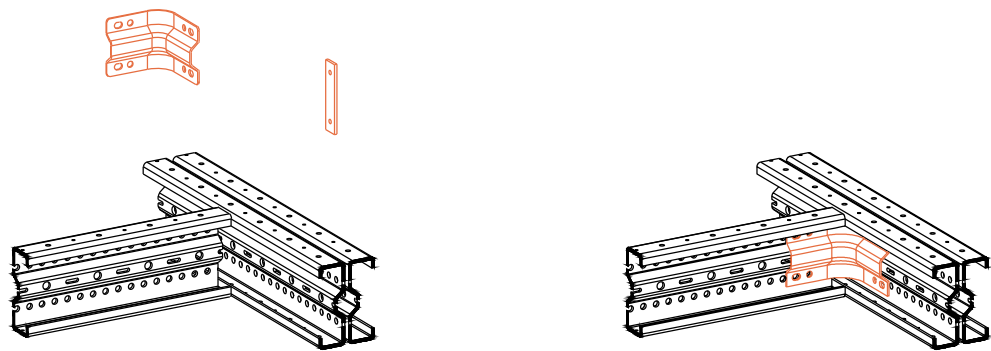
Double beam connection detail
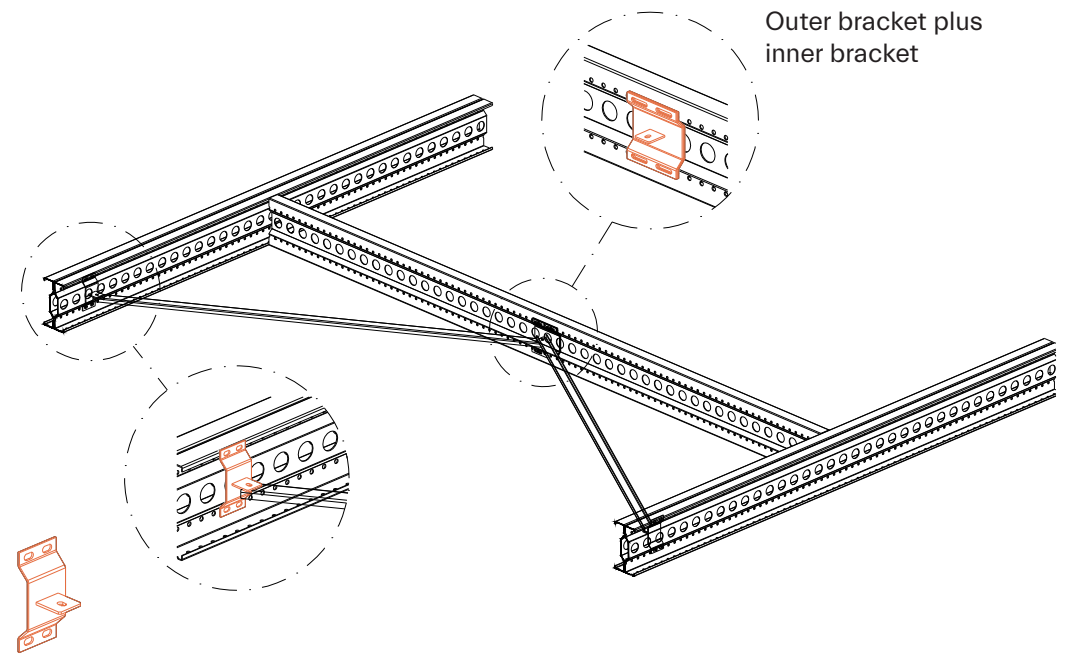
Special bracing profiles

5.2.1 // Materials baord

The virtual reality therapy tiny house project incorporates a range of materials that have been selected for both their functional and aesthetic properties. The walls of the house are made from translucent polycarbonate produced by Covestro, which is not only durable and stable, but also sustainable in its production. This allows natural light to filter through, providing a sense of transparency and openness to the space. The flooring features a soft green carpet, which creates a calming environment, complementing the theme of natural surroundings. The interior furnishings are made with soft fabrics that present green colors, further enhancing the connection with nature. In addition, the outdoor furnishing is made of concrete and provides a sturdy and low-maintenance option for social areas that are meant to be frequently used by university students. The design of the outdoor furniture by LoveCement is characterized by clean lines and a minimalist aesthetic that complements the overall design of the therapy house.

By using these materials and design principles, the small houses for virtual reality therapy provide not only a welcoming and comfortable space for university students but also a model for sustainable and responsible design practices.
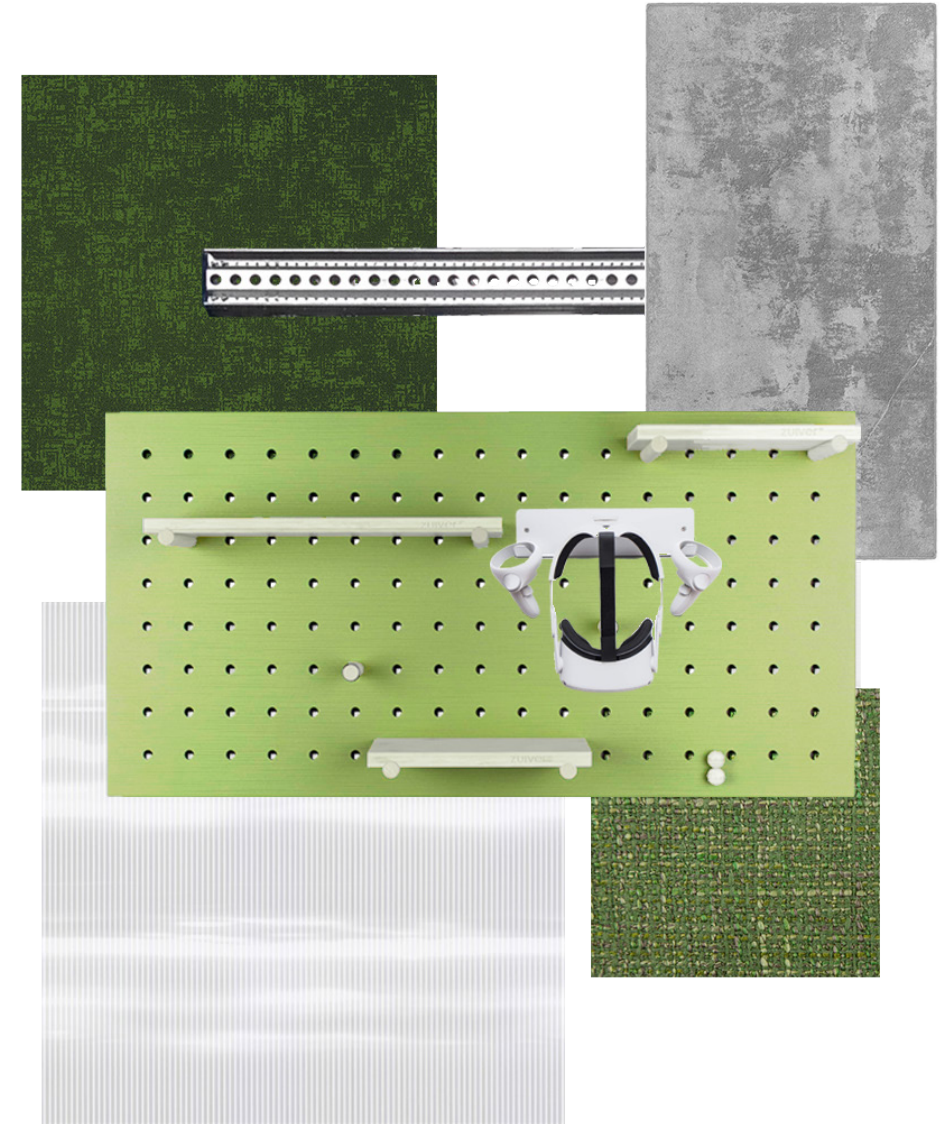
5.2.2 // The modules

Module 1:

The virtual reality experience is static. The user once seated will have no freedom of movement other than to adjust his or her position on the Sacco chair for comfort.
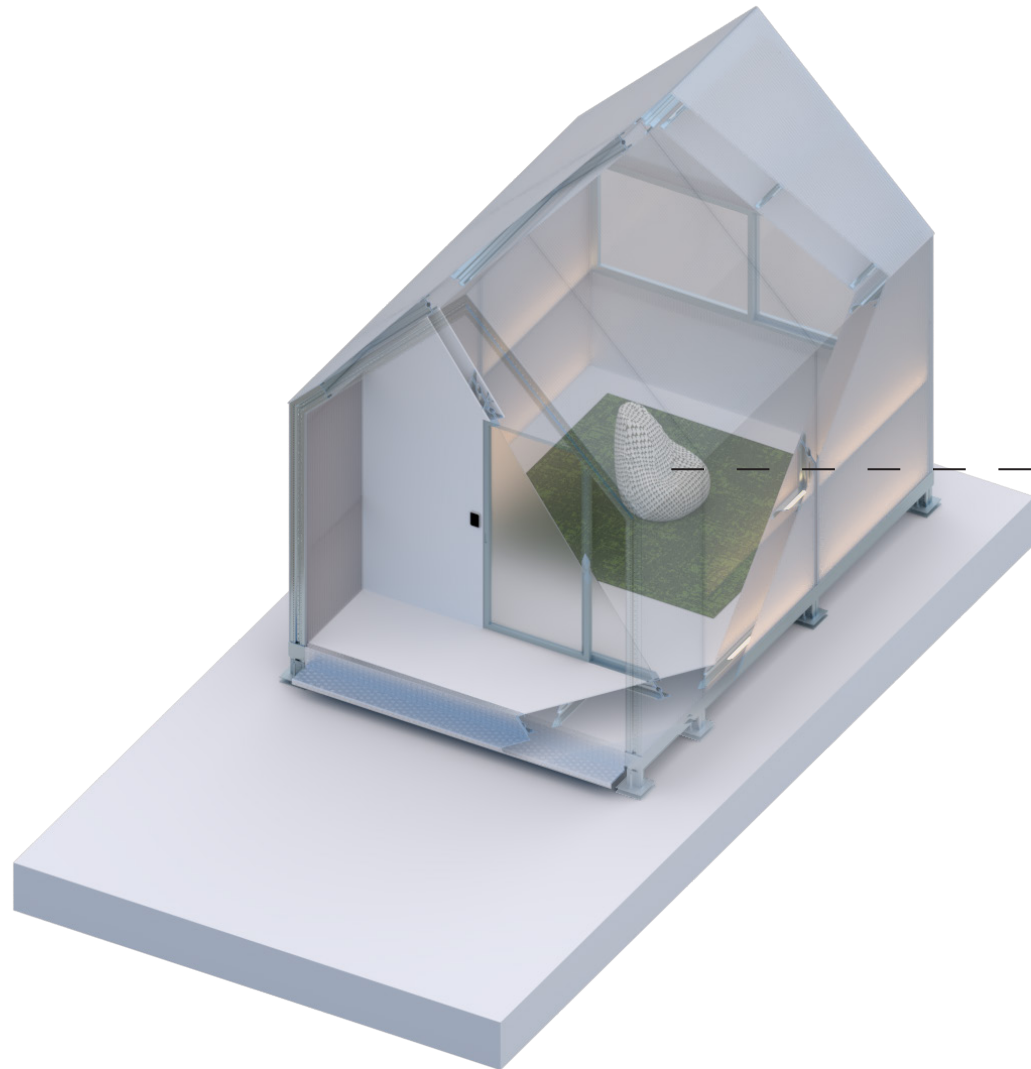
Module 2:

The VR experience conducted in this little house becomes more interactive and participatory. The Lud'o Lounge chair offers the possibility for the user to rotate 360 degrees achieving more effective and engaging levels of immersion.
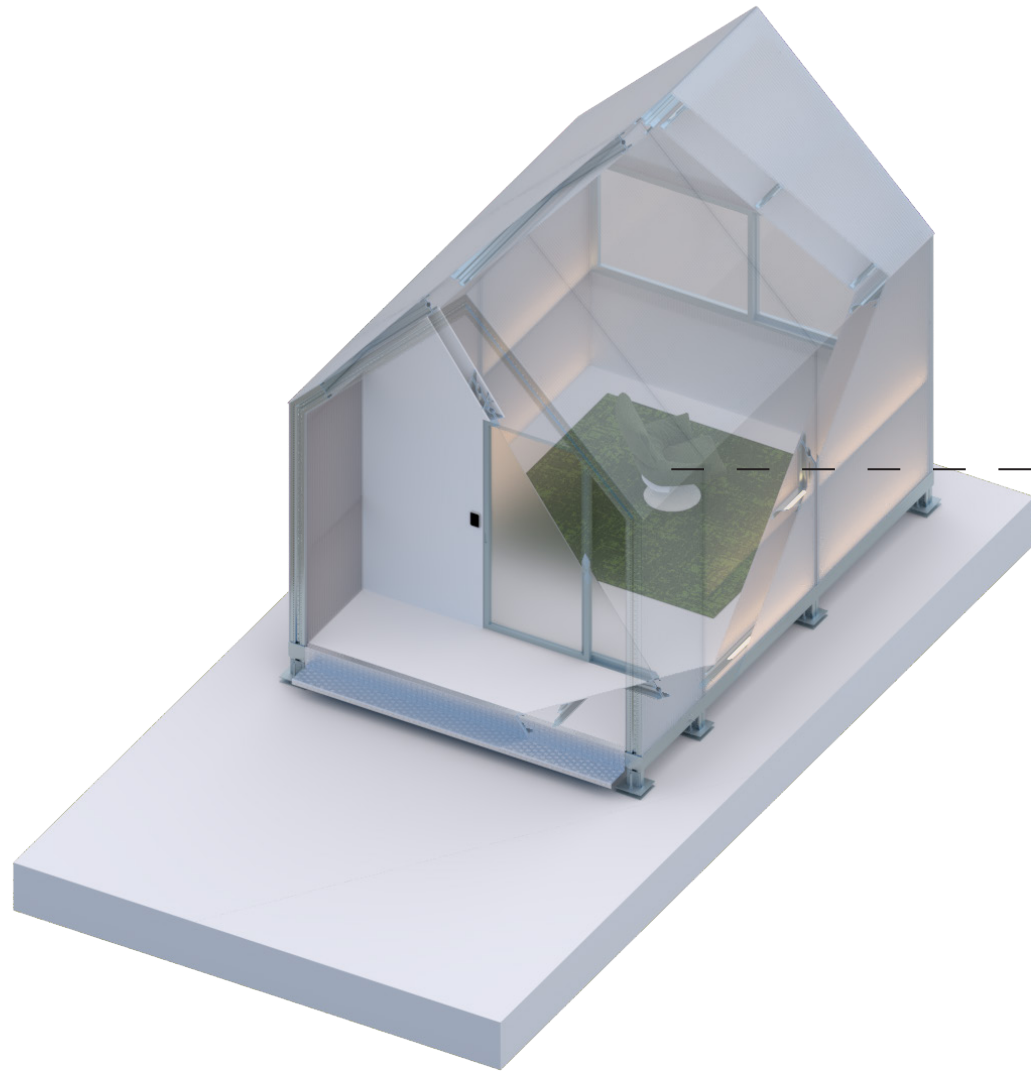
Module 3:

The third module has two purposes: the first is to make VR therapy inclusive even for people with disabilities by facilitating access via a ramp, and the second is that since there is no furniture inside, it is possible to conduct safe standing experiences, confined within the carpet that signals the "room stairs."
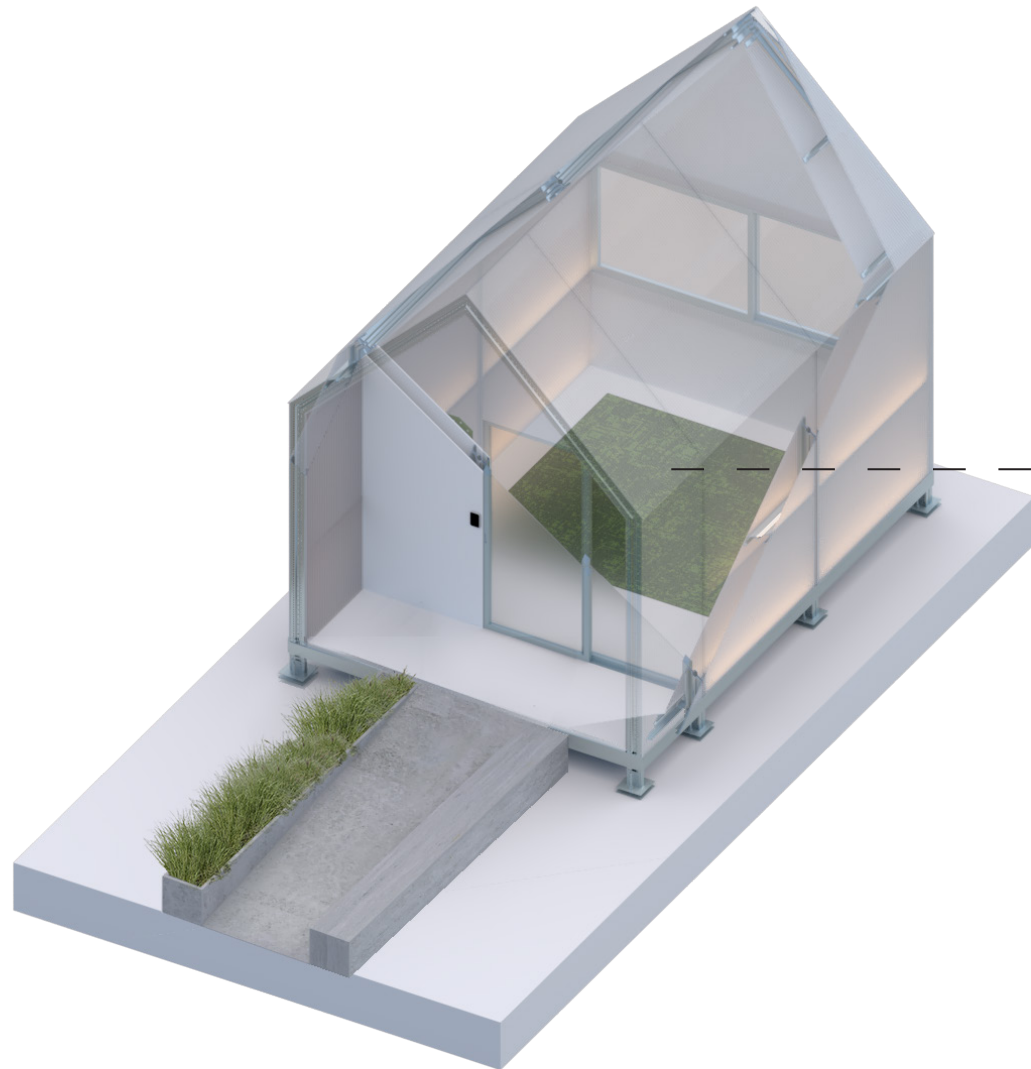
Land collection

Clap collection

Portals entrance
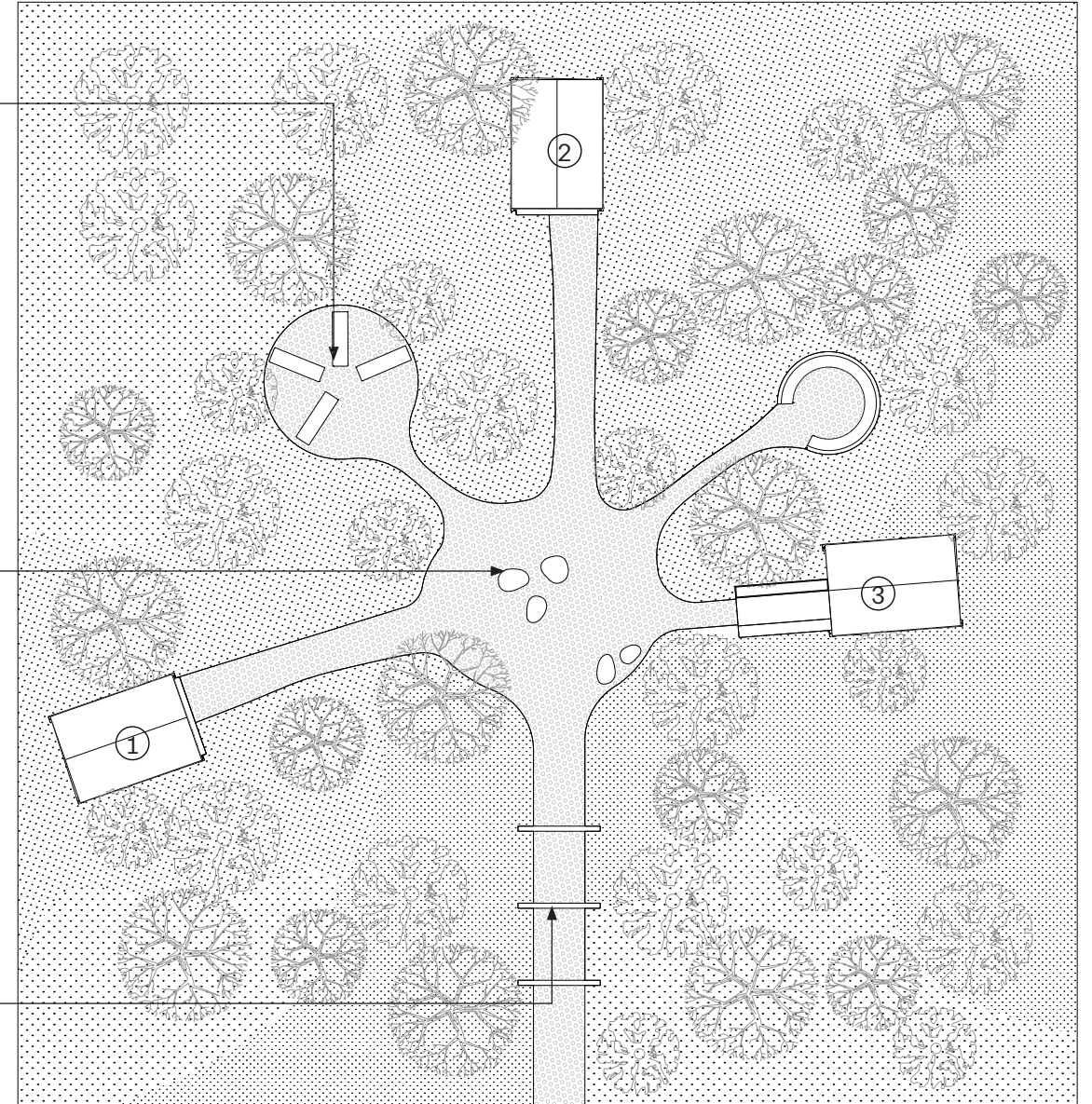
5.2.3 // Rendered mockup views and final effect

165

168
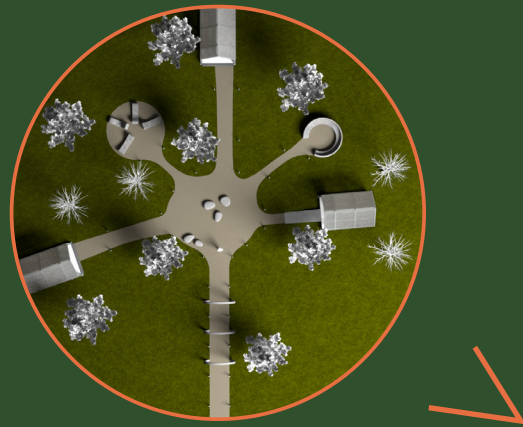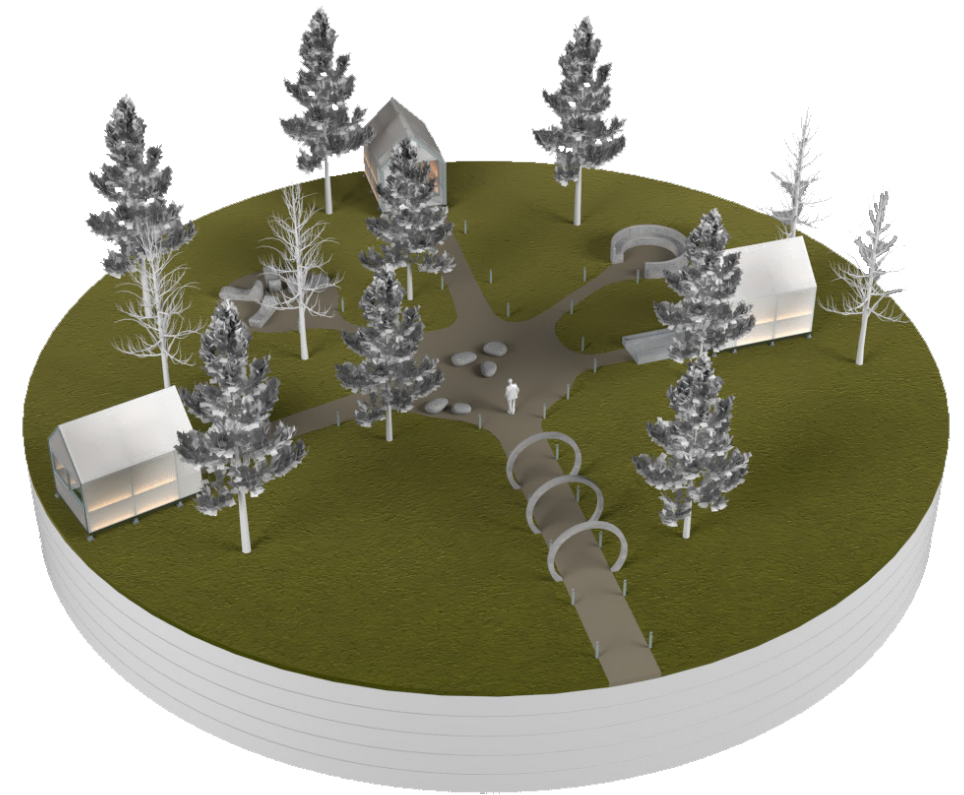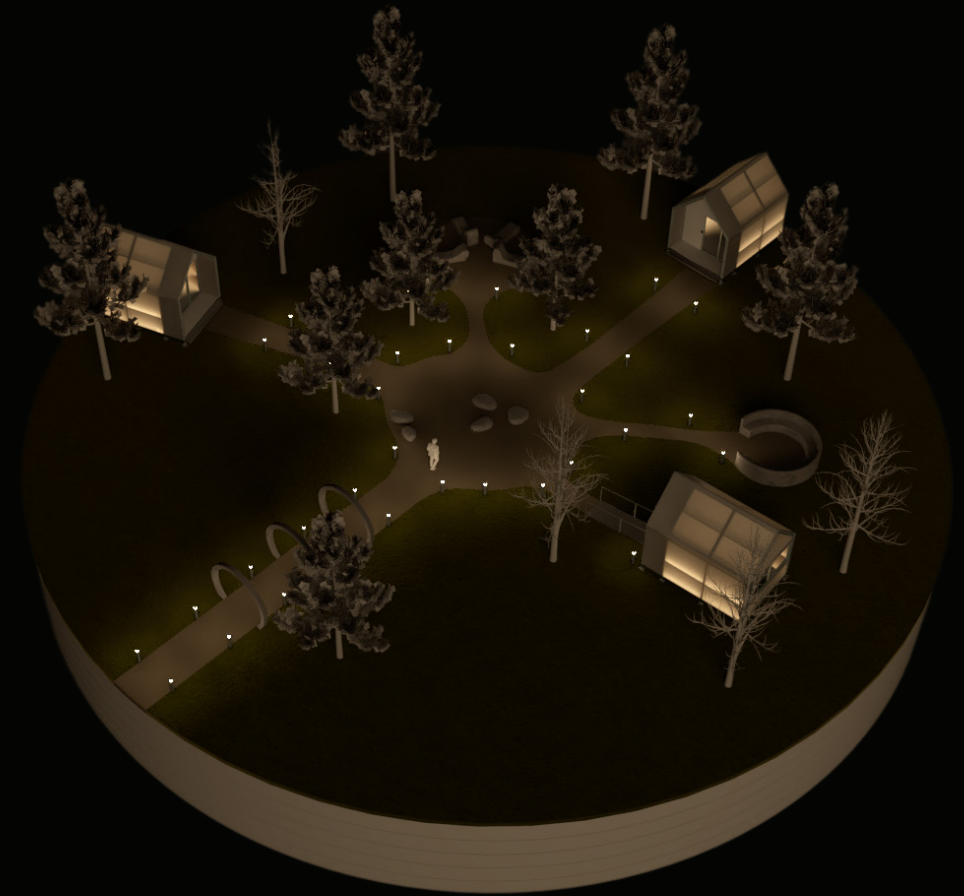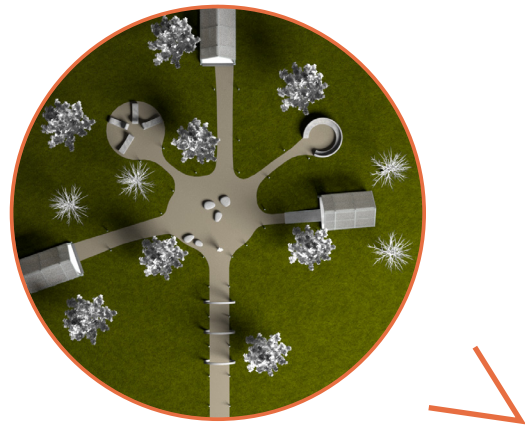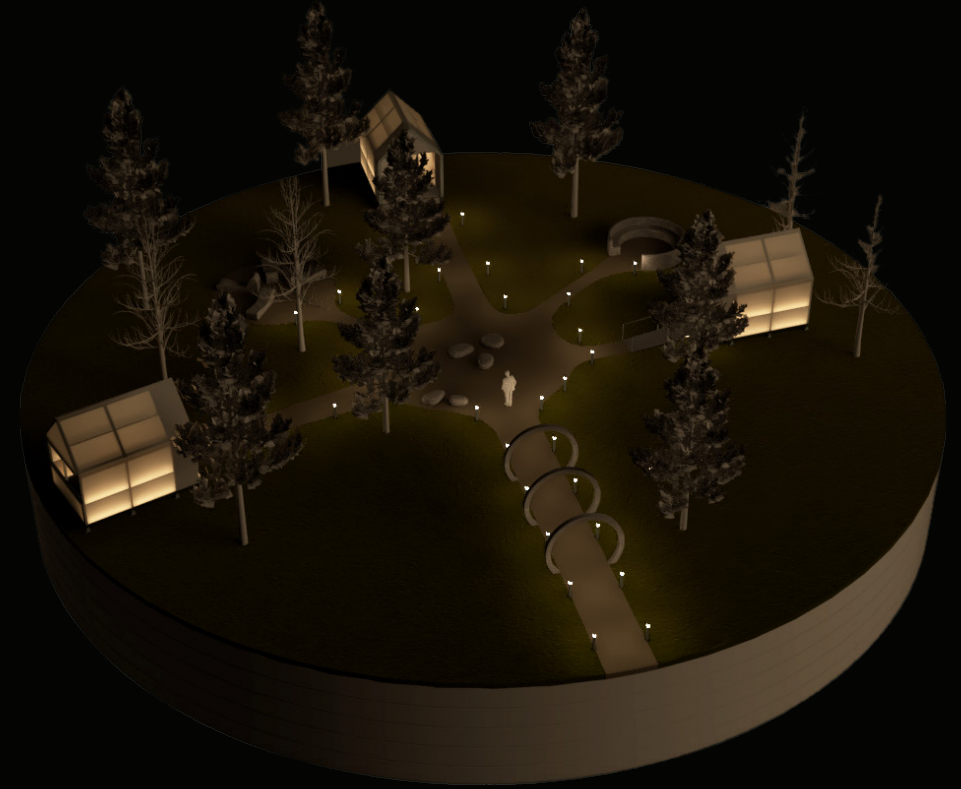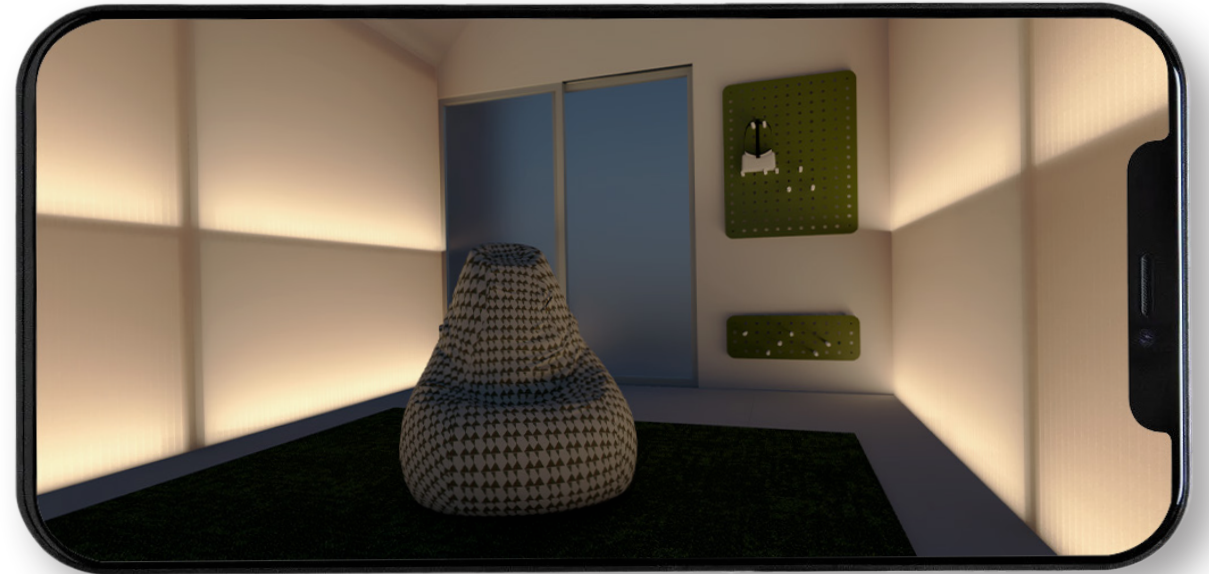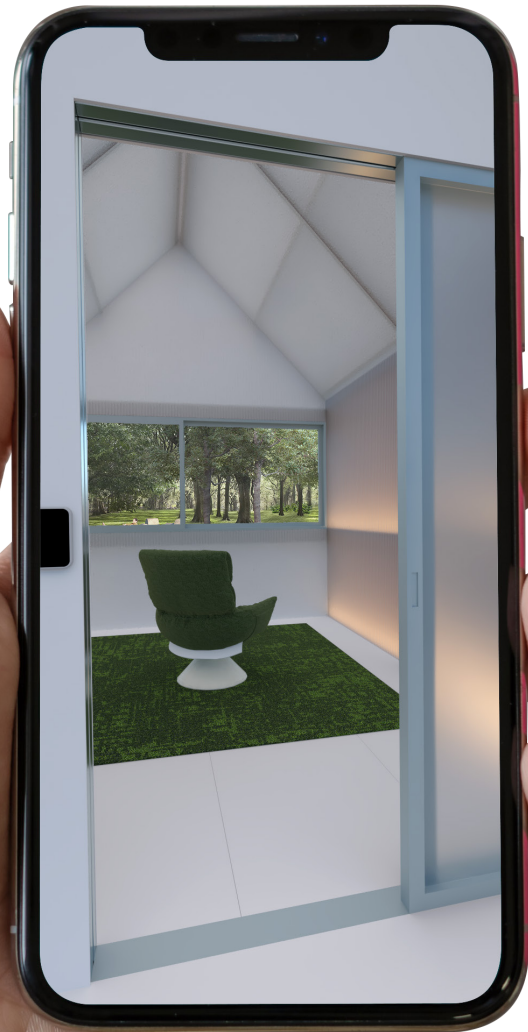
// Conclusions

Through this thesis we have seen that mental health has become a major concern, particularly among young adults. As noted by philosopher Umberto Galimberti in his book "L'Ospite Inquietante," the younger generations are increasingly burdened by the pressures of modern life, leading to heightened levels of stress and anxiety. These theories are supported by data from the World Health Organization and other sources, which show that mental health conditions such as depression and anxiety are on the rise worldwide.

The theoretical framework for this study also drew from the works of philosophers and doctors such as Miguel Benasayag, Randy Auerbach and Giuseppe Riva. All the authors have discussed the unique challenges facing young people today, including the pressure to succeed and the impact of social media on mental health, and they have emphasized the need for alternative approaches to mental health treatment that can help young people overcome these challenges.

To address this problem, researchers and mental health professionals have been exploring new and innovative approaches to treatment. One such approach is virtual reality (VR) therapy, which has shown promising results in reducing stress and anxiety levels in individuals. This technology allows individuals to experience relaxing and therapeutic environments, such as beaches, forests, and other peaceful settings, in a controlled and immersive way.

In response to these challenges, the present study aimed to design and implement small houses for VR therapy to be used by university students. The small houses were developed with the goal of creating an immersive and engaging environment that would facilitate relaxation and stress reduction. The design of the houses took into account a range of factors, including the need for privacy and comfort, as well as the use of calming colors and lighting. The modular design of the houses allowed for easy assembly and customization based on needs. Furthermore, the houses were designed to be environmentally friendly, incorporating sustainable materials and features that would minimize their carbon footprint. By taking a holistic approach to design, the project aimed to address both the physical and mental well-being of students, as well as their environmental impact.

Overall, the small houses for VR therapy offer an innovative and practical solution to the growing problem of mental health among university students. By providing an immersive and engaging environment for relaxation and stress reduction, these houses offer an accessible and effective tool for promoting mental health and highlight the importance of addressing the unique challenges facing young people today.

Bibliography

- Alsina-Jurnet, Ivan, Cristina Carvallo-Beciu, and José Gutiérrez-Maldonado. "Validity of Virtual Reality as a Method of Exposure in the Treatment of Test Anxiety." Behavior Research Methods 39, no. 4 (November 2007): 844–51. https://doi.org/10.3758/bf03192977.
- Aristotle. Metaphysics. Translated by W. D. Ross. Sioux Falls, SD: NuVision Publications, 2009.
- Asimov, Isaac. I. Asimov: A Memoir. New York: Bantam, 1995.
- Auerbach, Randy P., Jordi Alonso, W. G. Axinn, P. Cuijpers, D. D. Ebert, J. G. Green, I. Hwang, et al. "Mental Disorders among College Students in the World Health Organization World Mental Health Surveys." Psychological Medicine 46, no. 14 (August 3, 2016): 2955–70. https://doi.org/10.1017/s0033291716001665.
- Auerbach, Randy P., Philippe Mortier, Ronny Bruffaerts, Jordi Alonso, Corina Benjet, Pim Cuijpers, Koen Demyttenaere, et al. "Mental Disorder Comorbidity and Suicidal Thoughts and Behaviors in the World Health Organization World Mental Health Surveys International College Student Initiative." International Journal of Methods in Psychiatric Research 28, no. 2 (November 18, 2018). https://doi.org/10.1002/mpr.1752.
- Auerbach, Randy P., Philippe Mortier, Ronny Bruffaerts, Jordi Alonso, Corina Benjet, Pim Cuijpers, Koen Demyttenaere, et al. "Who World Mental Health Surveys International College Student Project: Prevalence and Distribution of Mental Disorders." Journal of Abnormal Psychology 127, no. 7 (October 2018): 623–38. https://doi.org/10.1037/abn0000362.
- Benasayag, Miguel, and Schmit Gérard. L'epoca Delle Passioni Tristi. Translated by Eleonora Missana. Milano: Feltrinelli, 2018.
- Burdea, Grigore C., and Philippe Coiffet. Virtual Reality Technology. 2nd ed. Wiley & Sons, Limited, John, 2011.
- Busetta, Giovanni, Maria Gabriella Campolo, Fabio Fiorillo, Laura Pagani, Demetrio Panarello, and Valeria Augello. "Effects of Covid-19 Lockdown on University Students' Anxiety Disorder in Italy." Genus 77, no. 1 (October 9, 2021). https://doi.org/10.1186/s41118–021–00135–5.
- Camara, Dayne, and Richard E. Hicks. "Using Virtual Reality to Reduce State Anxiety and Stress in University Students: An Experiment." Global Science and Technology Forum (GSTF) Journal of Psychology 4, no. 2 (January 2019). https://doi.org/10.5176/2345–7929_4.2.100.
- Cappannari, Lorenzo. Futuri Possibili: Come Il Metaverso e Le Nuove Tecnologie Cambieranno La Nostra Vita. Firenze etc.: Giunti, 2022.
- Corrigan, Patrick W., and Amy C. Watson. "Understanding the Impact of Stigma on People with Mental Illness." World psychiatry: official journal of the World Psychiatric Association (WPA 1, no. 1 (February 2002): 16–20. https://doi.org/https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1489832/.
- Cuijpers, Pim, Jack Dekker, Annemieke Noteboom, Niels Smits, and Jaap Peen. "Sensitivity and Specificity of the Major Depression Inventory in Outpatients." BMC Psychiatry 7, no. 1 (August 9, 2007). https://doi.org/10.1186/1471–244x-7–39.
- Dawkins, R. The Selfish Gene. Oxford: Oxford University Press, 1976.
- Dawkins, Richard. "Memes: the New Replicators." Essay. In The Selfish Gene, 189–201. Oxford: Oxford University Press, 1976.
- "Depression." National Institute of Mental Health. U.S. Department of Health and Human Services. Accessed August 21, 2022. https://www.nimh.nih.gov/health/topics/depression.
- Freud, Sigmund. Il Disagio Della civiltà e Altri Saggi. Translated by Sandro Candreva. Ed. integrale di riferimento, n.d.

- Galderisi, Silvana, Andreas Heinz, Marianne Kastrup, Julian Beezhold, and Norman Sartorius. "Toward a New Definition of Mental Health." World Psychiatry 14, no. 2 (June 2015): 231–33. https://doi.org/10.1002/wps.20231.
- Galimberti, Umberto. Introduction. In L'ospite Inquietante: Il Nichilismo e i Giovani. Milano: Feltrinelli, 2010.
- Ibrahim, Ahmed K., Shona J. Kelly, Clive E. Adams, and Cris Glazebrook. "A Systematic Review of Studies of Depression Prevalence in University Students." Journal of Psychiatric Research 47, no. 3 (March 2013): 391–400. https://doi.org/10.1016/j.jpsychires.2012.11.015.
- Ito, Miho, and Eisuke Matsushima. "Presentation of Coping Strategies Associated with Physical and Mental Health during Health Check-Ups." Community Mental Health Journal 53, no. 3 (August 11, 2016): 297–305. https://doi.org/10.1007/s10597–016–0048–9.
- The Lancet Global Health. "Mental Health Matters." The Lancet Global Health 8, no. 11 (2020). https://doi.org/10.1016/s2214–109x(20)30432–0.
- Lewis, Sian, Melvyn Freeman, Mark van Ommeren, Dan Chisholm, Olivia Gascoigne Siegl, and Dévora Kestel. "The World Mental Health Report: Transforming Mental Health for All." World Psychiatry 21, no. 3 (2022). https://doi.org/10.1002/wps.21018.
- Lund, Crick, Carrie Brooke-Sumner, Florence Baingana, Emily Claire Baron, Erica Breuer, Prabha Chandra, Johannes Haushofer, et al. "Social Determinants of Mental Disorders and the Sustainable Development Goals: A Systematic Review of Reviews." The Lancet Psychiatry 5, no. 4 (2018): 357–69. https://doi.org/10.1016/s2215-0366(18)30060–9.
- Lewis, Sian, Melvyn Freeman, Mark van Ommeren, Dan Chisholm, Olivia Gascoigne Siegl, and Dévora Kestel. "The World Mental Health Report: Transforming Mental Health for All." World Psychiatry 21, no. 3 (2022). https://doi.org/10.1002/wps.21018.
- Lund, Crick, Carrie Brooke-Sumner, Florence Baingana, Emily Claire Baron, Erica Breuer, Prabha Chandra, Johannes Haushofer, et al. "Social Determinants of Mental Disorders and the Sustainable Development Goals: A Systematic Review of Reviews." The Lancet Psychiatry 5, no. 4 (2018): 357–69. https://doi.org/10.1016/s2215-0366(18)30060–9.
- Modrego-Alarcón, Marta, Yolanda López-del-Hoyo, Javier García-Campayo, Adrián Pérez-Aranda, Mayte Navarro-Gil, María Beltrán-Ruiz, Héctor Morillo, Irene Delgado-Suarez, Rebeca Oliván-Arévalo, and Jesus Montero-Marin. "Efficacy of a Mindfulness-Based Programme with and without Virtual Reality Support to Reduce Stress in University Students: A Randomized Controlled Trial." Behaviour Research and Therapy 142, no. 103866 (April 26, 2021). https://doi.org/10.1016/j.brat.2021.103866.
- Newbury, Joanne B., Robert Stewart, Helen L. Fisher, Sean Beevers, David Dajnak, Matthew Broadbent, Megan Pritchard, et al. "Association between Air Pollution Exposure and Mental Health Service Use among Individuals with First Presentations of Psychotic and Mood Disorders: Retrospective Cohort Study." The British Journal of Psychiatry 219, no. 6 (2021): 678–85. https://doi.org/10.1192/bjp.2021.119.
- Porru, Fabio, Merel Schuring, Ute Bültmann, Igor Portoghese, Alex Burdorf, and Suzan J.W. Robroek. "Associations of University Student Life Challenges with Mental Health and Self-Rated Health: A Longitudinal Study with 6 Months Follow-Up." Journal of Affective Disorders 296 (January 1, 2022): 250–57. https://doi.org/10.1016/j.jad.2021.09.057.
- Richardson, Thomas, Peter Elliott, Ron Roberts, and Megan Jansen. "A Longitudinal Study of Financial Difficulties and Mental Health in a National Sample of British Undergraduate Students." Community

Mental Health Journal 53, no. 3 (July 29, 2016): 344–52. https://doi.org/10.1007/s10597–016–0052–0.

- Riva, Giuseppe, Brenda K. Wiederhold, and Fabrizia Mantovani. "Neuroscience of Virtual Reality: From Virtual Exposure to Embodied Medicine." Cyberpsychology, Behavior, and Social Networking 22, no. 1 (January 16, 2019): 82–96. https://doi.org/10.1089/cyber.2017.29099.gri.
- Rotenstein, Lisa S., Marco A. Ramos, Matthew Torre, J. Bradley Segal, Michael J. Peluso, Constance Guille, Srijan Sen, and Douglas A. Mata. "Prevalence of Depression, Depressive Symptoms, and Suicidal Ideation among Medical Students." JAMA 316, no. 21 (December 6, 2016): 2214. https://doi.org/10.1001/jama.2016.17324.
- Santomauro, Damian F, Ana M Mantilla Herrera, Jamileh Shadid, Peng Zheng, Charlie Ashbaugh, David M Pigott, Cristiana Abbafati, et al. "Global Prevalence and Burden of Depressive and Anxiety Disorders in 204 Countries and Territories in 2020 Due to the COVID-19 Pandemic." The Lancet 398, no. 10312 (2021): 1700–1712. https://doi.org/10.1016/s0140–6736(21)02143–7.
- Spielberger, Charles Donald, Richard L. Gorsuch, and Robert E. Lushene. Stai Manual for the Stait-Trait Anxiety Inventory ("Self-Evaluation Questionnaire"). Palo Alto, Calif: Consulting Psychologists Press, 1970.
- Spinoza, Baruch. Etica. Translated by Sergio Landucci. Roma: GLF editori Laterza, 2009.
- Spitzer, Robert L., Kurt Kroenke, Janet B. Williams, and Bernd Löwe. "A Brief Measure for Assessing Generalized Anxiety Disorder." Archives of Internal Medicine 166, no. 10 (May 22, 2006). https://doi.org/10.1001/archinte.166.10.1092.
- Tiller, John W. "Depression and Anxiety." Medical Journal of Australia 199, no. S6 (October 29, 2013). https://doi.org/10.5694/mja12.10628.
- Waterworth, John A., and Giuseppe Riva. Feeling Present in the Physical World and in Computer-Mediated Environments. Houndmills, Basingstoke,

Hampshire: Palgrave Macmillan, 2014.

- Wiederhold, Brenda K, and Mark D Wiederhold. "The Future of Cybertherapy: Improved Options with Advanced Technologies." IOS Press, Studies in Health Technology and Informatics, 99, no. Cybertherapy (2004): 263–70.
- Xu, Wenge, Hai-Ning Liang, Nilufar Baghaei, Xiaoyue Ma, Kangyou Yu, Xuanru Meng, and Shaoyue Wen. "Effects of an Immersive Virtual Reality Exergame on University Students' Anxiety, Depression, and Perceived Stress: Pilot Feasibility and Usability Study." JMIR Serious Games 9, no. 4 (November 22, 2021). https://doi.org/10.2196/29330.

Siteography

- "Anxiety Disorders." National Institute of Mental Health. U.S. Department of Health and Human Services. Accessed September 25, 2022. https://www.nimh.nih.gov/health/topics/anxiety-disorders.
- Ball, Matthew. "A DEFINITION (FINALLY) ." Essay. In The Metaverse: And How It Will Revolutionize Everything. New York, NY: WW Norton et Co, 2022.
- "Become. Corsi e Strumenti Digitali per Psicologi e Medici." BECOME. Accessed January 18, 2023. https://www.discoverbecome.com/.
- Bruce, Debra Fulghum. "What Is Depression?" WebMD. Accessed August 21, 2022. https://www.webmd.com/depression/guide/detecting-depression.
- Calamai, Dott.ssa Giulia. "Umorismo e Regolazione Emozionale." IPSICO, Firenze, November 13, 2018. https://www.ipsico.it/news/umorismo-e-regolazione-emozionale/#:~:text=L'umorismo%20si%20configura%20come,il%20problema%20che%20riduce%20i.
- Campus Nord Bovisa, RPBW. YouTube. PoliMi, 2022. https://www.youtube.com/watch?v=RZbJqkGZ_h4&t=2s&ab_channel=PoliMi.
- De Rose, Paola. "È Giunta L'ora Di Superare Lo Stigma per Le Malattie Mentali." Fondazione Umberto Veronesi, November 11, 2020. https://www.fondazioneveronesi.it/magazine/articoli/neuroscienze/stigma-come-affrontare-il-veleno-sociale-contro-le-malattie-mentali.
- "Delight the Light." Scaffsystem, April 11, 2018. https://www.scaffsystem.it/en/case-histories/delight-the-light/.
- "Feeling Good During and After the COVID19 Epidemic." COVIDFeelGood. Accessed November 2, 2022. https://www.covidfeelgood.com/home.
- Grady, Denise. "The Vision Thing: Mainly in the Brain." Discover Megazine, June 1, 1993.
- Greco, Mattia, and Giovanni Ragusa. "Università e Salute Mentale: Un Problema Non Più Rimandabile." Senza Tregua, August 2, 2021. http://www.senzatregua.it/2021/08/02/7347/.
- "Health and Well-Being." World Health Organization. World Health Organization. Accessed August 12, 2022. https://www.who.int/data/gho/data/major-themes/health-and-well-being.
- Il Severo Discorso Di Tre Neolaureate Durante La Consegna Diplomi Alla Normale Di Pisa. YouTube, 2021. https://www.youtube.com/watch?v=QFLMT_55FaQ.
- "Largest Survey of Its Kind Reveals Extent of University Students' Struggles with Thoughts of Self-Harm, Loneliness and Anxiety." Rethink Metal Illness, March 5, 2019. https://www.rethink.org/news-and-stories/news/2019/mar/largest-survey-of-its-kind-reveals-extent-of-university-students-struggles-with-thoughts-of-self-harm-loneliness-and-anxiety/.
- Leal, Pollyana Caldeira, Tiago Costa Goes, Luiz Carlos Ferreira da Silva, and Flavia Teixeira-Silva. "Trait vs. State Anxiety in Different Threatening Situations." Trends in Psychiatry and Psychotherapy. Associação de Psiquiatria do Rio Grande do Sul, August 14, 2017. https://www.scielo.br/j/trends/a/KJgHvnjZsxR8FL78yg5D/#:~:text=State%20anxiety%20reflects%20the%20psychological,tendency%20to%20present%20state%20anxiety.
- "L'effetto Benefico Della Natura Sulla Mente: 10 Studi Scientifici." Psicologo Milano, July 10, 2016. https://www.psicologo-milano.it/newblog/effetto-natura-mente/.
- Lynch, Gerald. "How to Set up Your Room for VR." Space.com, September 13, 2021. https://www.space.com/how-to-set-up-your-room-for-vr.
- Milk, Chris. "Virtual Reality Design (VR): A Beginners Guide to VR Apps Development." Marvel Blog, February 11, 2021. https://marvelapp.com/blog/designing-vr-beginners-guide/.

- O'Donnell, Andy. "Tips for Creating a Virtual Reality Room." Lifewire, December 2, 2020. https://www.lifewire.com/create-a-virtual-reality-room-4121179.
- Panciera, Nicla. "Allarme Suicidi Tra i Giovani: Con La Pandemia Aumentati Del 20%." la Repubblica. la Repubblica, January 22, 2021. https://bit.ly/3yz4sgo.
- "Parco La Goccia Milano |." Parco la Goccia Milano. Accessed January 6, 2023. http://www.parcogoccia.com/#.
- "A Place to Gather Strength and Inspiration, and Share the Joy with Your Loved Ones." Ziedlejas. Accessed December 19, 2022. https://ziedlejas.lv/en.
- "Rigenerazione Urbana. Bovisa-Goccia, Il Masterplan Di Renzo Piano per Ricuire Il Quartiere." Comune di Milano, November 25, 2022. https://www.comune.milano.it/-/rigenerazione-urbana.-bovisa-goccia-il-masterplan-di-renzo-piano-per-ricucire-il-quartiere.
- Rousseaux, Agnès, and Nacera Aknak Khan. "Basta!" Basta.media, November 8, 2010. https://basta.media/Miguel-Benasayag-Liberer-la-puissance-d-agir-des-gens.
- Scaffsystem, and Admin. "Scaffsystem, Soluzioni Strutturali per Logistica Architettura." Scaffsystem, March 8, 2023. https://www.scaffsystem.it/.
- "The State of Mobile 2021." Data.ai. Accessed September 23, 2022. https://www.data.ai/en/go/state-of-mobile-2021/.
- "The 72 Hour Cabin." Visit Sweden. Accessed December 19, 2022. https://visitsweden.com/where-to-go/southern-sweden/vastsverige/72hcabin/#:~:text=The%2072%20Hour%20Cabin'%20is,small%20cabins%20made%20of%20glass.
- "Translucent White Volumes Compose the 'Hermitage for Meditation' Retreat in Vietnam." Designboom, July 16, 2022. https://www.designboom.com/architecture/hermitage-for-meditation-cam-to-quang-quy-nguyen-huu-vietnam-06–14–2022/.
- Urbanet. "How Many People Live in Cities Worldwide? | Infographic." Urbanet, August 25, 2016. https://www.urbanet.info/world-urban-population/.
- "Watch Apple's Tim Cook Do a Q&A at the Utah Technology Council." The IT Nerd, October 4, 2016. https://itnerd.blog/2016/10/04/watch-apples-tim-cook-do-a-qa-at-the-utah-technology-council/.
- "The World Urban Population | Infographics." Urbanet, August 25, 2016. https://www.urbanet.info/world-urban-population/.
- "XRHealth Virtual Clinic: At-Home Virtual Reality Therapy." XRHealth. Accessed December 7, 2022. https://www.xr.health/.
- Younghans, Johanna. "College Stress." College Stress | Harvard Medical School, September 10, 2018. https://hms.harvard.edu/news/college-stress.

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