Universidade de Évora - Instituto de Investigação e Formação Avançada

Programa de Doutoramento em Artes e Técnicas da Paisagem

Tese de Doutoramento

Therapeutic landscape for elderly. Contribution to its design: indicators and strategies - the study case of Guiyang City -Yunyan urban district

guotai bao

Orientador(es) | Rute Sousa Matos

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Abstract

Therapeutic landscape for elderly. Contribution to its design:indicators and strategies - the study case of Guiyang City-Yunyan urban district

The purpose of this doctoral thesisisto explore and propose indicators, and strategies for a therapeutic landscape aimed at enhancing the physiological, psychological, and spiritual well-being of the elderly, as well as applying these indicators in practical settings, namely in elderly care institutions and medical centres in Guiyang Yunyan urban district. This research focuses on emerging trends in therapeutic landscape design in China and the West, emphasizing the integration of nature into medical environments.

We established a set of indicators called Holistic Therapeutic Landscape Indicators for the elderly (HTLD(E)) to improve the therapeutic landscape of elderly care institutions in Guiyang. These indicators set a standard for the qualification of the current built therapeutic landscape and suggest ways in which it could be reconstructed or improved through corresponding design strategies. The methodology employed includes literature reviews, interdisciplinary studies, reference case analyses, questionnaire surveys, and multivariate analyses. The study aims to contribute to effective and sustainable practices in therapeutic landscape design.

Keywords

Therapeutic landscape ;Design;Guiyang;Elderly; Evidence-based Therapeutic

 Landscape for elderly. Contribution to its design:indicators and strategies

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Resumo

Paisagem terapêutica para idosos. Contributo para a sua conceção:indicadores e estra tégias – o caso de estudo da cidade de Guiyang– distrito urbano de Yunyan

O objetivo desta tese de doutoramento é explorar e propor indicadores e estratégias para um ambiente terapêutico destinado a melhorar o bem-estar fisiológico, psicológico e espiritual dos idosos, bem como aplicar esses indicadores em ambientes reais, nomeadamente em instituições de cuidados para idosos e centros médicos no distrito urbano de Guiyang Yunyan. Esta pesquisa centra-se nas tendências emergentes no design de paisagens terapêuticas na China e no Ocidente, enfatizando a integração da natureza em ambientes médicos. Estabelecemos um conjunto de indicadores chamados Indicadores de Paisagem Terapêutica Holística para Idosos (HTLD(E)) para melhorar a paisagem terapêutica das instituições de cuidados para idosos em Guiyang. Esses indicadores estabelecem um padrão para a qualificação da paisagem terapêutica construída atual e sugerem maneiras pelas quais ela poderia ser reconstruída ou melhorada por meio de estratégias de design correspondentes. A metodologia empregada inclui revisões de literatura, estudos interdisciplinares, análises de casos de referência, pesquisas de questionários e análises multivariadas. O estudo visa contribuir para práticas eficazes e sustentáveis no design de paisagens terapêuticas.

Palavras-chave

Paisagem terapêutica; Design; Guiyang; Idosos; Baseado em evidências

Acknowledgements

Acronyms

HTLD (E)- Holistic Therapeutic Landscape Design Indicators for elderly

HTLD – General Holistic Therapeutic Landscape Design Indicators

TCM-Traditional Chinese Medicine

EBD-evidence based design.

TL-Therapeutic Landscape

ART-Attention Restoration Theory

HT-Horticultural Therapy

IDT-Interdisciplinary Design Team

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INTRODUCTION

1.1 Background

In modern medicine, diagnosis and treatment have been predominantly approached from a pathological and localized perspective, emphasizing the use of technological means to cure specific organs, thereby achieving physiological recovery in patients. While this shift has made breakthroughs in combating various biological diseases, it has weakened holistic rehabilitation in individuals, including comprehensive recovery in psychological, spiritual, and physiological aspects. Natural elements should be regarded as a part of medical rehabilitation rather than just a means to beautify the environment. The writing of this thesis originates from our contemplation on the current medical system. We believe the limitations in contemporary medical institution design concepts are closely related to our understanding of nature, health, death, and the essence of human existence. In the current era, the therapeutic potential of outdoor environments in accelerating patient recovery has been emphasized in the Chinese cultural landscape. However, comprehensive research and specific cases in this field are surprisingly scarce. The broader population is generally unfamiliar with defining the complex scope of therapeutic landscapes and their design strategies. To elucidate this field, our research utilizes the analytical software Citespace, integrating insights from landscape architecture, environmental psychology, and health geography. Our vision is to establish design metrics and strategies for therapeutic landscapes that can be assessed and applied in therapeutic landscape design.

1.2 Contextualisation

Therapeutic landscapes are becoming increasingly popular as the desire for a higher standard of living and a connection to nature grows. This emerging concept is based on the belief that nature helps promote health and well-being. However, a range of challenges, including a. excessive urbanization, environmental issues, b. the global challenges of aging and disability, c. the call for more humanistic medical care, d. concerns related to sub-health, e. the significance of nature in children's well-being, f. the need for spaces for the old and terminally ill to experience dignity in their final moments, and g. the inadequacies in spatial planning within Chinese cities, have underscored the necessity for further research in the realm of therapeutic landscapes.

a. Excessive urbanization, environmental issues and the pursuit of nature-centred recreation

In contrast to rural environments, urban centres offer significant resources, including employment, education and healthcare opportunities. The concentration of these facilities has led to a massive migration of people to these urban hubs, which in turn has accelerated urban sprawl. At the same time, the surge in urban population has

triggered a number of environmental problems, notably increased carbon emissions, PM2.5 particulate matter pollution[1] and widespread noise pollution. As a response to these environmental pressures, urban dwellers tend to seek solace in the natural environment. This trend is evident in agritourism businesses, Western-style farms and sprawling agricultural parks in China's suburban landscape. The underlying motivation for this is to relieve the stresses of urban life and embrace an inherently tranquil relationship with the natural environment, as the relationship between individual health and environmental context profoundly affects people's overall health. Empirical research continues to emphasize the beneficial effects of these environments on overall health. Therefore, an important consideration is to reimagine urban spaces to incorporate these nature-centred elements, thereby promoting long-term resident retention and health well-being.

b. Global aging and disability

Aging and disability are global issues that require special attention.

According to the United Nations, Department of Economic and Social Affairs, Population Division (2022), the growth rate of the population aged 65 and above exceeds that of the population under 65. The proportion of people aged 65 and above is increasing rapidly, and by 2050, it is expected to rise from 10% in 2022 to 16% globally. By that time, the number of individuals aged 65 and above will be twice that of children under the age of 5 and almost equal to the number of children under the age of 12. In China alone, the population aged 60 and over accounts for about a quarter of the global elderly population in 2050.

Disability is an issue that affects about 15% of the global population, with 2-4% experiencing significant difficulties in functioning. In 2020, China had a population of 85 million people with disabilities. These populations require not only physical care, but also attention to their mental and emotional needs, especially given the increased rates of loneliness and loss of mobility and independence. The connection between our environment and our mind and spirit is a focus of therapeutic landscape research.

c. Call for more humanistic medical care: a holistic approach

As medical technology advances and our understanding of health deepens, hospitals have shifted their approach to treatment beyond just administering medication. The focus is now on providing holistic care that addresses the needs of the body, mind, and spirit, resulting in a more humanistic approach to medical services. Today,

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[1] PM2.5, or particulate matter with a diameter of 2.5 micrometres or smaller, is a form of air pollution comprised of tiny particles that can be inhaled into the respiratory system. It originates from various sources, including combustion processes from vehicles and industrial activities, as well as natural events such as wildfires and volcanic eruptions. PM2.5 poses significant health risks, with both short-term and long-term exposure associated with respiratory and cardiovascular problems. Monitoring and controlling PM2.5 levels are crucial for safeguarding public health and maintaining air quality standards.

hospitals place a greater emphasis on the patient experience, taking into account their feelings and well-being. For instance, many public hospitals now offer psychological counselling to complement the patient's treatment plan. Moreover, the architectural and environmental design of hospitals is gaining attention for its potential therapeutic impact. Hospital outdoor environments are increasingly viewed as a valuable asset in supporting treatment and recovery. For example: Maggie's Centres (UK) are strategically located near NHS cancer hospitals and are renowned for their calming architecture and therapeutic gardens. They offer a refuge where patients and their families can find emotional and practical support. The Royal Children's Hospital (Melbourne, Australia) seamlessly blends interior and exterior spaces, boasting numerous gardens and outdoor terraces. Its Main Street even includes an aquarium and a meerkat exhibit, providing young patients with a delightful distraction from the often-stressful hospital environment. Khoo Teck Puat Hospital (Singapore) places healing through nature at the forefront of its design, showcasing gardens, water features, and even a rooftop farm. It stands as a testament to the benefits of biophilic design in healthcare settings. Such integrative designs and services underscore the shift towards a comprehensive approach to healthcare, making research on therapeutic gardens particularly promising in this evolving context.

d. Sub-health in China: the rise of a health crisis

A state of sub-health refers to an individual who has abnormalities in certain psychological behaviours or physiological traits, or abnormalities in certain medical examination indicators, but without typical pathological features. The concept was first introduced by Berkman in 1980, and it is alarming to note that about 65% of Chinese urban residents have been diagnosed with subhealth. By 2020, that number has increased to 70 percent, with about 75 percent of those in major capital cities such as Beijing exhibiting low immune systems, declining physical health and psychological stress due to lack of living space, competition with peers and severe environmental pollution. The rise of sub-health problems in China represents a major health crisis.

e. Importance of nature for children's health and well-being

Louv (2005) mentioned that people are away from nature and only learn about nature through television, internet and books. It causes a natural deficit disorder. Without going to the nature, it is impossible to really feel and understand nature to develop naturalistic intelligence [2] . Disconnection with nature cause psychological and

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[2] Naturalistic intelligence, as described, is one of the multiple intelligences proposed by Howard Gardner in his theory of Multiple Intelligences. Gardner initially identified seven intelligences in his 1983 book "Frames of Mind: The Theory of Multiple Intelligences," and later he added a few more, including the naturalistic intelligence. According to Gardner, naturalistic intelligence is the ability to recognize, categorize, and draw upon certain features of the environment. It's a reflection of how we evolved as humans, relating to our early days as hunters and gatherers who needed to recognize patterns in nature to survive—knowing which plants edible, which animals

behavioural disorder among children such as autism, obesity, ADHD[3]. Meanwhile, comparing the medical treatment, nature has a positive and long-lasting effect on children's health. Unfortunately, many children living in urban environments lack access to nature.

f. A sacred space for facing death with peace and dignity :therapeutic landscapes.

Due to the materialistic way of living and the lack of spiritual pursuit, people are less awed by the wonder of nature. However, the respect and love for nature deepens our understanding of life and death. Heidegger (2008) considers that knowing death leads to understanding the existence of being. Heidegger (2008) believes death is the nature of humanity.

Being-toward-death refers to a process of growing through the world where a certain foresight guides the Dasein[4] towards gaining an authentic perspective. It is provided by the dread of death. "The end of the world – is death. The 'end' that belongs to existence limits and defines the whole of Existence … death is just a part of Existence"[5] The great Chinese philosopher Zhuangzi also emphasizes that death is part of life. The hospital and old care centre should be a place not only to recover but to help people die peacefully. Hospitals and old care centres are as sacred as the places where we were born and the place we will die. It should be a holy temple. Therapeutic landscape is the holy space that allows it to happen.

g. Inadequate green spatial planning in Chinese cities

Guiyang ranks among the top cities in China in terms of greening and sustainability, but there is still a lot of room for improvement in spatial planning compared to Western cities, to improve well-being and to follow the United Nations sustainable development agenda. According to Goal 11 "Make cities and human settlements inclusive, safe, resilient and sustainable"[6], therapeutic landscape planning is a possible solution. For example, in densely populated urban areas, the search for healing

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were predators, and so on. Today, someone with strong naturalistic intelligence might be good at understanding the natural world, gardening, conservation, or identifying patterns in nature.

[3] Attention deficit hyperactivity disorder (ADHD) is a behavioural condition causing restlessness, concentration difficulties, and impulsivity (Centres for Disease Control and Prevention, 2020).

[4] Heidegger calls "Dasein" (literally, "being there") in order to stress subjectivity's worldly and existential features. For Heidegger, the human subject had to be reconceived in an altogether new way, as "being-in-the-world." Because this notion represented the very opposite of the Cartesian "thing that thinks".

[5] Heidegger, M. (2008). Being and Time. Harper Collins. p.32

[6] United Nations. (2017). Resolution adopted by the General Assembly on 6 July 2017, Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development (A/RES/71/313).

gardens can serve the population, especially dealing with future similar situations such as the Covid-19 pandemic, when the use of private gardens was not adopted due to the high density of the urban population. With more outdoor open space, people would have been healthier during the lockdown. It is effective to solve the above problems by applying therapeutic landscapes to balance the relationship between humans and nature. Therefore, research on the therapeutic landscape is very important.

1.3 Purpose Statement

The purpose of this research is to conduct a comprehensive study with the aim of proposing indices and design strategies for therapeutic landscapes for the elderly in Guiyang Yunyan urban district elderly care institutions and medical centres. By achieving this goal, we elucidate the potential of integrating nature into environments to enhance physiological, psychological, and spiritual well-being, thus exploring the concept of therapeutic landscapes. The study delves into the history of therapeutic landscapes, theories, and experiments that substantiate the positive impact of nature on overall well-being.

Research Questions:

How has the evolution of therapeutic landscapes unfolded within historical and cultural contexts, particularly in the West and China?

What are the rehabilitation theories of therapeutic landscapes, specifically concerning physiological, psychological, and spiritual well-being?

How can the establishment of indicators for therapeutic landscapes design aid in optimizing these spaces?

How can indices and design strategies for therapeutic landscapes targeting the elderly be established?

1.4 Research Methodology

Given the intricate nature of therapeutic landscapes, the research methodology employed was diverse, incorporating:

• Literature review: provides a comprehensive understanding of therapeutic landscape theory and history, laying the groundwork for the study.

• Interdisciplinary research: daws insights from various fields such as landscape architecture, environmental psychology, well-being geography and traditional Chinese medicine , offering a holistic perspective.

• Reference case analysis identifies and analyses successful examples of therapeutic landscapes.

• Questionnaire survey: a key method in social sciences, utilizing observation, dialogue, and surveys to obtain user-centred viewpoints.

• Multivariable analysis: a statistical method that evaluates therapeutic landscape design by considering multiple outcome variables.

1.5 Thesis Organization

Chapter I addresses the concept of therapeutic landscape, studying and discussing the concepts of landscape, therapeutic effect, traditional Chinese medicine and therapeutic landscape. The therapeutic landscape is analysed from different perspectives: landscape architecture, geography of well-being, environmental psychology and traditional Chinese medicine, as open spaces that promote healing and health for patients and visitors in hospitals and elderly centres. These disciplines offer abundant therapeutic landscape related theories and research studies. They explain how therapeutic landscape has therapeutic effect on welling with evidence-based studies and scientific proved theories and philosophical approaches.

Subchapter one of Chapter 1 is related to the historical background of the therapeutic landscape in China and the West is studied. In ancient China, therapeutic landscapes were rooted in the belief in the healing power of nature, influenced by Taoism, Feng Shui, Buddhism and Confucianism. Tranquil landscapes surrounded religious buildings, providing a serene environment for healing. With the emergence of empirical medicine, the concept of harmony between man and nature became increasingly important in China. Healing sanctuaries and monastery gardens in ancient Greece and medieval Europe played a crucial role in human recovery from illness, sharing similarities with holistic medicine and natural medicine. The Renaissance marked a focus on science and emphasized mechanical philosophy.

The Western world has adopted a mechanistic view of the human body based on mechanistic medicine. Western hospitals have prioritized scientific efficiency, devaluing holistic rehabilitation. In modern China, after the establishment of the new nation, the emphasis was placed on the economic development of the cities due to their economic backwardness, focusing less on holistic medicine and the relationship between human beings and the environment. The natural concepts of traditional Chinese medicine were left behind and the mechanistic treatment approach of Western medicine was adopted. Western medicine and technology were believed to be the solution to improve health. However, in the 1990s, Western medicine placed great emphasis on and researched holistic medicine, focusing on green space systems,

which led China to gradually realize the importance of traditional Chinese medicine for the health of patients and the population in general. Although later than in the West, this trend is increasing.

The current state of research on the therapeutic landscape in China and the West is also analysed. To do this, we used the Citespace tool, which visualizes and analyses academic literature. A comparative analysis of articles published between 2013 and 2022 was carried out using the CNKI and Web of Science databases. The results indicated that foreign research focuses on medicine and the patient experience, while China focuses on the design of the therapeutic landscape based on the methodology of traditional Chinese medicine.

In subchapter 3 in the chapter 1, based on a review of definitions related to the therapeutic landscape concept and the history of Chinese and Western therapeutic landscapes, two methodological approaches to the design of the therapeutic landscape are presented: evidence-based design methods and philosophical design methods. From these two methodological approaches, theories and strategies have been developed for the recovery of physiological, psychological and spiritual well-being. Evidence-based design refers to the effect of design on human rehabilitation obtained through empirical research: inquiring about the patient's state of rehabilitation and observing changes in it; empirical evidence and deductive inference. The following authors have provided evidence-based research and theories: Roger Ulrich, Stephan Kaplan and Rachel Kaplan, Jay Appleton, Clare Cooper Marcus, Walter Bradford Cannon, Silvan Tomkins, Edward O. Wilson and John Haygarth among others.

The philosophical design method of therapeutic landscapes explore therapeutic landscapes through logical reasoning and conceptual discussions. It draws from non-biomedical models and evidence-based qualitative research: Gesler, Heidegger and Zhuangzi, Norberg-Schulz, Merleau-Ponty, Kevin Lynch, Cristopher Alexander, Guopu and Huangdi.

These authors' theories set theoretical foundation for therapeutic effect on well-being from a physiological, psychological and spiritual point of view and also contribute to the proposal of holistic therapeutic landscape design indicator-HTLD for chapter 2 .

Chapter 2 aims to propose a holistic indicator for the design of the therapeutic landscape - HTLD. It also aims to discuss strategies for improving the physiological, psychological and spiritual indicators of HTLD. Why are HTLD indicators and the corresponding strategies important? Because the HTLD indicators provide the standard for evaluating the currently constructed therapeutic landscape and offer guidelines for constructing new therapeutic landscape projects. The strategies corresponding to HTLD include the following design strategies: five senses strategy,

natural therapy strategies, sacredness design strategies and space design strategies to improve the overall results of physiological, psychological and spiritual indicators.

In addition, two case studies on the holistic approach to designing therapeutic landscapes are presented, namely the "Panzhou Hospital Therapeutic Garden" and the "Elisabeth Noah Garden".

The extensive research carried out for this thesis resulted in two published articles: one on the curiosity to test the psychological effect of landscape on people, albeit through photographs, like the approach suggested by Kaplans (1986). The other was the curiosity to test the same effect, but this time through storytelling, namely to what extent an story can determine how a landscape influences the way people feel about it.

Chapter 3 presents the district of Yunyan - Guiyang City and the current situation of the elderly in China. Indicators specifically adapted for the elderly are proposed (Holistic Therapeutic Landscape Design Index for the Elderly - HTLD Index (E)) based on the HTLD indicators in Chapter 2. A survey was carried out among the elderly (aged 65 and over) in Guiyang City - Yunyan District, with a total of 100 participants. According to their answers (Appendix B) the importance of each indicator was assessed. The HTLD Indicators (E) aimed to design and evaluate therapeutic landscape indicators for the elderly focusing on a) evaluating the existing therapeutic landscape in institutions for the elderly and offering strategies to improve it; b) proposing guidelines for new therapeutic landscape projects for the elderly; c) proposing recommendations for therapeutic landscape projects for the elderly.

To test the HTLD indicators of the therapeutic project, after constructing the HTLD index (E) we applied the HTLD index (E) to evaluate an existing institution: "the Golden Home Elderly Care Centre" in the Yunyan district of Guiyang. This test was carried out through a survey of users and staff. The evaluation aimed to identify the current shortcomings of the Golden Home Elderly Care Centre and propose strategies for improvement. At the end of this chapter, One example is also shown for the HTLD（E) indicators: the "Roger Smith elderly care centre." And Conclusion is given in the end of the thesis.

1.6 Framework of the thesis

Table 1:Framework of the thesis

Introduction	Background Problem Research Method Purpose of the dissertation

Definition of Terms:
Landscape ,Therapeutic landscape(TL),
healing garden ,Traditional Chinese
Medicine (TCM)

Character of TL	User Need of TL

History and Current Situation of
Therapeutic Landscape

2.1)Primitive medicine Formation
2.2)Empirical medicine Emergence
2.3)Empirical medicine development
2.4)Mechanical Medicine Emergence
2.5)Redevelopment of TCM and
natural Therapy under humanism

2.6.1)Formation of TL in China
2.6.2)Formation of TL in West
2.7.1)Current development of TL in
China
2.7.2)Current development of TL in
West

Theory ,indices and strategy of Therapeutic Landscape

Evidence based design theory :
Ulrich green landscape enhancing body recovery theory
Kaplan's (ART) attention restorative theory
Jay Appleton Prospect-refugee theory
Clare Cooper Marcus Therapeutic benefit theory
Fight or flight theory by
Emotion Congruence theory
Wilson biophilia and nature preference theory
Placebo effect theory

Philosophical design theory :
Gesler Therapeutic Landscape Theory and framework
Heidegger's poetic Dwelling and Facing Death theory By Zhuangzi
Place and Genuis loci by Schultz
Perceptional Phenomenology
Kevin lynch's Theory of Sense
Christopher Alexander's Spatial Theory of Sacred Space and Vitality
Feng Shui, the Five Elements, and Zangxiang Theory

**Holistic Therapeutic landscape
design indicators** based
Evidence based design theory
Philosophical design theory

TL design strategies based
Evidence based design theory
Philosophical design theory

Research and case studies to apply and prove the effectiveness of Therapeutic landscape theory and
indicators from physiological, psychological and spiritual aspects
4.1 cases study to apply and prove the effectiveness of TL from physiological aspects
4.2 Research of Icelandic TL to apply and prove the effectiveness of TL from psychological aspects
4.3 Research of Evora TL to apply and prove the effectiveness of TL from Spiritual aspects

Background : Guiyang Yunyan district	Questionnaire survey on Elderly people to evaluate the importance of the indices from their opinions	indices for Elderly=HTLD index (E) built	Application of indices for Elderly=HTLD indices on Evaluation of Golden family Old-Care Outdoor space

Background : Aging in China Elderly need and state from physical Psychological And spiritual perspective	Design strategies for the elderly based HTLD (E)	Cases studies for old-care Houses 1)Roger smith garden 2)Sofia life garden 3) Personal project for old care house renovation

by Bao Guotai (2024).

CHAPTER 1

About Landscape and about Therapy

CHAPTER Ⅰ About Landscape and about Therapy

1.Concept of Therapeutic Landscape

1.1 Landscape

What exactly is a landscape? Prior to its recognition as a transdisciplinary issue or science, or design medium, landscape was primarily a genre of painting, a motif in theatrical arts, and a mode of human subjectivity. Landscape historical evolution has been extensively documented and by art historians like Gombrich (1966) and cultural geographers such as Cosgrove (1998) among others. Jackson (1984) stands out in his discussions on the origins and emergence of landscape. In his influential 1984 work "The Word Itself," Jackson starts by referring to the dictionary definition of the term: "**a portion of the earth's surface that can be comprehended at a glance.** "[7]The rise of landscape as a cultural concept in the postmodern era is well-recognized, but its multifaceted nature and connections to related fields have been relatively understudied.

Geographers define landscape as a scientific term, referring to a surface view or a comprehensive natural geographic area, encompassing various types such as urban landscapes and forest landscapes (Ci Hai, 1995). Artists consider landscape as an object for expression and representation, synonymous with scenery. Architects view landscape as a backdrop or background for buildings, while ecologists define it as a system of ecosystems (Naveh, 1984; Forman, 1995). Tourist experts regard landscape as a resource. In the context of urban development, landscape is often equated with elements like city street facades, neon lights, parks and gardens and the ornamental and functional objects.

A more literary and broad definition is "a scene that can be shown in one picture and can be viewed in its entirety from a certain viewpoint"[8], especially when referring to natural scenery. However, even for the same landscape, different people may have

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[7] Jackson, J.B. (1984). The Word Itself. In *Discovering the Vernacular Landscape* (pp. 1–8). New Haven, CT: Yale University Press.P8.

[8] Merriam-Webster. (2024). Landscape. In Merriam-Webster.com dictionary. Retrieved April 13, 2024, from https://www.merriam-webster.com/dictionary/landscape

very different interpretations, as Meinig suggests "ten versions of the same landscape"[9] (Meinig,1979).

In the context of this study, landscape is understood as: A) The marks of human relationships with each other and with nature on the earth surface . B) The place of human life experiences. C) A spatial manifestation of social life, an organic whole of human and environmental interaction. D) An environment transformed by human activities. E) A system create cyclic relationships between humans, design, and the environment.

A) Every landscape is a home. Ancient Chinese landscape paintings considered habitability as the highest standard for artistic expression and sentiment. Whether creating or appreciating art, it essentially involves a process of seeking for dwelling (Guo Xi, Guo Si, 2010). It also embodies the profound meaning of the concept of "place". This brings us back to the philosopher Heidegger's concept of "dwelling" (Heidegger, 1971). The process of dwelling is essentially an interaction with the forces and processes of nature to achieve harmony. Landscapes on the earth surface result from humanity's adaptation, transformation and creation for survival ,living and pleasure. Simultaneously, the process of dwelling is also a process of establishing harmonious coexistence among people. Ponds in front of cities ,villages and gardens, pathways , roads and railways leading from the back doors of houses to the mountains, terraced fields, and its' vegetation and irrigation system are all results of the interaction and balance achieved between humans and nature over thousands of years. It represents people's choices and utilization of the resources of nature, as well as their avoidance and submission to the harshness and ruthlessness of nature.

B) Landscape as the place where people live, connects specific individuals with specific places. Landscape is composed of "places" and the structure of places is expressed through landscapes (Norberg-Schulz, 1979, p.8). Like concepts of time and space, places are ubiquitous. Places are the foothold for humans on Earth and in the universe. Landscapes turn the abstract into concrete, allowing people to have a starting point and an endpoint in understanding and grasping external space, as well as in recognizing and positioning themselves. Philosophers have elevated the concept of places to a philosophical level, exploring worldviews and life (Casey, 1998; Heidegger, 1971;Assunto,1973). Geographers, architects, landscape architects and landscape theorists have brought it to a deeper understanding of landscape phenomena. Understanding the nature of places requires consideration of physical attributes, the

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[9] Meinig, D.W. (1979). The beholding eye: Ten versions of the same scene. In J.B. Jackson (Ed.), The Interpretation of Ordinary Landscapes: Geographical Essays (pp. 33-48). New York; Oxford: Oxford University Press. ISBN 0195025369.

inner-outer relationship between individuals and places, human activities in places, and the omnipresence of time. These four aspects constitute an inseparable whole for experiencing places (Yu ,2002).

C) Jackson's (1984) understanding of landscape emphasizes that landscapes exist in human life, not merely as objects for observation. Landscape is a spatial manifestation of social life, an organic whole of human and environmental interaction. This is completely opposite to the positivist view of the separation of subject and object. The judgment of landscapes is made as a space for living and working, standing from the perspective and position of those who live and work in it. All landscapes express an ideal, an enduring vision of creating a paradise on earth.

D) Landscape is an environment transformed by human activities and the scope of landscapes includes large-scale environments as well as small-scale spaces (Marcus, 2014).

E) Landscape is a system.

In landscape architecture, landscape systems create cyclic relationships between humans, design, and the environment.(Hedfors,2011) Design and learning occur simultaneously. Functionality guides design orientation, and the landscape's three aspects—structure, function, and process—work together to create emergent properties. Classic science views understanding as the sum of parts, but emergent properties show new characteristics that parts alone don't have. Landscape system elements and their effects are interdependent, with no independent subgroups (Ackoff 1981). Complexity and dynamism, driven by natural processes like hydrologic cycling or photosynthesis, are crucial for understanding landscapes. Thus, systematic thinking, shifting from linear to cyclic perspectives, is needed to address practical problems efficiently using the successive approximation method.

1.2 Therapeutic Effect.

Therapeutic effect or healing is a transformative holistic experience for individuals from a state of discord to a harmonious state in terms of spiritual, psychological and physical.

The word "heal" derives from the Anglo-Saxon "haelon" symbolizing wholeness (Gesler, W. M., 2003). Quinn (1997) interprets healing as recognizing individuals as holistic entities—comprising body, mind, and spirit—rather than mere collections of parts needing repair. It's crucial to differentiate healing from curing: while the latter is anchored in allopathic solutions, the former encapsulates the personal journey in confronting illness (Lerner, M, 1993). Healing operates in both psychological and biological domains. The psychological aspect addresses our spiritual, mental,

emotional, and social experiences (Landis, 1997). Gawain (1997) contends that as we progress in healing, attending to these dimensions, we cultivate balance and harmony.

The essence of "healing" aligns with its etymology. Stemming from the root "haelan," it relates closely to "holy," which denotes spiritual purity. This suggests a time-honoured connection between healing and spirituality, often contrasting with biomedical views (Webster's, 1979).

Egnew (2005) frames healing as a journey toward personal wholeness, harmonizing our physical, mental, emotional, social, and spiritual dimensions. Here, illness disrupts this wholeness, leading to distress. Transcending this—either by addressing its root or reshaping one's self-perception—results in healing. In this paradigm, enduring personal relationships are vital.

Therapeutic and healing have the same meaning. The Cambridge Dictionary succinctly defines "therapeutic" as: 1)Pertaining to disease treatment; 2)Offering happiness, relaxation, or enhanced health; 3)Beneficial for overall health.

Based on statements from scholars like Gesler, W. M., Quinn (1997), Lerner, M. (1993), Gawain (1997) and Egnew (2005), as well as the definition of "therapeutic" from the Oxford dictionary, we summarize the process of bringing individuals back to a state of harmony and balance emotionally and mentally as an aspect of the psychological. Additionally, the return to harmony on a biomedical level can be summarized as an aspect of the physical or psychological. Finally, the return to harmony on social and spiritual levels can be summarized as an aspect of the spiritual. Therefore, healing, or achieving a therapeutic effect is a transformative holistic experience for individuals, transitioning them from a state of inner discord to a state of harmony, encompassing spiritual, psychological, and physical well-being.

1.2.1 Spiritual Therapeutic Effect

The spiritual aspect of a being is the inner essence, the soul and the part of the being that exists beyond time and space. It connects human beings with the universal source and the oneness of all life[10]. Developing the awareness of the spiritual level gives people an experience of a feeling of "belonging" in the universe. The lack of connection to the spirit is the root of many of social and cultural ills as well as personal problems. The contact with the spiritual dimension gives people an expanded perspective on their lives as individuals in the society by developing spiritual awareness. One is able to find the inspiration, understanding and strength that is

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[10] Gharipour, M., & Zimring, C. (2005). Design of gardens in healthcare facilities. Environmental Exposure and Health, 491, WIT Transactions on Ecology and the Environment. Retrieved from https://www.witpress.com

needed to confront the difficulties and challenges of healing on other levels[11] (Gawain, 1997). Because of this strong belief in spiritual aspects, religious therapeutic effect has been a common way of therapy throughout the history.

1.2.2 Psychological Therapeutic Effect

In the discussion of psychological therapeutic effect in this study, emotional and social therapeutic effect are also included in psychological recovery .

The psychological aspect of human beings includes their intellect and ability to think and reason. All thoughts, attitudes, beliefs, and values which can cause confusion or bring profound understanding are different aspects of psychology.

Developing the psychological level allows one to think clearly, remain open-minded, yet discriminate intelligently (Gawain, 1997). According to Gawain, the first step in any therapeutic process is acknowledgement and acceptance of what is true in the moment. Nobody can be healed unless he accepts the existence of disease and all negative thoughts and beliefs which are part of the mind (Gawain, 1997). Ornish (1998) believes that the patient's own beliefs play an important role in the healing process and healing process depends strongly on the doctor's belief upon the medicine and methods, which is using to heal the patient. Everything is based on a try to change the person's belief system and to make people aware of new possibilities. In this sense, the doctor's job, sometimes, is working on a person's religious or cultural belief system[12]. Lown (1983), a psychologist, believes that some patients have been able to overcome their life-threatening illnesses by using the power of the mind such as laughter and positive thinking[13].

Another level in the psychological therapeutic effect is working on the emotional aspects of being. This aspect is the ability to experience life deeply to relate to another person and the world on a feeling level. This is the part of human beings which is always seeking meaningful contact and connection with others. Developing the emotional level gives people the opportunity to feel the full range of the human experience and find fulfilment in the relationship with people and the world (Gawain, 1997). Rossi (1986) believes that positive attitudes and emotions can affect the biochemistry of the body and can facilitate healing[14]. Another researcher, Fox, believes that a synergy between patient and practitioner can help patient and practitioner to

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[11] Gawain, S. (1997). The Four Levels of Healing. Mill Valley, CA, Nataraj Publishing.

[12] Ornish, D. (1993). Changing Life Habits. Healing and the Mind. B. Moyers. New York, Main Street Books: 87-114.

[13] Lown, B. (1983). Introduction. The Healing Heart. N. Cousin. New York, W. W. Norton: 11-28.

[14] Rossi, E. L. (1986). The Psychobiology of Mind-Body Healing. New York, W. W. Norton.

bring the resources [15] (Lown, 1983; Fox, 1993). Candace Pert (1993) in an interview with Bill Moyers[16] explains that moods and attitudes come from the realm of the mind and transform themselves into the physical realm through emotions[17]. In addition to emotional aspects of psychological therapeutic effect, Dean Ornish (1993), a clinical professor of medicine in an interview with Bill Moyers, adds another concept: psychosocial therapeutic effect. He believes that psychosocial has to do with the context in which therapy occurs. He adds "an individual does not exist in isolation from everyone and everything else, but exists in the context of a community, family, workplace, religion, and so on"[18] (Ornish, 1993; Gharipour & Zimring, 2005) .

1.2.3 Physical Therapeutic Effect

The physical aspect of human beings is their bodies, which includes the ability to survive and thrive in the material world. Developing the physical level of the being involves learning to take good care of the body and to enjoy it and to develop the skills to live comfortably and effectively in the world (Gawain, 1997).

Almost all researchers agree that healing body is only possible if the patients want to get well and if they coordinate their thoughts, spirituality, emotions and social support in an effort to get better. Medicine, as a complementary, can act as only an effort to a physical cure[19] (Gesle, 2003). This relationship between physical and psychological aspects of healing is described by Delaney and James (1992), who believes that the "healing mechanism includes a series of chemical reactions in the patient's body, such as replacing cells, adjusting the blood pressure, turning hormone and immune system to respond to one's thoughts, feelings and physical activities"[20].

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[15] Fox, N. J. (1993). Postmodernism, Sociology, and Health. Buckingham, Open University Press.

[16] Bill Moyers, a prominent American journalist and commentator, is celebrated for his astute analysis and investigative reporting across various social, political, and cultural landscapes. While he has covered a wide range of topics, including s mental health and healthcare.

[17] Pert, C. (1993). The Chemical Communications. Healing and the Mind. B. Moyers. New York, Main Street Books: 177-194.

[18] Ornish, D. (1993). Changing Life Habits. Healing and the Mind. B. Moyers. New York, Main Street Books: 87-114.

[19] Pert, C. (1993). The Chemical Communications. Healing and the Mind. B. Moyers. New York, Main Street Books: 177-194.

[20] Delaney, C. B., James. (1992). "Design Quality: Landscape Design - Improving the Quality of Health care". Journal of Healthcare Design 6: 153-162.

1.3 Traditional Chinese Medicine (TCM)

Traditional Chinese Medicine (TCM) refers to the holistic approach to diagnosis, pathophysiology and therapy in Chinese Materia medicine, based on over 2000 years of accumulated knowledge and practice (Xu et al., 2013). Major aspects of the practice include herbal medication, acupuncture and other physical therapy such as massage (Chan, 1995; KJ & H, 2003; Tang et al., 2008). Outside of China, the practice is generally regarded as a complementary or 'alternative' form of medicine, although the international prevalence of the practice has been steadily increasing (Chan et al., 2010). Acceptance of TCM by the scientific community has been limited at best. Certain guiding principles of TCM such as the concept of 'vital energy' are esoteric and difficult to validate under modern scientific methods and the TCM approach to both diagnosis and treatment also fundamentally differs from conventional Western methods (Jiang, 2005; Dong, 2013). Nevertheless, there are selected aspects of the practice that hold clear promise for modern evidence-based medicine. The application of TCM into study of therapeutic effect of landscape also requires the integration of TCM theories and practices, including Feng Shui, Five Elements Theory and the extensive use of herbal plants (Li, 2022).

While scientific research methods are valuable, they can be limited in their scope. Therefore, integrating research methods from nature based traditional Chinese medicine as a matter of philosophical approach can provide a complementary perspective, fostering innovation and the development of study on therapeutic effect of landscape. This is why we have incorporated research methods from nature based traditional Chinese medicine with scientific approaches, evidence-based research method, to study therapeutic effect of landscape.

1.4 Therapeutic Landscape

From series research from Clare Cooper Marcus (1999, 2010, 2014) and Naomi A. Sachs (2014) the term "therapeutic landscape" or "healing garden" or "therapeutic garden "or "rehabilitative landscape" has the same meaning as an outdoor space in healthy facilities for improving health. However, in this research the term "therapeutic landscape" is the only used term which refers to a physically constructed environment that individuals with a transformative experience, transitioning them from an internal state of disharmony to a state of harmony across mental, psychological and physical levels. Simultaneously, these spaces deeply intertwine with cultural narratives, symbols and social values, reflecting broader societal narratives.

Exactly aligned with the landscape concept mentioned before in chapter 1.1 A) The marks of human relationships with each other and with nature on the earth. B) The place of inner human life experiences. C) A spatial manifestation of social life, an

organic whole of human and environmental interaction. D) An environment transformed by human activities. People in such a landscape experience a therapeutic effect, which is a transformative holistic experience for individuals, transitioning them from a state of inner discord to a state of harmony, encompassing spiritual, psychological and physical well-being. Such a therapeutic experience in a place forms the therapeutic landscape. Examples of therapeutic landscape include enormous natural landscape which has therapeutic effect and down to small scale landscape just as the outdoor space of hospital and gardens in old care institution.

Wilbert Gesler's pioneering work in health geography[21] introduced the concept of therapeutic landscapes (1993). He described them as environments that integrate physical, symbolic and social elements conducive to overall healing. Gesler (1996) showcased the therapeutic effects of these landscapes through historically health-related sites when their diversity is combined.

Over the years, scholars have extended Gesler's framework exploring themes such as spirituality, overall health, cultural health beliefs and contemporary rest spaces. While research praises the therapeutic benefits of nature, it distinctly indicates that not all types of nature possess healing properties (Stigsdotter & Grahn, 2002; Ulrich & Gilpin, 1999).

Gesler's initial description (1996) of these spaces fused physical and architectural environments with social conditions and human perception to foster healing. However, this definition has evolved. Williams (2010) argues that the therapeutic landscape should not only has therapeutic effect but also sustain health and well-being. Foley & Kistemann (2015) describe these spaces as originating from experiential practices related with emotional and sensory experiences, providing therapeutic benefits.

The types of therapeutic landscapes aren't explicitly confined by scale; they can range from expansive natural settings to smaller, man-made environments (Partrick, 2009; Sun, 2021). Any landscape that fosters interaction between the surrounding environment and individuals promoting therapeutic functions, can be labelled a therapeutic landscape (Partrick, 2009; Sun, 2021).To delve more specifically into the therapeutic landscape our focus will be on a small scale particularly within medical institutions and Elderly centres. In the journey for exploring the therapeutic landscape

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[21] Health geography is a close relative of medical geography. It shares a focus on geographical variations in health and healthcare. Its specific concern is with a social model of health and particularly with a definition of health that emphasizes positive health and well-being over death and disease. It has also been particularly concerned with health-related behaviors such as diet, drinking, smoking and exercise and with the provision of healthcare outside medical settings. Health geography emerged from medical geography over the past 30 years and the process of emergence is now mature. It has stressed place awareness, a critical position and an engagement with sociocultural theory (Moon, 2020).

in elderly care centres, some research studies have been carried on for testing the therapeutic effect on mental prospect on such landscape. However, overall , we mainly focus on therapeutic landscape in old care and medical hospital and the term "therapeutic landscape " is the one we have chosen to use.

The therapeutic effects of a healing garden arise from therapeutic landscapes and these therapeutic landscapes are a result of the healing processes of nature. The object here is the therapeutic effect of landscapes on physical, psychological and spiritual well-being to materialize in garden. Landscape and gardens are the products of human societal development . The subjects of the study are landscapes, which also encompass gardens and therapeutic gardens are manipulation of landscape. If it is an enclosed garden, does the confinement of space also encompass isolation from culture and spirituality? Garden is more a tangible physical object. But landscape is more than garden per se, as an experience, a place, an interaction with people and place. A) The marks of human relationships with each other and with nature on the earth. B) The place of inner human life experiences. C) A spatial manifestation of social life, an organic whole of human and environmental interaction. D) An environment transformed by human activities. Thus, a therapeutic landscape is much more proper than therapeutic garden in this work.

When it comes to the design concept of therapeutic landscapes, the system theory of landscape is integral (Murphy, 2011).

- **Structure**: Defines the components and relationships within the system.

- **Function**: Defines the outcomes or products of the system.

- **Process**: Defines the activities in which the system components are engaged.

- **Environment**: The interdependent setting within which these aspects exist.

In landscape architecture, a landscape system creates a cyclic relationship between humans, design, and the environment. Design and learning occur simultaneously and at the same pace.

While classic science views understanding as the sum of all parts, the rule of emergent properties suggests that each landscape possesses new properties that its individual parts do not have. The process, structure, and function together create the emergent properties of a landscape.

The behavior of landscape system elements and their effects on the whole are interdependent. The elements of a landscape system are so interconnected that independent subgroups cannot be formed (Ackoff, 1981).

Complexity and dynamism are crucial for understanding landscapes. In a landscape context, these are not merely technical aspects, but autonomous phenomena driven by natural processes, such as forces driven by solar radiation, including hydrologic cycling and photosynthesis.

Therefore, landscapes require systematic thinking, shifting from the conventional linear perspective to a cyclic perspective. When facing practical problems, this approach involves moving from the original idea to solve the problem, to practical implementation, and then to alternative solutions for newly emerged problems (Figure 1).

Following the rule of successive approximation, cyclic thinking in therapeutic landscape design helps solve problems practically and efficiently. This process involves:

1. Stating the problem.

2. Defining problem requirements.

3. Developing alternative concepts.

4. Evaluating the alternative concepts.

This is a cyclic process where new problems will emerge, and the cycle will begin again by restating the problem.

Figure 1 : Cyclic Thinking in Landscape System Theory
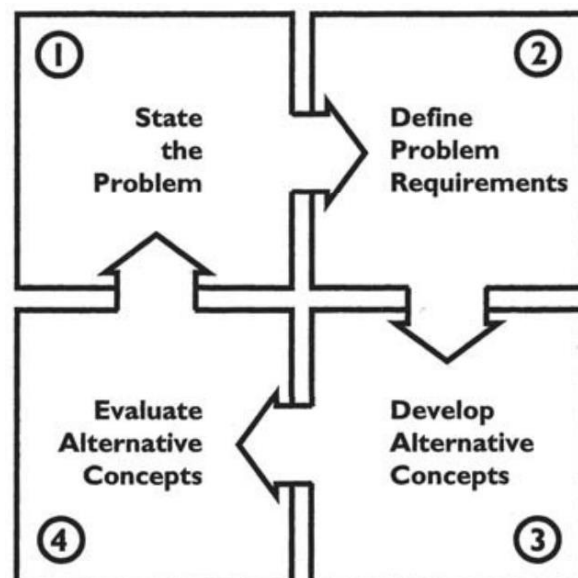
By Michael D. Murphy(2011)

After the exploration of the design concept of therapeutic landscape, we are into talking about some rest including the character of therapeutic landscape and the user's needs for therapeutic landscape.

2.Evolution of Therapeutic Landscapes in China and in West

Figure 2 : Evolution of Therapeutic landscapes
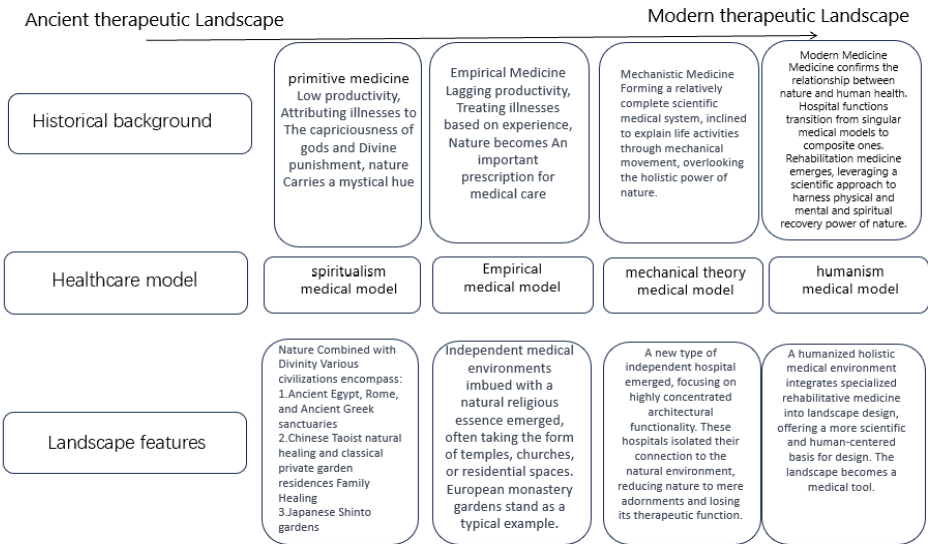
By Bao Guotai (2024).

The history of therapeutic landscapes can be traced back several centuries when the natural healing effects were self-evident. The evolution of these landscapes has been closely intertwined with societal development and the transformation of medical models. With changes in healthcare paradigms, the development of therapeutic landscapes has paralleled the evolution of medicine—from primitive medical practices to the early stages of empirical medicine, from the continued growth of empirical medicine into the heyday of mechanistic medicine and then to the resurgence of naturalism and traditional Chinese medicine. Consequently, therapeutic landscapes have undergone transformations, progressing from spiritual and religiously associated spaces to hospitals rooted in mechanistic approaches and finally to contemporary hospitals coexisting with natural environments (Figure 2), (Guo ting, 2013; Huci, 2006; Qi Dai, 2007; Jiang, 2012).

Understanding the therapeutic landscapes through history allows insight into its formation of therapeutic landscapes. This chapter focuses on the historical development and current status of therapeutic landscapes in both China and Western countries. The rationale behind this is twofold: firstly, the therapeutic landscapes in China constitute the core focus of our research and secondly, the recent development of Western therapeutic landscapes has significantly influenced those in China. Although the influence during ancient times was limited, the modern impact of colonialism, missionary activities, efficient modes of trade and transportation and scientific technological advancements has played a pivotal role in the development of therapeutic landscapes in China. The influences are described as follows:

A)Mechanistic view from Descartes significantly influenced scientific development. His dualistic perspective on the mind-body relationship, likening organs to machinery, diminished emphasis on holistic human health, confining medicine within the realm of pathology. This resulted in contemporary Western medicine primarily focusing on disease treatment, neglecting the holistic medical approaches in both Eastern and Western traditions that emphasize preventive care. Why not begin with the state of health to nurture life?

B)Francis Bacon's scientific philosophy, rooted in empiricism, clashed with the empirical and individual effectiveness-based approach of traditional Chinese medicine restricting its development. Chinese medicine incorporated Western evidence-based medicine as its primary direction, consequently influencing the development direction of therapeutic landscapes in China.

C)The returning of Romanticism in west and a renewed view of the relationship between humans and nature inspired various fields in China, including traditional Chinese medicine and therapeutic landscapes. This revival led China back to its traditional roots of traditional Chinese medicine, Feng Shui and Taoism, creating a new context where ancient cultural traditions served therapeutic landscapes.

D)The Western acknowledgment of alternative therapies including natural remedies (namely traditional Chinese medicine) as a secondary branch of medicine, alongside modern Western medicine, is a development path that China should consider emulating. This also implies that the design approach for therapeutic landscapes should incorporate experimental evidence from evidence-based medicine while integrating philosophical methods such as land culture, environmental historical evolution, etc. This shouldn't negate the importance of holistic medicine for human health. After all, traditional Chinese medicine has played an irreplaceable role in human recovery for thousands of years. Even though scientific research may not provide precise conclusions and patterns, this doesn't diminish its significance.

Reasons for Introducing the Current State of Chinese and Western therapeutic landscapes:

1)Therapeutic landscapes in China are in an early stage of redevelopment, necessitating continued learning and borrowing from more extensive research on Western therapeutic landscapes.

2)Presenting the current state of Eastern and Western therapeutic landscapes through a literature review provides a professional starting point, offering readers an overview of the development of therapeutic landscapes in the current stage facilitating a better understanding of our research.

The historical development of therapeutic landscapes in China and the West is divided into seven chapters each comprising two subsections—one detailing the historical development of therapeutic landscapes in China and the other in the West—chronologically presenting the formation of primitive medicine, the emergence of empirical medicine and development of empirical medicine, the resurgence of traditional Chinese medicine under the influence of mechanistic medicine in the West, emphasis on naturalism in the West, the reconstruction of Chinese medicine under humanism and the development of Western natural medicine. The evolution of therapeutic landscapes is aligned with the progress of medicine. Therefore, summarizing the formation of therapeutic landscapes in China and the West according to the historical development of medicine will be outlined. Section 2.7 introduces the current state of therapeutic landscapes through literature analysis. And also give some introduction about character and users' needs of therapeutic landscapes.This clear understanding of the historical and present states of therapeutic landscapes in this Chapter will facilitate an easier comprehension of therapeutic landscape design theory in part 3.

2.1 Origin of Medicine

The emergence of medicine was prompted by the necessity to treat those afflicted. Historians suggest (Diamond, 1997) that before humans transitioned into agrarian societies, although diseases posed a threat to human health, the low population density limited the spread of viruses and bacterial infections, resulting in a relatively small variety of ailments. However, as people began cultivating wild grasses and domesticating animals, diseases similar to schistosomiasis started to affect humans. The pathogens from domesticated animals also began to adapt to the human environment. With the shift to settled living, commensal insects like flies, and cockroaches, which cohabited with humans, spread diseases that coevolved with humans. Both commerce and warfare facilitated the exchange of various diseases. Faced with diseases, humans were killed by highly virulent pathogens and when hosts died, so did the pathogens. However, those viruses and bacteria that were not lethal, either because the host developed immunity or because their toxicity was low, continued to spread and mutate. People, in addition to relying on their own immunity,

began to use medical techniques and drugs to combat diseases. This marked the beginning of the development of medicine.

A common feature in both the East and the West during this period was the coexistence of medicine and witchcraft, without a clear separation from religion.

due to limitations in understanding both oneself and the natural world. People of that time could not explain many phenomena or understand diseases, leading to a reverence and awe of the divine. Medical practices and religious rituals often intertwined and overlapped, with medicine primarily relying on dietary therapy. Therefore, the healing gardens of this period primarily centred around natural worship and religious rites.

People of that time struggled to explain many phenomena and had limited knowledge of diseases, leading to a deep reverence and awe towards the divine. Medical practices and religious rituals often overlapped and complemented each other, with medicine primarily relying on dietary therapy. Consequently, healing gardens during this period predominantly served as places of natural worship and religious rites.

In the realm of ancient Chinese writings, the term "医" (medicine in traditional characters) is also associated with "spell" or "witchcraft". In Western culture, the word "medicine" has an additional connotation according to the Oxford Dictionary: it refers to a spell, charm, or fetish believed to cure afflictions.

2.1.1 In China

The era of primitive medicine is associated with a limited understanding of the processes of life and death. People marvelled at the wonders of nature, personifying natural forces and regarding them as their deities. They also believe that the natural force is controlled by some gods with the same appearances as them.   They attempted to treat illnesses through purification rituals and worship gods. Therefore, during this period, Chinese therapeutic landscape were characterized by a reverence for the divine, seeking heavenly intervention for the healing of diseases.

In China, Traditional Chinese medicine has a deep-rooted history that is closely related to nature. Its earliest medical thinking was shaped by various philosophical branches such as Daoism, Fengshui, Buddhism and Confucianism, all of which emphasize the importance of harmony between humans and the natural environment.

Daoism – in Daoist ideology, man is part of nature and nature contains all the means to cure sick people.

Fengshui – is an energy force to harmonize individuals with their surrounding environment. If we follow the law of nature, we will reach a healthy state of spirit, mind and body.

Buddhism – a belief of human beings in the cycle of suffering and rebirth and in an enlightenment state that helps to escape the cycles. A natural landscape would be the ideal environment to help reach nirvana (enlightenment).

Confucianism – acknowledges the importance of living in harmony with nature. The philosophy reasons that human prosperity is interdependent with the natural environment – one is rejuvenated by its beauty, revitalized by its seasons and fulfilled by its rhythms. Therefore, nurturing nature in all its diversity and abundance is crucial for human flourishing. Any act contrary to nature's processes is detrimental to not only individuals but also society as a whole.

During the primitive times, the emergence of indigenous Taoist medicine in China exerted the most profound influence on traditional Chinese medicine and therapeutic gardens. Nevertheless, Confucianism and Buddhism also carried philosophical guidance in these practices.

The principles of Daoism medicine emphasize the importance of living in harmony with nature for achieving good health and longevity. *The Inner Canon of the Yellow Emperor* and *Shen-nong's Herbal Classics* are two important Daoist books. They provide guidance on the use of these natural remedies. Such as using various herbal medicine, acupuncture and Qigong exercises to improve health. And the herbal medicine's therapeutic effect from *Shen-nong's Herbal Classics* has been studied and summarized in paper[22] by Duan Lei (2024) and specific aromatic Chinese herbs and therapeutic effects of *The Inner Canon of the Yellow Emperor* has been published in paper[23] by Huang Xuying (2021).

In Taoist temples, the worship of nature is integral to the healing process. The choice of location for these temples is based on the principles of Fengshui, which seeks to harmonize the natural environment with human habitation. The Taoist building is often located in peaceful, serene and pastoral landscapes, allowing visitors to connect with the natural world and achieve a sense of inner peace.

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[22] Duan, L. (2024). Analysis of Drug Characteristics of "Yannian" in Shennong Bencao Jing. Chinese Journal of Ethnomedicine and Ethnopharmacy, p.33(1), DOI: 10.3969/j.issn.1007‑8517.2024.01.zgmzmjyyzz202401002

[23] Huang, H. (2021). Analysis of the properties of ancient aromatic Chinese herbs and the application of the theory of "aromatics acting on the spleen" in Huangdi Neijing. Journal of Beijing University of Traditional Chinese Medicine, 44(6), 485.

As Daoism evolved, the focus shifted from observing the celestial phenomenon to observing the healing power of nature. The practice of Wuwei （无为）thinking, which emphasizes living in harmony with the natural world, became an important aspect of Daoist medicine. Practitioners of Daoism medicine believe that by following the simple and spontaneous course of nature, one can achieve good health and longevity.

In the era of primitive medicine, China placed significant emphasis on the vital connection between harmonious coexistence with nature and the attainment of good health and longevity. Simultaneously, there was a profound belief in the power of ancestral worship and seeking blessings from heavenly deities as a means to achieve health.

2.1.2 In West

After delving into the historical origins of primitive medicine and therapeutic landscapes in China, let's now turn our attention to the West. According to Jiang Ying (2012), in the earliest periods, both Chinese and Western medicine were intertwined with shamanistic practices and characterized by the anthropomorphising of nature, along with a deep reverence for it. The earliest therapeutic landscapes in the West served as places of worship, where supplications were made to deities for recovery.

Around 1570, Theodor Zwinger, a physician and medical professor at the University of Basel, traced the roots of medicine and the healing arts back to ancient Greece. He proposed that Asclepius was the progenitor of medicine and attributed the establishment of pharmacology to the mythological centaur Chiron, who was part-human and part-horse. Zwinger asserted that God had already dispersed healing remedies throughout the world prior to the emergence of human civilization, for future generations to discover. His amalgamation of myth and reality highlights two key points: firstly, the level of medical scientific knowledge at the time was rudimentary and medicine was inseparable from mythology. Secondly, the practice of medicine and the utilization of remedies predated written records (Roy Porter,1996).

Healing shrine of Greek medical god Asclepion (Figure 4) in Epidaurus (S. Greece) among other healing shrine in Tricca (N. Greece), Lebena (Crete), Cos and later Pergamum (now Turkey) were holy curing places (Porter, 1996).The temple of Asclepius in Epidaurus was documented as the earliest case of therapeutic landscape in Europe. Sufferers would stay overnight within the temple. If fortunate they would receive healing in a dream, either directly from Asclepius or in the form of instructions interpreted by a priest and often compatible with the recipes and advice of secular physicians. The remedies were mainly rehabilitative therapy including hydrotherapy, air therapy, sunbath, physical exercise, dietary therapy enema and rub ointment. In

the site besides the temple a library, a museum, a market and a grove were designed for visitors. Natural water was seen having the purification power to wash away the sins and was widely used in the ritual. When the patients were treated, the companion could hang out in the theatre watching the comedian's performance debating or walking in the forest. In ancient times hospitals were often located in open-air environments, such as on hilltops or near hot springs to take advantage of natural ventilation and access to sunlight.

Valetudinário for Roman soldiers and slaves was known as the earliest hospital. Natural light, fresh air and space separation prevent the spreading of contagious diseases.

Figure 3 : The heart of the Epidaurus sanctuary, the Temple of Asclepius (centre right).
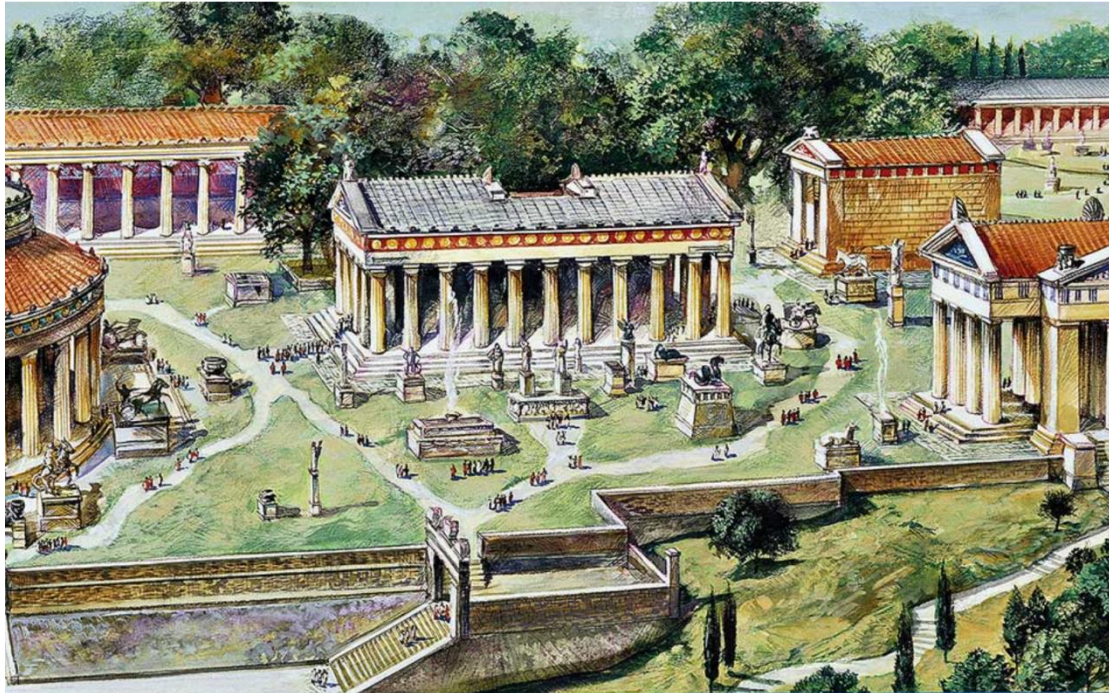
By Leonard, J. (2019).

2.2 Empirical Medicine

The advent of empirical medicine signified a departure from sorcery and religion as it introduced medical practices like herbal remedies and surgery for treating patients. However, it was a time when there was limited experimental data to validate the efficacy of specific prescriptions or procedures. Concurrently therapeutic gardens in this era shifted away from sorcery emphasizing natural spaces and herbal remedies in patient treatment.

2.2.1 In China

The era of empirical medicine emerged from a blend of natural philosophy, religious beliefs and accumulated treatment experiences notably influenced by Buddhism, Daoism and Confucianism. With limited scientific knowledge available medical practitioners leaned heavily on their personal experiences.

In China the development of empirical medicine is attributed to the publication of Shanghanlun (Treatise on Cold Damage Diseases) by Zhang Zhongjin before 220 AD. Zhang is revered as a sage of Chinese medicine and his theories were based on the classic Huangdi Neijing which dates back to the Han dynasty. However, the exact time of his inheritance of these theories is unknown, although it is believed to be during the Pre-Qin period, Nanjin and Tangye Jingfa (before 221 BC). Zhang's contributions

to traditional Chinese medicine included dialectic thinking on theories, treatment methods, prescriptions and reasoning of illnesses. He emphasized the importance of the relationship between people and nature and how the environment could affect health based on the Taoism Yin Yang theory.

During the Eastern Han dynasty (25-220 AD) frequent wars and natural disasters caused epidemic diseases to spread throughout the country. Zhang Zhongjin was instrumental in diagnosing patients and offering prescriptions. Based on the extent of the patients' recovery he collected the most effective prescriptions and wrote the book Shang Han Lun (WU, 2010). Its completion marks the transition from primitive medicine to empirical medicine in China. During the Tang Dynasty, Taoist temples (Figure 3) expanded in scale and were built on mountains with a continued emphasis on the worship of nature at the core of Taoist practices. Travelers ascended the mountains to reach these temples establishing a strong connection with the natural world.

Figure 4: analysis of Daoism Temple
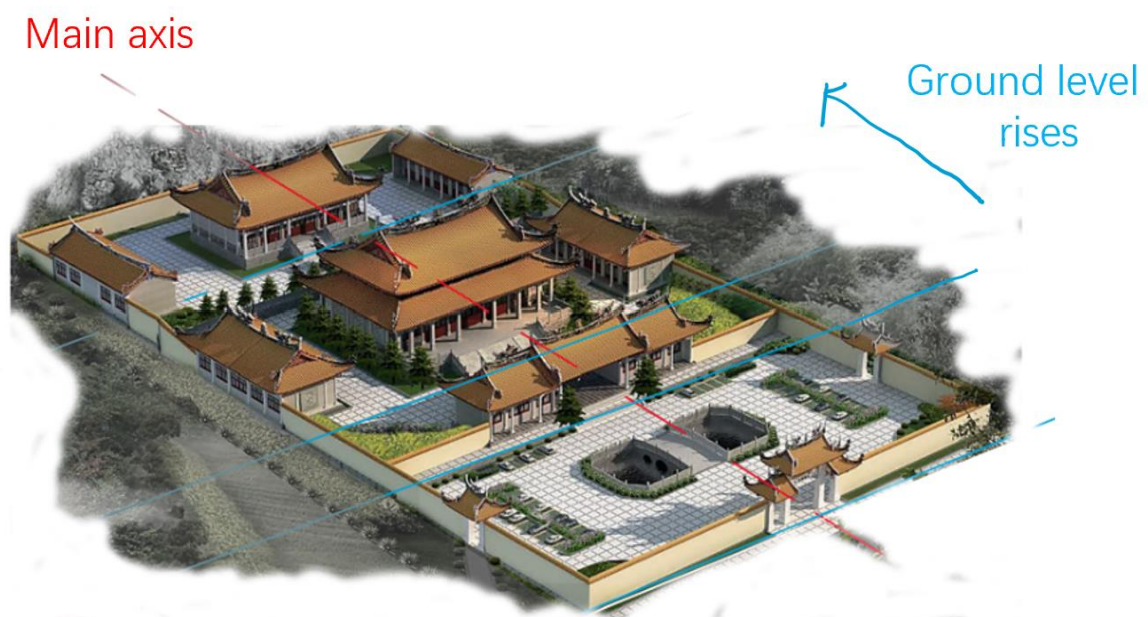
By Bao Guotai (2023).

Gong Guan (Figure 5) is a temple where the emperor worshiped nature, practiced mindfulness and engaged in self-reflection. It is worth noting that the temple's symmetric layout is the result of the Confucian belief in seeking order.

In Daoism the belief in the law of nature is paramount and this belief extends to the practice of medicine. Daoist doctors would often seek out natural ingredients found in the woods to make Chinese medicine. Ge Hong, a Daoist scholar from the Eastern Jin period (317 AD-420 AD) wrote in his book Biographies of the Deities and Immortals

that Daoist doctor Dong Feng treated patients by asking for apricot trees instead of money. Apricot trees are commonly used in Chinese medicine and planting them in the woods not only adds to their medicinal value but also provides horticultural therapy (Luo, 1997). Buddhism arrived in China during the Han period in 67 AD and with it came the spread of Buddhist medicine. Whether located in towns or woods, Buddhist temples were known for their serene and peaceful courtyards and wards making them ideal places for patients to recover. This period was the rise of charitable temples which were like hospitals. The concept of "Yang sheng"[24] or nourishing life found in both Daoism and Confucianism influenced Chinese classic garden design. During the Six Dynasties period (220 AD - 589 AD) the central governing system was weakened by the nobles leading to frequent wars between them and the emperors. Strategists known as "moushi" would retreat to seclusion for peace and safety. Private gardens in nature became their dwellings to demonstrate their Daoist philosophy with the principle of "wuwei" or seeking purity of life without material possessions or fame. This thinking shaped gardens to mimic nature with plants, rocks and water bodies being the main features. These gardens were considered therapeutic helping the strategists improve their health of body, mind and spirit during the war period. In Japan during the Kamakura Shogunate period (1192 AD - 1333 AD) Zen gardens were transformed from Chinese classic gardens with the influence of Buddhism (Jiang, 2012) .

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[24] **Yang sheng** is a core component of traditional Chinese medicine (TCM) that puts paramount emphasis on prevention of illnesses. The Chinese words yang refers to nourishing, nurturing, nursing, taking care of, fostering, or promoting and sheng means life, birth, growth, vitality and health. Putting together, yang sheng refers to nourishing life, fostering health and well-being and pursuing longevity (Chen, 2011).

Figure 5: Photography of Taoist temple Gongguan in Fanjin Mountain, Guizhou.

By Bao guotai (2019) .

2.2.2 In West

In the West the separation of independent hospitals from churches symbolized the division between medicine and religion. However, due to technological limitations the primary methods of treatment involved herbal remedies, bloodletting and induced vomiting. There was also a significant emphasis on the spiritual recovery of the patients. Empirically driven medicine gradually replaced sorcery and ritual-based primitive medicine. During this period healing gardens emerged predominantly in the form of herb gardens within monasteries, primarily providing spiritual comfort for the patients.

During the European Middle Ages (476 - 1453 AD) standalone hospitals began emerging alongside churches, temples and even within ordinary households. Yet,

these facilities were less centred on addressing physical maladies but more on nurturing the spirits of the indigent.

Typically situated within urban confines these hospitals frequently lacked expansive outdoor spaces. Congested and inadequately ventilated chambers were commonplace inadvertently serving as breeding grounds for infectious diseases.

In stark contrast, monasteries often nestled amidst remote natural settings, acted as buffers against diseases, enhancing the overall health and well-being of their inhabitants. One of the pioneering European sites for medical care were the monastic or cloister gardens (Watt & Hayes, 2013).

Monasticism a religious way of life where individuals forsake worldly endeavours to wholeheartedly commit to spiritual undertakings, gained momentum following Emperor Constantine the Great's decriminalization of Christianity in the Roman Empire in 313 AD via the Edict of Milan. Subsequently, Christianity was elevated to the state's official religion. Rooted in Christian beliefs illnesses were perceived as divine retributions. As a result monks envisioned themselves as spiritual healers adhering to Christ's teachings. Their therapeutic repertoire encompassed methods such as purification, bloodletting and herbal applications with an overarching emphasis on spiritual interventions aligned with Christian tenets. Furthermore, monastic medicine emerged as a linchpin during the Middle Ages, particularly in conserving and disseminating herbal medicinal knowledge. Monastic institutions like the Cistercian abbey of Maulbronn in southern Germany stood out as vital hubs of herbal medical wisdom during this period (Watt & Hayes, 2013). The monastic tradition catalysed the evolution of a healthcare paradigm that championed nature's curative prowess. Characteristically monastic gardens bore a rectangular contour ensconced by cloisters and featuring a central atrium. These green havens mirrored the monks' reclusive lifestyle and their aspiration to spiritually commune with God amidst nature. Illustratively the 10th-century abbey of St-Martin-du-Canigou in southern France boasted an herb garden, a testament to the pivotal role such gardens occupied in the medieval monastic existence (Watt & Hayes, 2013).

2.3 Mechanical Medicine

Due to the advancement of science and technology our understanding of medicine has deepened over time, evolving from rituals of deity worship and the expulsion of demons to the utilization of herbal remedies and surgical procedures for addressing illnesses. The pinnacle of mechanical medicine includes three significant moments in the East: the introduction of Li Shizhen's "Compendium of Materia Medica" during the Ming Dynasty marking the peak of empiricist pharmacology. In the sixteenth century the invention and global dissemination of smallpox inoculation techniques made a

substantial impact. Additionally, the publication of the "Botanical Names and Facts Atlas" in the nineteenth century made remarkable contributions to herbalism, medicine, agronomy and horticulture, representing a product of the high development of mechanical medicine.

In the Western context three pivotal moments stand out: 1) Bacon's formulation of epistemology in the sixteenth century. 2) The introduction of dualism by the French scientist Descartes. 3) The incorporation of natural philosophy and mathematical principles under the ideas of Isaac Newton in 1687. During this period in the East, therapeutic gardens aimed to mimic nature presenting a man-made creation that seemed heaven-sent. In the West, both geometric therapeutic gardens and landscape therapeutic gardens coexisted. The emphasis was on the healing effects of the natural environment and the spiritual functions of rituals and prayers to deities gradually diminished under the robust development of empiricist medicine

2.3.1 In China

During the Sui, Tang and Five Dynasties period (581-960 AD) the medical field expanded and diversified accompanied by a growing accumulation of medical knowledge and a more structured approach to medical specialties. The establishment of clear medical divisions in the Tang Dynasty's Imperial Medical Academy indicated the specialization within the field. Notably, renowned medical practitioners compiled comprehensive medical works that reflected the comprehensive development of clinical medicine. Publications like "Treatise on the Origins and Symptoms of Various Diseases" meticulously described the origins and symptoms of internal, external, gynaecological, paediatric and miscellaneous diseases, reflecting the continued development of empirical medicine in China. Additionally, Sun Simiao's "Qian Jin Yi Fang" documented 59 medicinal formulas including ingredients like wolfberries, rehmannia root, and pine nuts, based on accumulated experiential knowledge and summaries of medical classics. These publications combined traditional Chinese medicine, dietary therapy and pharmacology under empirical scientific guidance. "Tai Ping Sheng Hui Fang," building on the theories of "Treatise on the Origins and Symptoms of Various Diseases" not only gathered prescriptions but also expounded on the pathogenesis, explaining the relationship between formula drugs and symptoms. This era saw the continued development of mechanical medicine in China (Zhang, 2016).

In the Song, Jin and Yuan Dynasties (960-1279 AD) anatomy experienced significant advancements through increased cadaver dissections and the illustration of anatomical charts based on physical observations. Prominent publications such as

"Wuzangtu" and "Cunzhen Tu" contributed to anatomical studies. Further diagnostic developments, especially in pulse and tongue diagnosis, made substantial progress. Works like "Cui Shi's Pulse Diagnosis" and "Investigation Guide of Diseases" significantly contributed to simplifying and illustrating pulse and tongue diagnosis. The publication "Aoshis Shang Han Jin Jing Lu" integrated tongue diagnosis with pulse conditions elaborating on the causes of diseases, treatment strategies and prognosis. This period witnessed significant influence from reformists and medical practitioners with a prevailing view that "ancient prescriptions cannot always be applicable" fostering the continued development of evidence-based medicine.

During the Ming Dynasty (1368-1544) medicine made strides in both practical application and theoretical frameworks, leading to the systematic summarization of fundamental theories and mechanical medicine. Traditional Chinese medicine underwent continuous innovation becoming more refined and mature. Li Shizhen's "Compendium of Materia Medica" represented the pinnacle of Chinese pharmacology, encompassing around 1,897 drugs from various regions globally before the 16th century, classified into 16 categories. This work addressed a wide range of human-related physiological, pathological, disease-related and hygiene-related sciences, along with environmental natural sciences. Li Shizhen's proposition of the brain as the residence of the primordial spirit had a positive impact on later neurological theories. The "Compendium of Materia Medica" spread to Korea, Japan, Vietnam and was translated into various languages significantly influencing various countries worldwide. Li Shizhen's work received high regard from both Chinese and foreign scholars cementing his position as a distinguished scientist globally. Charles Robert Darwin highly praised the "Compendium of Materia Medica." Wu Youxing's "Treatise on Pestilence" proposed that the pestilence enters through the mouth and nose, challenging previous theories that posited its entry through skin and hair.

In the 16th century variolation, a form of artificial immunization through smallpox inoculation, gained widespread use in China, serving as a precursor to artificial immunization methods. The success of variolation drew attention and emulation from other countries. It reached Japan in the ninth year of the Shunzhi period (1652), Russia in the 27th year of the Kangxi period (1688) and England and the European continent in the 21st year of the Kangxi period (1721), subsequently extending to the United States. In the late 18th century Edward Jenner developed vaccination using cowpox, building upon the practice of variolation in China and promoting it in Europe and China. In his "Philosophical Letters," the French philosopher Voltaire highly praised

variolation stating "a hundred years the Chinese have practiced this method and considered it a great example from the smartest nation in the world[25].

Regarding therapeutic landscape gardens, Wu Qirui during his tenure as a governor and viceroy, conducted botanical observations, collections, recordings and illustrations during his travels across various provinces. He consulted local herbalists and residents and authored "Zhiwu Mingshi Tukao" in 1847, which consisted of 38 volumes, documenting 1,714 plant species and 1,805 illustrations, divided into 12 categories. This work with high scientific value in the 19th century, significantly contributed to botanical studies in medicine, agriculture and horticulture. Wu Qirui's meticulous work provided critical reference material for selecting medicinal plants in therapeutic gardens. German scholar Enil Bretschneider praised "Zhiwu Mingshi Tukao" in his "Review of Chinese Botanical Literature" (1870).

The therapeutic gardens of this period as stated by the renowned classical garden designer Ji Cheng were "created by man but appeared to be natural". These gardens aimed to emulate natural ecologies avoiding obvious artificial imprints. Confucius said "The wise enjoy water, the benevolent enjoy mountains"(Confucius, 221BC). In the philosophical context of China water symbolizes wisdom while mountains represent benevolence and virtue. According to Taoist philosophy the essence of humanity aligns with nature's unity. The standard for assessing landscape value lay in its ability to evoke human emotions creating an environment reminiscent of poetry and landscape paintings—a concept termed "mood." In simple terms like natural landscapes that evoke emotional responses, medical landscape gardens aim to influence positive emotions, feelings of admiration, love and a sense of meaningfulness in life. This aligns with the essence of medical landscape gardens' psychological and spiritual positive impact.

2.3.2 In West

The mechanistic approach in the West led to the exclusion of holistic and naturalistic perspectives. As a reflection of this shift hospitals moved away from religious architecture emphasizing the increasingly scientific spirit of medicine.

During the 15th century Europe underwent significant transformations due to the Renaissance and the rise of capitalism (Nutton, V., 2012). Consequently, natural sciences started to detach from theology fostering advancements in medicine.

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[25] Voltaire. (2007). Philosophical Letters: Or, Letters Regarding the English Nation. Hackett Publishing Company, Inc., 132.

According to Porter (1997), European medicine during this period departed from the medieval religious framework. The focus shifted towards a more empirical understanding of anatomy and the human body. This evolution facilitated the dissemination of medical knowledge and its practical applications. Additionally, this era witnessed the establishment of new medical colleges and institutions marking the institutionalization of medical education.

Paracelsus (1493 – 1541) emerged as a key figure in medical reform during the Renaissance, challenging established academic medical doctrines and advocating a critical attitude towards academic medical literature.

In the 16th century Francis Bacon's epistemology including empiricism and induction, became crucial tools for modern medicine. Bacon proposed that all human knowledge stemmed from sensory experience, but it required rational understanding to grasp the essence of things. He emphasized the necessity of carefully designed experiments to unveil the mysteries of nature and comprehend the essence of medicine. Bacon's empirical induction method based on summarizing scientific experiences involved three steps: gathering extensive sensory experience material, categorizing and comparing this material and finally, inducing conclusions based on these examples. These theories significantly propelled scientific and technological progress exerting a crucial influence on the development of empirical medicine. It marked a milestone in the rise of experimental medical systems in the 16th and 17th centuries ushering the world of medicine into a new phase.

In terms of Western therapeutic landscapes during this period rationalist philosophers such as René Descartes, Baruch Spinoza and Gottfried Wilhelm Leibniz, considered all sciences to be part of a deductive system reflecting the absence of chance in nature. Hence, everything in all gardens was meticulously planned to avoid accidental or unexpected effects guided by philosophical theories. Italy and France developed extreme axiality and strict orderliness reflecting this philosophical view. Later in the 17th century, England produced Newtonian cosmology based on order and harmony as well as John Locke's empiricism based on rapid sensory experience. Francis Bacon suggested that any heightened beauty had an element of strangeness in proportion. He predicted the emergence of naturalistic therapeutic gardens abandoning symmetry, shaped trees and stagnant water designs, emphasizing the natural charm of gardens akin to "approaching the pure wilderness and local vegetation". Healing, both mentally and physically, was achievable in nature. The emergence of naturalistic therapeutic gardens provided a return to nature where greenery and fresh air could improve the conditions of patients. Consequently, in Western therapeutic landscapes during this period there were dominant rules in Southern Europe focusing on axiality such as the therapeutic landscape in New Hôtel-Dieu in Paris (figure 5).

Figure 6: view and master plan of therapeutic landscape in New Hôtel-Dieu, Paris
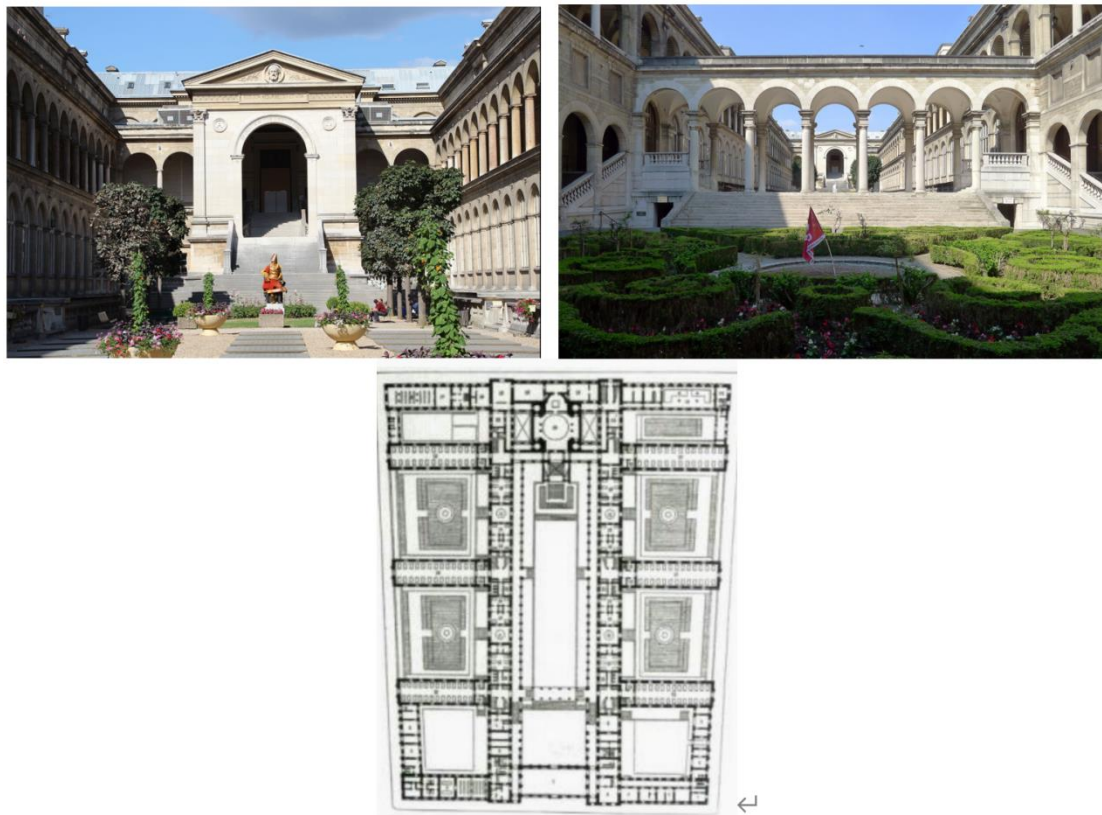
The Allgemeinen Krankenhauses Bamberg (Figure 7) a public hospital designed by Johann Lorenz Finck in Bamberg, Germany, built from 1787 to 1789, represented the advancement of mechanical medicine, concentrating on physiological recovery departing from religious and prayer-centric hospital models. It was the first hospital to categorize patients into curable and chronic cases. Instead of following the ward layout of medieval religious architecture, the Bamberg hospital used corridors to connect smaller spaces and included bathrooms between two patient rooms. The hospital's main building had extensive green spaces, following the traditional quadrangular form, providing areas for people to relax, where the awe of nature had faded turning into a place for admiration.

Figure 7: Therapeutic Landscape and Public Hospital, Bamberg, Germany
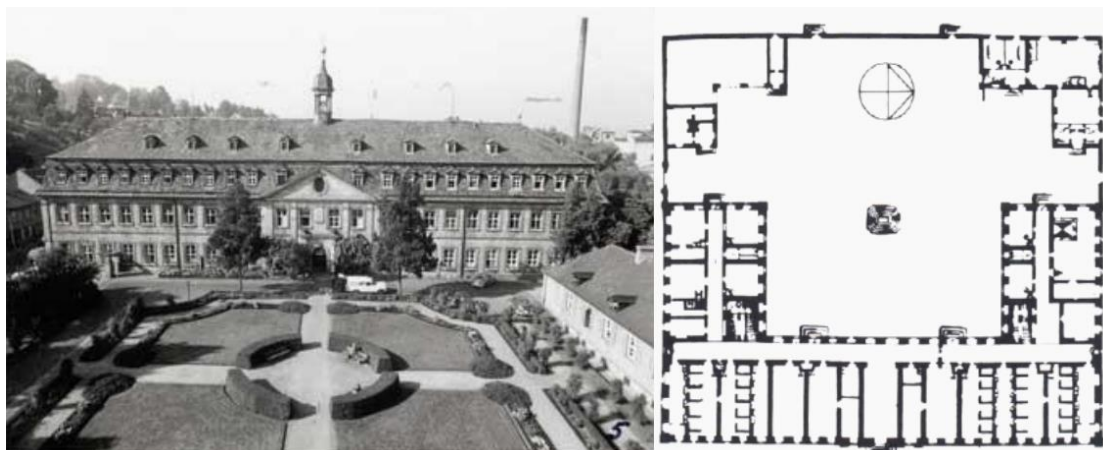
By He Xiaosai (2012).

2.4 Humanistic Medicine

Unschuld (1985) emphasizes that Descartes' approach, viewing the body as a dismantlable and repairable machine, sharply contrasts with the holistic and dynamic balance principles of traditional Chinese medicine. Descartes laid the foundation for Western medicine's perspective on structure and function. With the rise of modern biomedical science, this viewpoint gained widespread recognition globally, but it posed challenges to the holistic approach of traditional Chinese medicine.

During the Republic of China era (1912-1949) the rapid development of Western medicine in China faced multiple attempts by Chinese government authorities to abolish traditional Chinese medicine. The traditional Chinese medicine community sought development by establishing educational institutions, affiliated hospitals and publishing medical journals. From the Beiyang government to the Nationalist government, policies discriminating against, suppressing, attacking and even attempting to abolish traditional Chinese medicine were implemented. However, the traditional Chinese medicine community succeeded through resolute resistance.

The development of Western medicine was also accompanied by the trends of pastoralism and romanticism. People began to recognize nature as a harbour for physiological, psychological and spiritual recovery (Sunjingjing, 2020). Natural therapies began to emerge. Whether in China or the West there was a mutual recognition of the fundamental limitations of modern medicine rooted in mechanistic principles. Consequently, both regions consistently borrowed from traditional Chinese medicine and natural therapies in the treatment of patients.

2.4.1 In China

During the Republic of China era (1912-1949), Western medicine under the influence of mechanistic principles rapidly entered and developed in China. Simultaneously, modern China was a semi-colonial and semi-feudal society. The existence of traditional Chinese medicine (TCM) didn't align with the interests of Western powers in China. The Beiyang government in China made multiple attempts to abolish TCM. The TCM community sought development by establishing TCM education, affiliated hospitals and publishing medical journals. From the Beiyang government to the Nationalist government, discriminatory, suppressive and even abolishing policies were imposed on TCM. However, the TCM community fiercely resisted and emerged victorious[26].

Zhang Xichun, a prominent clinical figure during the Republic of China era, believed that the principles of Western medicine are encompassed within the theories of TCM stating that bridging Eastern and Western medicine wasn't difficult. He advocated for the combined use of Chinese and Western medicine. He promoted the integration of Eastern and Western medicine striving to align with historical trends. He strongly advocated for the global recognition of Chinese medicine and his thoughts were widely disseminated in the TCM community.

Under the ideology of integrating Eastern and Western medicine, which accommodated flexible adaptations in China and the advocacy of Ding Fubao, a scholar who studied in Japan, advocating the scientific development of TCM based on Chinese teachings and supplemented by Western knowledge, traditional Chinese medicine saw a resurgence. It provided a holistic perspective on health, shifting the focus from viewing the human body as a series of independent components to understanding the delicate balance between the mind, body, spirit and individual environment. This method emphasized restoring internal harmony rather than merely addressing symptoms.

Practitioners of TCM employed various methods including acupuncture, herbal medicine, dietary therapies, as well as exercises like Tai Chi and Qigong. These techniques aimed to enhance the body's natural healing abilities and maintain the flow of vital energy. Physicians recognized that health wasn't solely a product of

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[26] On 1913, November 29th, the presidential palace planned to abolish TCM. Representatives of TCM petitioned advocating for five reasons: a) the deep theoretical knowledge of TCM cannot be disregarded; b）the geographical, climatic and dietary differences between China and the West require improvements to Western medical techniques; c）the trust in TCM among the populace is tenfold compared to Western medicine; d) with fewer than 100,000 Western doctors, they cannot adequately treat the entire nation, requiring at least 20 years of training; e) TCM is a natural product and a source of revenue for the Chinese government. The government expressed agreement and retracted the decision to abolish TCM (Wu Hongzhou, 2010).

mechanical functions but stemmed from the dynamic interaction between individuals and their environment.

2.4.2 In West

The development of Western medicine was accompanied by pastoralism and romanticism. People began to realize that dirty air could cause infectious disease episodes; so hospital design began to incorporate hygiene codes and focus on fresh air circulation. After the Crimean War (1854-56), the famous public health reformer and British nurse Florence Nightingale converted military hospitals into well-ventilated, well-lit, open spaces; in just six months the mortality rate dropped from 40 percent to 2 percent. Her research in hospital design made pavilion hospitals popular (Figure 7). Her research identified ventilation, light, warmth, hygiene, diet, cleanliness and observation as important factors in patient care. But windows with views to nature were also a very important factor. According to Nightingale, as described in the third edition of her Hospital Notes (1863), the pavilion design included the following: the ideal number of patients per pavilion was 20-32. There should be two beds per window; the windows could be opened and double-glazed. There should be two fireplaces for heating and ventilation. Pavilions should be oriented so that the windows face east and west for direct sunlight. The nurse manager's office shall have an observation window with a view of the patient area. Walls shall be impervious Balian cement or tile; floors shall be oak or pine, sealed or tiled In the case of two levels the staircase should be open and sunny. There should be connecting corridors or covered walkways between pavilions. Sewers should never run through a building but must be located away from it and never at the entrance to a building. The site plan in addition to a south facing orientation for adequate light and covered walkways, should include units 'side by side and spaced twice the height of the pavilion. The shape of the courtyard layout was thus delineated so that patients and healthcare workers could walk freely in nature (Nightingale, 1863).

Figure 8: Wide Hall Hospital and Nightingale Ward
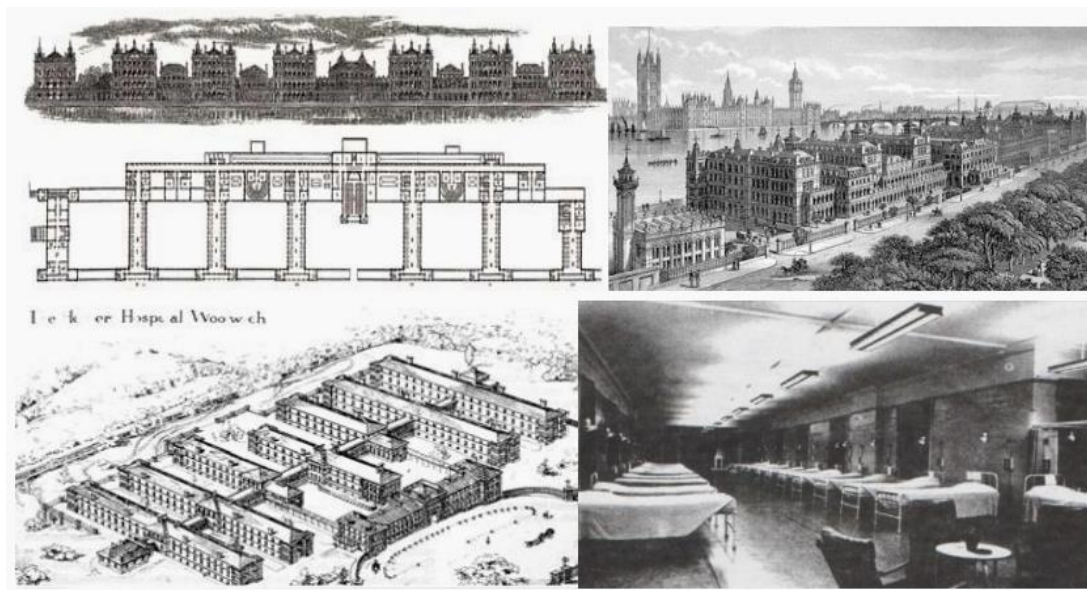
By Hao Xiaosai (2012)

Hospital-style pavilions revolutionized the healthcare industry, but hospitals also experimented with new techniques for outdoor spaces. This included the construction of rooftop gardens (roof gardens) with glass roofs and winter gardens. The roof terrace of a wing of the Bristol General Hospital (King Edward VII Wing of 1912-14) is recorded as having been used as a roof garden, with asphalt beds and trees. The construction of a new hospital by Leeds City Council (Figure 8) included a winter garden with an iron and glass roof. The garden has a fountain and colourful flowers. Thanks to the glass roof people can enjoy nature all year round, regardless of the seasons, as it maintains a stable and warm temperature.

Figure 9: Winter Garden in Leeds Hospital

THE HIDDEN HALL AND LOST WINTER GARDENS OF THE L.G.I
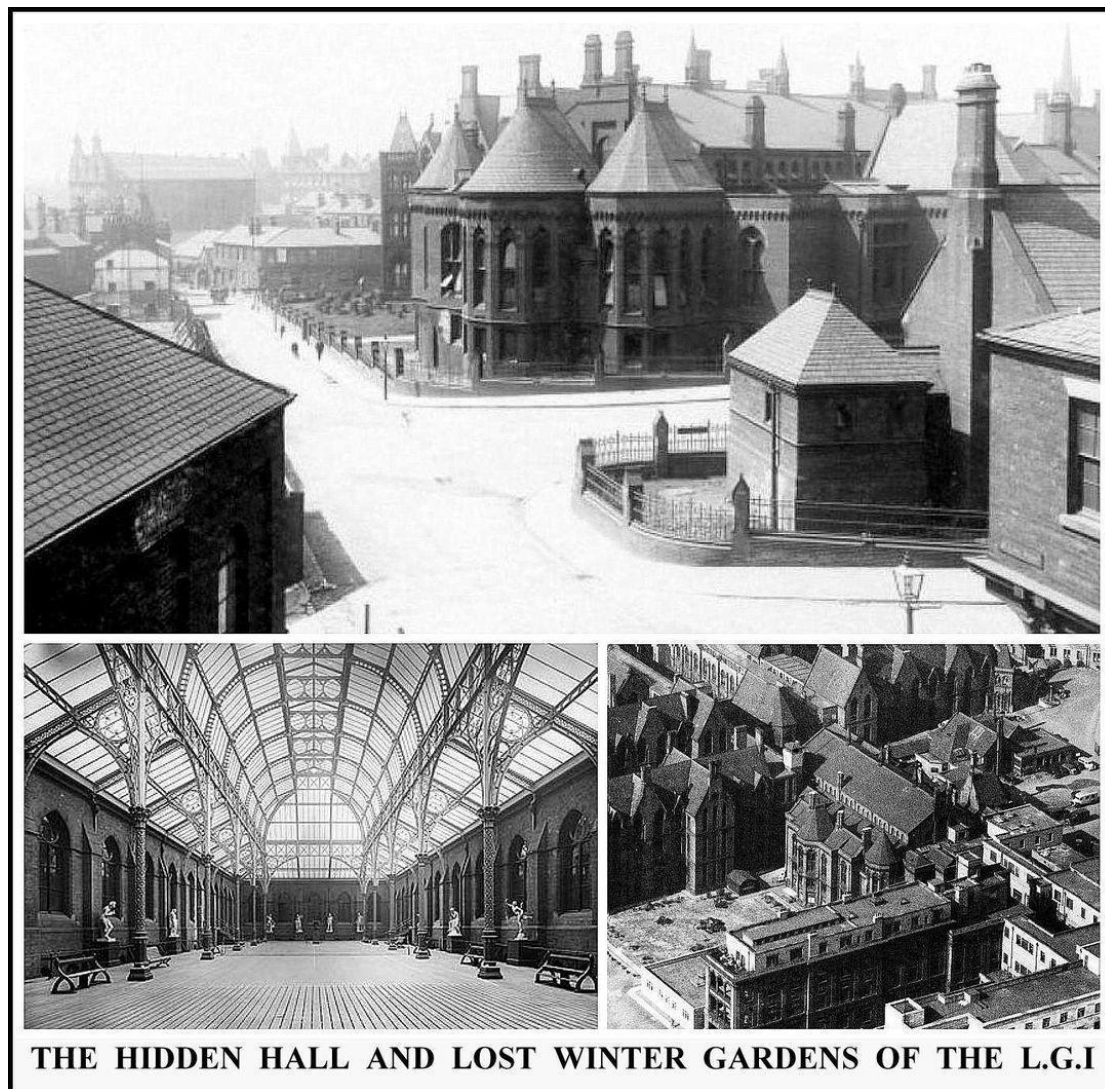
By Davison, P. (2015).

In the 19th century, European countries began to build public psychiatric hospitals and to promote moralistic therapies under the auspices of the government. Dr. W.A.F. Brown, manager of the Royal Asylum for the Insane at Montrose, published a paper entitled "The Nature, History and Mission of the Asylum" in which he pointed out that the asylum was the most effective place for the treatment of mental disorders and suggested that extensive natural landscapes and gardens were essential for the recovery of patients. As a result, many sanatoriums were built in picturesque rural areas and the buildings and gardens were designed to create a comfortable home environment for the patients, similar to the local style. The idea of a nursing home garden is to create a positive, organized environment for which landscape elements and plants with health benefits are selected by medical experts and landscape designers (Sun, 2012).

In May 1889 Vincent van Gogh voluntarily travelled to the sanatorium of St. Paul de Mausole in the south of France, where he produced more than 140 works, including Starry Night and St. Paul de Mausole. Through the window he depicted distant mountains, meadows and flowers in bloom in the surrounding landscape (Figure 9 and Figure 10).

Figure 10: painting of Sanatorium of St. Paul de Mausole, France

By Van Gogh, V. (1889-1890).

Figure 11: painting of Sanatorium of St. Paul de Mausole, France

By Van Gogh, V. (1889-1890).

During the same period, horticulture and agricultural labour also began to be used in Europe as one of the ways to treat mental illness. The pioneering of horticultural therapy was initiated. In the development of modern medicine, the importance of the natural environment for human health has never been ignored. The medical gardens of the West in this period were connected from the wards to the outdoor gardens where the windows played the role of ventilation, bringing fresh air and sunshine to the indoor. Outdoor green grass and trees gave people exercise and coolness. It was already very similar to the modern therapeutic garden. At the same time, we would like to point out that the location of the natural environment also plays an important role in the rehabilitation of people. Skrabanek (Skrabanek, P., 1989) in his book "The Demise of Humane Medicine and the Rise of Compulsory Healthism" explores the many facets of health and well-being including the perception of certain environments

(e.g. mountainous and seaside areas) being viewed as avenues for healing through a historical lens. Snyder (Snyder, L. H., 1994) reveals the historical interplay of medicine and biology in the marine realm in his paper "Discriminating Mountains and Seas: The Origins of Marine Biology". This paper provides valuable insights that promise to shed light on the reasons why the oceans, with their rich biodiversity and unique climatic conditions, have always attracted scientific inquiry. This fascination with the ocean's properties highlights its importance in issues of health and well-being.

2.5 Holistic Medicine

Under humanism traditional Chinese medicine underwent a reformation influenced by modern Western medicine, aligning with Western medical frameworks, adopting their methodologies and structuring their healthcare systems accordingly. However, while integrating aspects of Western medical systems it retained the theoretical core of traditional Chinese medicine: the natural medicine approach. Traditional Chinese medicine proliferated rapidly in China and globally, akin to spring shoots after rain. The West shifted toward a more comprehensive approach to holistic medicine emphasizing the importance of natural methods in treating ailments and maintaining overall health.

Simultaneously the medical model shifted towards the biopsychosocial model, which considers the intricate interplay between biological, psychological and social factors in understanding health, illness and medical services (Engel, 1977).

2.5.1 In China

Although Western medicine has had a tremendous influence on China, traditional Chinese medical practices have consistently remained an integral part of healthcare services, coexisting alongside Western medicine within the national healthcare system as holistic medicine. Following 1949 there was a pattern of establishing traditional Chinese medicine hospitals modelled after Western hospital systems, and by 2009 there were over 2,700 such hospitals. In the 1980s, during the healthcare reform the number of these hospitals significantly increased. With the modernization of traditional Chinese medicine, the services and functional structures of contemporary Chinese medicine hospitals gradually converged with those of comprehensive hospitals. Simultaneously the external environments of these hospitals began developing towards incorporating more greenery, open vistas and leisure spaces, although many hospitals still feature concrete parking lots outside (Hao Xiaosai, 2012). The philosophy of designing therapeutic gardens in China is rooted in Confucianism, Taoism and Buddhist traditions, aligning naturally with emerging Western therapeutic landscape concepts. In Western academic circles concepts like "biophilia" and China's

long-standing "landscape philosophy" both extol the restorative effects of a harmonious natural environment (Yue, 2012). Modern Chinese hospitals are starting to reflect these philosophies integrating green spaces, meditation areas and herbal gardens, emphasizing herbal therapy and natural complementary treatments. Architectural designs rely on Feng Shui principles, emphasizing the maintenance of harmonious energy flows within these recuperative environments (Yan and Santos, 2018).

The revival of ancient pavilion-style hospitals began in the late 1970s but underwent modern modifications. While the therapeutic properties of nature remain crucial, architecture aims to bridge the gap between tradition and the modern world. Hospitals in cities like Beijing and Shanghai are integrating traditional courtyards, water features and therapeutic gardens, seamlessly blending with advanced infrastructure. Overall, the 20th century witnessed the integration of traditional and modern elements in Chinese medical spaces deeply influenced by indigenous philosophies and Western paradigms. The focus gradually shifted towards holistic treatment, drawing lessons from ancient wisdom and modern humanism.

2.5.2 In West

In contemporary times, Western medicine has shifted towards a more holistic approach to maintaining overall health, emphasizing the importance of natural methods in treating diseases and preserving physical well-being. Western practices have adopted methods such as Western dietary therapy and the use of functional nutritional supplements to enhance immunity naturally in disease prevention, leading in research on the effects of the natural environment on human health compared to China.

In the mid-20th century Western modern medicine shifted towards the biopsychosocial model, considering the complex interplay between biological, psychological and social factors in understanding health, disease, and healthcare services (Engel, 1977). This approach focuses on maintaining overall health rather than solely treating diseases. It aims to eliminate or reduce organ dysfunctions while promoting physical, social and mental well-being (Firth, 2020; Saunders, 2000). The biopsychosocial model underscores the importance of natural means in treating illnesses such as physical exercise, behavioural therapy and occupational therapy, emphasizing the importance of establishing positive relationships with one's own mind, spirit, society, and natural environment (Saunders, 2000).

During the 1970s in Western countries, the concept of therapeutic landscapes gained popularity. The theories of biophilia by Ulrich and Attention Restoration Theory (ART) by Kaplan laid a robust evidence-based foundation for design. In a humanistic context, the design of urban landscapes considered people's physiological and psychological

needs, creating environments that provided harmony, comfort and satisfaction (Kaplan & Kaplan, 1989). Human-centred designs focused on the surrounding environment, aiming to capture the essence or so-called "genius loci" of a place (Gifford, 2014).

Western-style hospitals have undergone significant development evolving from rudimentary facilities to advanced healthcare centres prioritizing patient welfare and recovery. One notable change has been the integration of outdoor spaces and greenery in hospital design. In the 20th century hospitals began reintegrating outdoor spaces and greenery into their designs as medical professionals recognized the importance of nature in promoting patient well-being and recovery. This led to the establishment of therapeutic gardens, healing courtyards and green roofs within hospitals, providing patients with access to natural environments and aiding stress relief. Today hospitals continue to prioritize outdoor spaces and greenery in their designs, incorporating features like rooftop gardens, green walls and outdoor walkways. These spaces not only promote patient recovery but also provide a respite for hospital staff and visitors who often experience high levels of stress in hospital environments. The architectural developments in Western hospitals in the 21st century not only respond to healthcare needs but also actively engage with the local medical and social environment, diversifying hospital architecture across various countries and entering a new phase of humanistic architectural development. Consequently, Western hospital and nursing home designs and their external environments have become important models for emulation and learning in China. However, it's undeniable that Chinese traditional medical concepts and health-preserving practices also influence the design of some Western therapeutic landscapes.

2.6 Emergence of Therapeutic Landscapes

Sections 2.1 to 2.5 discussed the historical development of therapeutic landscapes from the perspectives of Chinese and Western medicine. Section 2.6 introduces the influence of Chinese landscape culture and Western landscape culture on the emergence of therapeutic landscapes.

2.6.1 In China

Classical Chinese landscape are known for their poetic and artistic qualities, skilfully mimicking nature to create though man-made landscapes that feel "as if they were created by nature itself" [27] (Ji Cheng，1631）. The influence of Confucianism,

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[27] Ji Cheng （1631).The Craft of Gardens. This book is seen as the most detailed and completed technique book discussed the classic landscape engineering in 15th century .

Buddhism and especially Taoism on self-cultivation is evident in these gardens. The term "health maintenance" is derived from the Taoist classic Zhuangzi. The essence of this philosophy is to live in harmony with nature and to view human existence as an integral part of the natural world.

One of the cornerstones of traditional health thinking, especially in classical gardens, is the principle of "spiritual nourishment". This philosophy emphasizes the importance of tranquillity. As Lao Tzu put it in the Tao Te Ching: "Only nothing can conceal it, the quietness of it"(Lao Tzu,400 BC)[28] . Zhuangzi, on the other hand, advocated an attitude of serenity in "sitting and forgetting 坐忘"(Zhuangzi,476BC)[29] and tranquillity in the midst of turmoil. Sun Simiao emphasized the spiritual dangers of pursuing material desires in his Thousand Golden Fonds and advised the wise to avoid them wisely. Landscape themes such as "Habitat" and "Joy in Knowledge'' often echoed this sentiment, advocating a life away from fame and fortune.

Chinese health philosophy advocates the concept of "quiet nourishment". This philosophy is consistent with the nature of Chinese horticulture, which promotes "emptiness and quietness" to provide an oasis of tranquillity in the midst of the hustle and bustle of the world. Yoshimasa's Garden Metaphysics celebrates landscapes that exude tranquillity.

Classical Chinese gardens, especially private gardens, emphasized self-cultivation in a natural setting. These spaces evoked dreams of an almost sacred state of being. From royal gardens reflecting royal culture to private gardens embodying the values of the literati and hermits, from suburban landscape gardens influenced by Confucian teachings to temple gardens responding to the Taoist notion of the unity of man and nature, all of these spaces were intended to nourish the soul and to ensure overall well-being.

In contrast to the Western approach of taming nature, China emphasizes living in harmony with it. This is particularly evident in the art of classical Chinese landscapes where the underlying message is a call to return to nature. These landscapes reflect China's deep appreciation of natural beauty characterized by subtlety, inclusiveness

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[28] This sentence is from Chapter 15 of the Tao Te Ching. In this chapter Laozi discusses the essence of the Dao, emphasizing the principle of governing through inaction (无为而治) and reaching profound states through non-action. The phrase conveys the idea of achieving new accomplishments by embracing nothingness and tranquillity.

[29] The term "坐忘" is derived from Zhuangzi's work, "Zhuangzi · Da Zong Shi." In this passage, Zhuangzi introduces "坐忘" as a form of cultivation through a fictional dialogue between Yan Hui and Confucius. The specific description is as follows: "墮肢體，黜聰明，離形去知，同於大通，此謂坐忘" [Duo zhi ti, chu cong ming, li xing qu zhi, tong yu da tong, ci wei zuo wang]. This suggests the practice of forgetting individual aspects such as the body, wisdom, form, and cognition, aiming to achieve unity with the Great Way. "坐忘" is understood as a means to transcend worldly constraints, returning to one's true nature and embracing a genuine way of cultivation

and serene charm, and emphasize the symbiotic relationship between humans and nature. While these concepts laid the foundation for therapeutic landscapes.

2.6.2 In West

In ancient times people often discovered specific spaces in nature wit therapeutic effects such as medicinal hot springs, religious sacred groves, rocks and caves (Huang, 2005). Western religious devotees have a deep connection with wildlife and the natural environment. In Scandinavian and Central European countries, the presence of forests is not only historically significant but is still valued today. These forests can be seen as a continuation of the sacred groves from the ancient polytheistic era (Huang, 2005). Ancient Babylonians observed the relationship between celestial bodies and diseases early on, gradually forming a unified view of heaven and humans believing that the sky, earth and water had a decisive impact on human health.

Early Western hospitals were often located within monasteries where herbs and prayers were viewed as primary treatment methods. An indispensable part of these monasteries was their cloistered courtyard gardens where various plants for medical use were cultivated.

Although Western landscape art went through upheavals and religious suppression in the early medieval period, the pursuit of beauty was unstoppable. In the later medieval and post-medieval periods, whether in monasteries or castles of the nobility, there emerged gardens with richer content and diverse forms. Elements like pruned and shaped trees, shrubs, lawns for sitting and fountains of various colours and shapes, were preserved and further developed during the Renaissance. Medical practices in the medieval period also gradually advanced with the translation of ancient classical works, doctors' exploration and research in medical knowledge, and the care provided by monks to patients. People increasingly realized that besides prayers in the church, creating a pleasant physical and mental environment played a role in saving individuals spiritually. This laid the foundation for the later rise of humanism and the development of therapeutic landscapes.

The origins of Western therapeutic landscapes can be traced back to the monastery landscapes of the Western Middle Ages. During this period due to the rise of religious power and the fusion of divine authority with secular authority, the development of Western medicine was greatly constrained. Religion replaced the simple medicine of antiquity, becoming the primary avenue for seeking treatment and also provided an opportunity for the integration of medicine with landscapes. Psychologist Carl Jung once pointed out "Religion is a system of spiritual healing" so, for Westerners religion is their primary spiritual support.

The life of Western European monasteries began around the 6th century initiated by St. Benedict (480-547), the founder of the Catholic monastic system and the Benedictine Order. In the monastery people found temporary tranquillity and solace within the embrace of religion. To confront various physical illnesses monasteries established hospitals, wards, intensive care units and infirmaries, and cultivated medicinal herb landscapes for the treatment of diseases. Patients could receive treatment in these places and their rooms were close to sunny courtyards for walking and relaxation. Here, individuals suffering from both physical and mental illnesses could receive care.

From the surviving site plan of the St. Gall Monastery (Figure 11) in Switzerland (drawn between 820-830 AD) it can be seen that the design of the monastery was highly intricate. In fact, the monastery was not only a place for prayer but also a comprehensive community, including various functional areas for medical care, learning and living. The herbal therapeutic landscape was designed for patients meeting their medical needs and providing them with spiritual solace.

Figure 12: Master plan of Therapeutic landscape in St. Gall Monastery
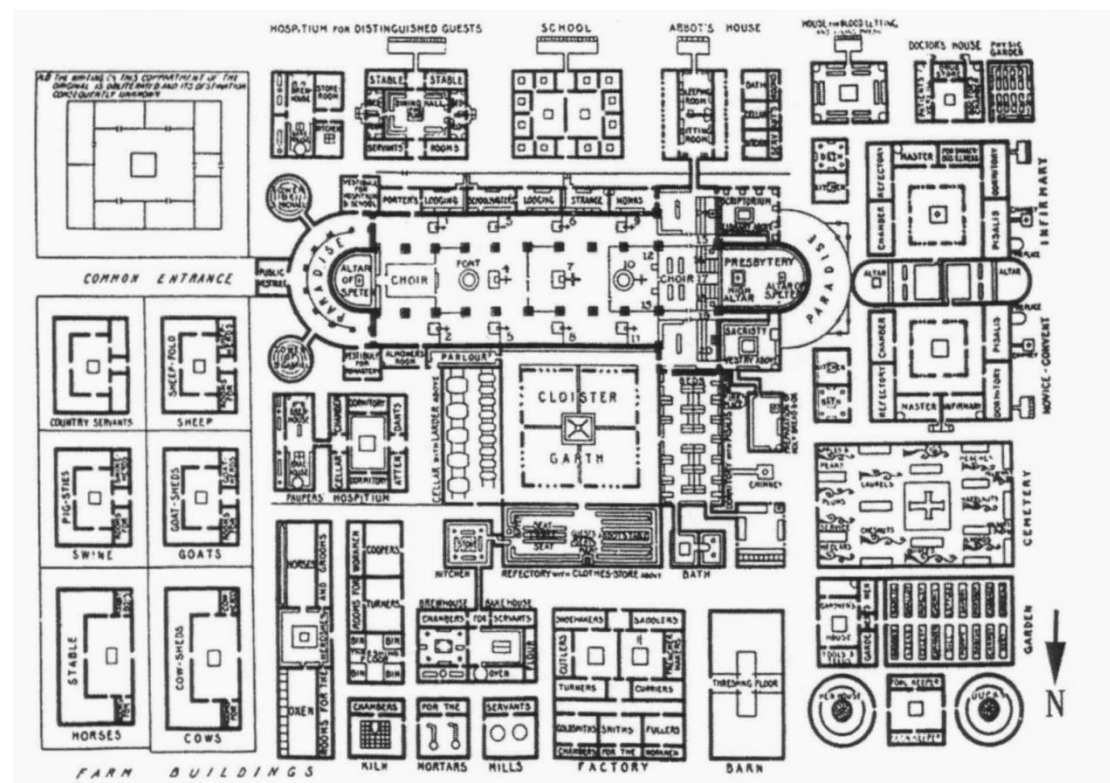
By Jiang Ying(2011).

The combination of the spiritual impact of religion within monasteries and the practical therapeutic function of hospitals had a significant influence on people's lives. For a considerable period thereafter this dual comfort and treatment addressing both the spiritual and physiological aspects, brought hope to people during the slow development of medicine in the Middle Ages. This combination of landscapes with a religious or suggestive nature and medical facilities laid the groundwork for the development of therapeutic gardens. St. Bernard (1090-1153) described his goal for the infirmary at Clairvaux in France: "Here, surrounded by many small trees, a pleasant grove is formed. The patient sits on a lawn as lush as moss, feeling safe, secluded and shielded from the blazing sun. This soothes the pain in his body, the lawn diffuses fragrance in his nose, lovely green grass and trees nourish his eyes, the melodious songs of beautiful birds gently touch his ears and the earth exudes a rich aroma, allowing the weak-bodied individual to experience the delight of colour, song and fragrance through his eyes, ears, and nose"[30]. Evidently the sensory pleasure brought about by the gardens described by these patients is similar to the reactions of modern hospital garden users in subsequent years (Cooper Marcus & Barnes, 1995).

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[30] Jiangying. (2011). The Origin of Healing Landscape [PhD dissertation, University of Being Forestry, p.51.

In the 14th and 15th centuries, due to the recurring outbreaks of plagues leading to agricultural declines, a large influx of immigrants entered cities resulting in a reduction in the medical services provided by monasteries. At the same time with the decline of monasteries therapeutic gardens began to be overlooked by people. For instance, the most influential Ospedale Maggiore Hospital (1948) in Milan had a cross-shaped floor plan resembling the central nave of a church with windows so high that it was impossible to see outside. Thus, within the traditional context of urban church institutions and Roman Catholicism, one of the primary motivations for designing long-term wards for the care of patients was to establish an environment where every patient in every bed could watch a priest conduct a Mass. However, some hospitals continued the tradition of having courtyards. Many hospitals still maintain the tradition of having courtyards, like l*es Invalides in Paris* (1671) planting a row of trees in the central courtyard. John Howard, a reformer of hospitals and prisons in England, described the gardens used for patients in hospitals in Marseille, Pisa, Constantinople, Vienna and Florence: "In all these hospitals, he envies the fresh air flowing in the air. Patients can see the garden through their windows and doors, and give recovering patients the opportunity to enter the garden[31]". The spirit of Christian charity and the religious mission to save souls led to the birth of therapeutic landscapes (Jiang , 2011).

2.7 Current Status of Therapeutic Landscapes

Previous paragraphs display historical evolution of therapeutic landscapes through the lens of Chinese and Western medicine and landscape culture. This subchapter critically analyses the current research on therapeutic landscape in China and West.

This exploration aims to facilitate a comprehensive understanding of the developmental trajectories.

The development of science and technology, the use of computers and the digitization of literature facilitated the visualization of the current research on therapeutic landscapes using Citespace. Despite the widespread belief in nature's inherent healing properties, research and development of therapeutic landscapes as a therapy did not truly begin until the late 20th century. The volume of research on therapeutic landscapes significantly increased since then, especially in the early 21st century. However, research on this topic is highly interdisciplinary and exhibits significant differences between China and Western countries. To visualize the current research trends in therapeutic landscapes within and outside China, a comparative analysis was conducted using the CNKI and Web of Science (WOS) databases to create a knowledge map.

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[31] Jiangying. (2011). The Origin of Healing Landscape; PhD dissertation, University of Being Forestry, p.56

To ensure data accuracy and reliability, searches were conducted in two databases—China National Knowledge Infrastructure (CNKI) and WOS—limited to papers published between 2013 and 2022. The searches were conducted in July 2022 and were restricted to English papers using keywords such as "therapeutic landscape", "healing garden" and "restorative landscape". A total of 591 papers were found in WOS and 691 papers were found in CNKI using the Chinese term "康复景观" (rehabilitation landscape).

For data analysis CiteSpace was utilized—a Java-based application that employs social network analysis and cluster analysis to explore and visualize scientific literature data. CiteSpace allows in-depth exploration of co-citation data, investigates the knowledge structure of relevant fields and identifies research development trends and key points in scientific literature. It serves as a powerful tool for exploring the dynamics of professional fields by displaying information from the temporal evolution of research frontiers to their knowledge bases.

To ensure compatibility with CiteSpace analysis Chinese papers from CNKI were exported in refwork format and English papers in text format. These datasets were then transformed using CiteSpace Version 6.1.R3, wherein "node types" were set to keywords to calculate and present keyword maps of relevant research in China and other countries. The font size and circle size around each keyword in the map represent the frequency and centrality of that keyword in the research.

2.7.1 In China

Chinese studies (Figure 12) have focused on horticultural therapy, therapeutic landscapes, therapeutic gardens, the elderly, landscape architecture, landscape design, design strategies and forest therapy. Meanwhile, overseas papers also emphasized horticultural therapy and therapeutic landscapes, but focused more on more specific topics such as stress reduction, ethnobotany and patient experience. In addition, overseas studies are more interdisciplinary and practical. Chinese papers, on the other hand, are more general and theoretical especially in the areas of strategy and design. It is worth noting that forest therapy is a well-established area of research in therapeutic landscapes in Japan and Germany, but it is an area that has only recently become a research hotspot in China. Therefore, China lags behind in therapeutic landscape research compared to other countries. Table 1 offers translation of the themes from Chinese into English.

China has a high Betweenness Centrality and high frequency of keywords (table 3) in terms of research focus on horticultural therapy (0.53,163) where 0.53 is the Betweenness Centrality value ranging from 0 to 1. When the value is 1 it means that the keywords are fully associated with therapeutic landscapes and the number 163 indicates the number of papers that had the therapeutic landscape keyword set. Therapeutic Landscape (0.43,153), Therapeutic Gardens (0.39,118) and Landscape Architecture (0.23,78).

Figure 13: Research Trends of Therapeutic Landscape in China
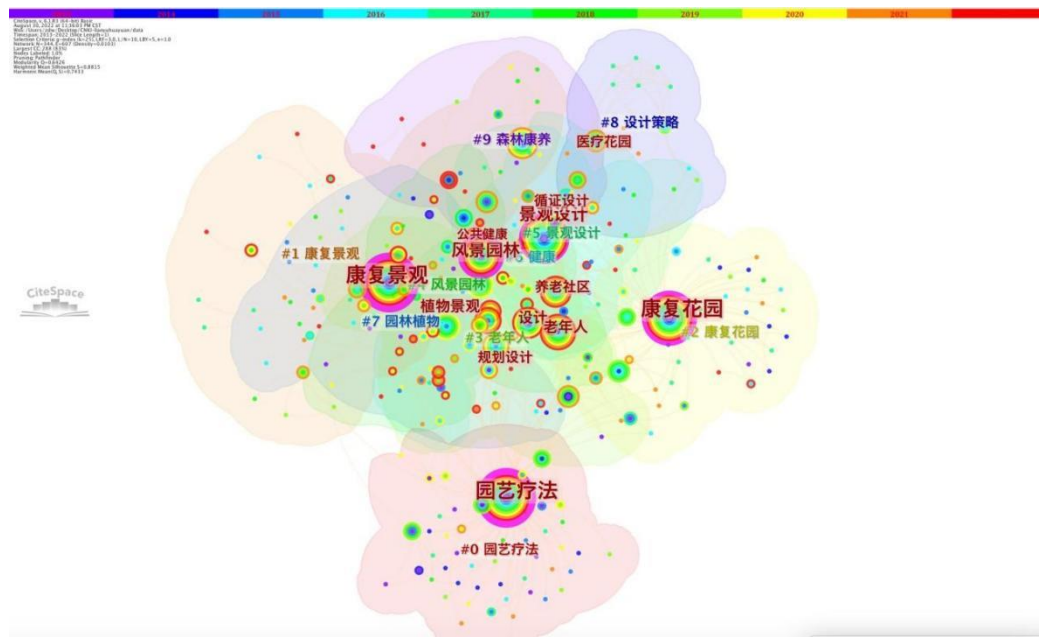
By Bao Guotai (2023)

Table 2:Translation of the words

Translation of the Word		
Numbering	**Chinese**	**The meaning of words in English**
0	园艺疗法	horticultural therapy
1	康复景观	therapeutic landscape
2	康复花园	therapeutic garden
3	老年人	the old
4	风景园林	landscape architecture
5	景观设计	landscape design
6	健康	health
7	园林植物	landscape plant
8	设计策略	design strategy
9	森林康养	forest therapy

By Bao Guotai (2023)

Table 3：Between centrality, frequency display by different keywords in China

Co...	Ce...	Year	Keywords	
163	0.53	20...	园艺疗法	Horticultural therapy
153	0.43	20...	康复景观	Therapeutic landscape
118	0.39	20...	康复花园	Therapeutic garden
78	0.18	20...	景观设计	Landscape design
52	0.23	20...	风景园林	Landscape architecture
26	0.07	20...	设计	Design
24	0.03	20...	老年人	The old
20	0.10	20...	植物景观	plant landscape
17	0.05	20...	养老社区	Community-based old Care
14	0.02	20...	康复	Rehabilitation
14	0.07	20...	规划设计	Plan and design
13	0.05	20...	循证设计	Evidence-based design
12	0.03	20...	医院	Hospital
12	0.03	20...	森林康养	Forest therapy
11	0.02	20...	公共健康	Public health
11	0.03	20...	植物配置	Plant arrangement
11	0.00	20...	适老化	Elderly-oriented
10	0.03	20...	健康	Health
10	0.01	20...	五感体验	Five sense experience

By Bao Guotai (2023)

Despite China's growing national power and economic progress in recent decades, the country previously placed more emphasis on infrastructure development due to factors such as its economic situation. As a result, most research in landscape design has focused on the theoretical aspects lacking the economic resources and equipment needed to conduct experiments and applications.

Figure 13 shows that plant design (2019-2022), forest therapy (2020-2022), knowledge mapping (2020-2022), research advances (2020-2022), public health (2020-2022) and mental health (2020-2022) have emerged as popular topics of research in China and that the focus on public and mental health may be related to the COVID-19 pandemic.

Figure 14: Keywords with the Strongest Citation Burst

	Keywords	Year	Strength	Begin	End	2013 - 2022
Evidence-based design	循证设计	2013	2.38	**2013**	2015	
Horticultural activity	园艺活动	2013	1.77	**2013**	2014	
Horticultural therapy	园艺治疗	2013	1.75	**2013**	2015	
Medical landscape	医疗景观	2013	1.64	**2015**	2017	
Rehabilitation	康复	2013	1.97	**2016**	2018	
Landscape	景观	2013	2.94	**2017**	2018	
Design	设计	2013	3.71	**2018**	2019	
Plant arrangement	植物配置	2013	3.04	**2019**	2022	
Plant	植物	2013	1.6	**2019**	2020	
Forest therapy	森林康养	2013	2.47	**2020**	2022	
Research progress	研究进展	2013	2.42	**2020**	2022	
Knowledge graph	知识图谱	2013	2.42	**2020**	2022	
Public health	公共健康	2013	2.15	**2020**	2022	
Psychological health	心理健康	2013	2.01	**2020**	2022	

By Bao Guotai (2023)

In summary, therapeutic landscape research in China remains slower to develop than in other countries, despite the fact that Chinese research topics tend to follow overseas findings. Most published papers in China summarize previous work and describe the relevance between authors and papers, but there is a lack of foundational breakthroughs in therapeutic landscape research.

Current Research in China on therapeutic landscapes started late and scholars mainly began to focus their main efforts on analysing Western literature. According to Luo Yun (1997), green hospitals in China should utilize forests and medical services to complement each other in order to create a sustainable mechanism for hospital environments. Li Shuhua (2002) published two series of papers to establish the theory and practice of horticultural therapy suitable for the Chinese situation. He was the first scholar to introduce horticultural therapy to China and the paper covered the history and current status of horticultural therapy in the United Kingdom, the United States and Japan.

Chi Daiwei (2007) summarized the differences between Eastern and Western medical treatments. Historically, people have lived longer by engaging in nature-based activities. However, philosophies and ideas were different in the ancient West and East. As a result, attitudes towards medical treatments differed. Chinese medicines were more inclined to prevent diseases, while Western medicines were more inclined to cure them. In this context Taoist monastic gardens and Buddhist Zen gardens were formed in China while in contrast, labyrinths and prayer gardens, sacred forests, monastic herb gardens and hospitals were formed in the West. He also summarizes

how people can heal from different fields of study - ergonomics, rehabilitative psychology, behavioural psychology and botany - and concludes with specific and effective treatment protocols for patients.

Huang Shuzhen (2008) discusses strategic guidelines for urban healing landscapes. Su Peng (2009) mentions the application of healing landscapes in the perspective of Chinese medicine summarizing many design methods and design principles, spatial planning and design based on Feng Shui concepts. Incorporating Taoist-related exercises into the design of hospital outdoor spaces will be more beneficial to patients.

The Chinese Association of Landscape Architecture has added a special section devoted to healing landscapes to Volumes VII and VIII of Chinese Gardens. Ying Jiang (2010) wrote a paper on the origins and development of healing gardens. She says that the healing landscape did not appear by accident. It reflects people's pursuit of health and a better life. For both East and West gardens represent a yearning and expectation for an ideal life. With the goals of landscape and medical science so aligned, it was only a matter of time before healing landscapes emerged.

Liu Boxin and Li Shuhua (2012) published a paper on exploring and analysing therapeutic landscapes looking at Chinese landscapes from a neuroscientific perspective, which offers more possibilities for future research on therapeutic landscapes. Since 2013 the number of papers related to therapeutic landscapes has increased rapidly. In order to better summarize the current situation, we selected 16 papers from different years and filtered them according to their impact and co-citation index.

Summarizing these 16 papers from the perspective of research methodology (Table 2), included six empirical studies, four literature studies, four case studies, and four papers translated from English into Chinese. According to Jiang Shang (2013), in China research methods for healing gardens are mainly literature reviews and case studies and very few studies use evidence-based design methods or controlled trials. However, in recent years researchers in China have increasingly focused on evidence-based research methods and, since 2013 six out of 16 major papers have been empirical studies. These studies combine a phenomenological approach with a rigorous scientific method, as shown in a 2019 paper written by Yuehua. The paper utilized traditional Chinese medicine practices and applied the scientific method to track patients' recovery and health improvement. The Chinese researchers also effectively combined evidence-based design and post-assessment methods as demonstrated in a paper by Yue Hua in Chinese Gardens. Although Citespace was widely used in the Healing Gardens Research Literature Study, it has had little impact in subsequent research due to low citation rates (Lai, 2021).

Hanna (2019) identified three approaches to literature reviews - systematic, semi-systematic, and synthesis - and used these approaches to analyse literature review studies of healing gardens. Her analysis found that the most influential early literature reviews were the systematic and semi-systematic articles by Hou Yang (2014) and

Ruben (2014). Until 2020 only Li Shuhua published a comprehensive literature review on healing gardens. As scientific research methods evolved more tools were introduced to aid literature reviews, such as Citespace in healing garden research (Lai, 2021).

Case studies, such as the project (2022) case study paper on spa parks in Germany, have been shown to motivate and inspire landscape architects to design therapeutic landscapes. In addition, since 2009, China Garden, the most influential Chinese journal in the field of landscape architecture, has edited a feature on healing gardens. From 2013 to 2022, four of the 16 major papers published in Chinese Gardens present the results of healing garden research in Western countries (Yang, Zhao 2013; Hou Yang, Zhao Xue 2014; Ruben 2014; Liu C 2020) suggesting that Western findings have had a significant impact on research in China. The researchers focused on four main areas when the papers were researched: areas of focus, research methodology, key findings and design recommendations. The 16 papers were summarized and integrated based on these four areas, and the results are displayed in Table 4.

Table 4: Detail of the 16 papers

No.	Source type	Author	Focus area	Research method	Major findings
1	Article	Hu hui,Zhai Y(2013)	A Study on Behaviour System and Spatial pattern of Community-based Day Care Centre for the Aged	Case study: daycare centre cases in America, Germany, and Finland365	It discusses design methods and patterns of daycare centres in response to facilities and behaviour systems of users to integrate user, spatial environment and service in design
2	Translated Article	Yang C, Zhao Q(2013)	Healing Garden of Danderyd in Sweden	Case study: Healing Garden of Danderyd in Sweden	introduce the development of healing gardens in Sweden and promote the research and construction of healing gardens in China.
3	article	Hou y, Zhao x （2014）	Evolution of Western Landscape Architecture Based on Health-trend	Literature review	Tracing back Western health-trend landscape history to promote fast development of health-trend landscape in China.
4	Translated Article	Reuben M(2014)	The Return of Garden to High-Tech Medical Facilities in the United States	Literature review	Gardens and other types of spaces such as parks and nature preservation have positive health benefits to the methodology of the social sciences
5	Article	Wang M, Yang F, (2016)	Ecological benefits of plant community in Shenzhen Healing Garden	ecological experiments targeted at health protection functions	20 plant communities constituted of individual plants with high ecological benefits in five parks and green spaces in three affiliate hospitals were selected as research objectives to screen suitable plant communities by an evaluation system targeted at health protection functions
6	Article	ZHAO F，ZHANG Z(2016)	On Ecological, Sociological, and Physiological Mechanisms of Horticultural Therapy in the Treatment and Rehabilitation of Children with Autism Spectrum Disorder	Literature review	Analyzing the various forms and multiple mechanisms of horticultural therapy in the treatment and rehabilitation of children with ASD, provides a complete theoretical basis, aiming at promoting the development of Chinese horticultural therapy and relevant clinical research and applications.

7	Article	LI D; ZHANG Q(2017)	Preliminary study of traditional Chinese flowers and horticultural therapy	Literature review	Promote the development of horticultural therapy in China by exploring the correlation between Chinese traditional flowers, represented by the top ten famous flowers, and horticultural therapy.
8	Article	Li S Hua, Liu C,(2018)	Therapeutic Landscape Research Fronts: Hot Issues and Research Methods	Literature review	The establishment of a theoretical and practical system based on oriental culture, studies related to landscape architecture, and a practice-improving evaluation system.
9	Article	Yue H, Zhao J,2019	Research on Health Gain of Healing Garden Participatory Design Based on Constitutionology of Chinese Medicine	Experiments and Chinese medicine questionnaire (CCMQ)	Through qualified and quantified Chinese medicine experiments, data have shown that the healing garden participatory design is effective or the health gain of 45~70-year-olds
10	Article	Liu C, Li S (2020)	Review of Restorative Natural Environment under Multidisciplinary Perspectives	Literature review	Rresearch prospective concluded according to a synthesis analysis of disciplinary backgrounds, research levels, methods and research conclusions for the relative research in recent 40 years
11	Article	Li Xue, Huang Q, (2020)	research on the physical and psychological health effect of the horticultural plant cultivation activity on the elderly with dementia	Designated experiments using systematic physiological Indexes and psychological indexes	a course in horticultural plant cultivation activity positively improves the positive emotions of the elderly．Compared with seeding，the thinning activity can make the male elderly with dementia more relaxed
12	Article	Yang R, Li S(2020)	Comparative study on the effect of flower arrangement on the emotions of four types of elderly	Designated experiments	In terms of the changes in ECG and EEG Indicators, the result shows that a flower arrangement can make the elderly feel relaxed，and this relaxation is unrelated to disability，dementia and isolation.
13	Article	Zhang w, Liu H (2020)	Effect of strawberry Gardening on autonomic nervous response and emotion of people long term.	Designated experiments using the POMS scale and salivary cortisol density	Emotion and autonomic nervous responses of humans who stay indoors for a long time would be affected by strawberry gardening, and there is a correlation between emotional changes and autonomic nervous responses
14	Article	Li shu, Huang Q(2020)	A review of effects of horticultural intervention based on quantitative measurements of health and well-being of the elderly	Literature review	Future research or practices of using horticultural activities to improve the health and well-being of the elderly could gain powerful insights from this review．
15	Article	Lai W(2021)	Analysis of Domestic Hospital Landscape Research Trends in the Perspective of Healthy China: a Visualized Analysis Based on Citespace	Scientometric analysis, literature review	1) The hospital landscape has changed from focusing on a single greening function to a multi-function.2) The research method has changed from theoretical case interpretation to qualitative and quantitative analysis development.3) The disciplinary backgrounds of research scholars are diversified.
16	Article	XIANG P, HUANG Q, （2022）	German Health Resort (Kurort) and Spa Park (Kurpark): The Formation, Evolvement, Space Pattern and Landscape Design Feature	Case study: spa park in Germany	In conclusion, the experience of the German spa park should be suggested as a reference for the current development of small towns, particularly the planning of health towns in China.

By Bao Guotai (2023)

2.7.2 In West

Western therapeutic landscape research (Figure 15) has focused on green infrastructure, stress reduction, cannabis, ethnobotany, complexity, quality of life, therapeutic alliances, horticultural therapy, and patient experience. In the West, research was evenly distributed across different related topics: health (0.03,95), therapies (0.08,84) and landscapes (0.09,77). In order to show the research trends more clearly, we performed a cluster analysis of the keywords, as can be seen in Figures (1-1 and 1-2), where the modularity Q = 0.5372 (WOS), Q = 0.6426 (CNKI), and the mean contour S = 0.8318 (WOS), S = 0.8815. When Q is greater than the critical value of 0.3 (Q ≥ 0.3) and S is greater than the critical value of 0.5 (S ≥ 0.5) the clustering results are significant and valuable.

In the Western context concerning higher Between Centrality and keyword frequency, the research focus on therapeutic landscapes appears relatively even. Among them, the proportion of "Therapeutic landscape" is (0.08, 84) with a Betweenness Centrality value of 0.53 ranging from 0 to 1. A value of 1 implies complete association between the keyword and therapeutic landscapes, while the number 84 indicates how many papers included the keyword "therapeutic landscape" during that period. "Healing Garden" (0.04, 52), "Mental health" (0.08, 25) and "Experience" (0.13, table 5) are also keywords mentioned within the research context.

Figure 15：the therapeutic landscape research trend in Oversea
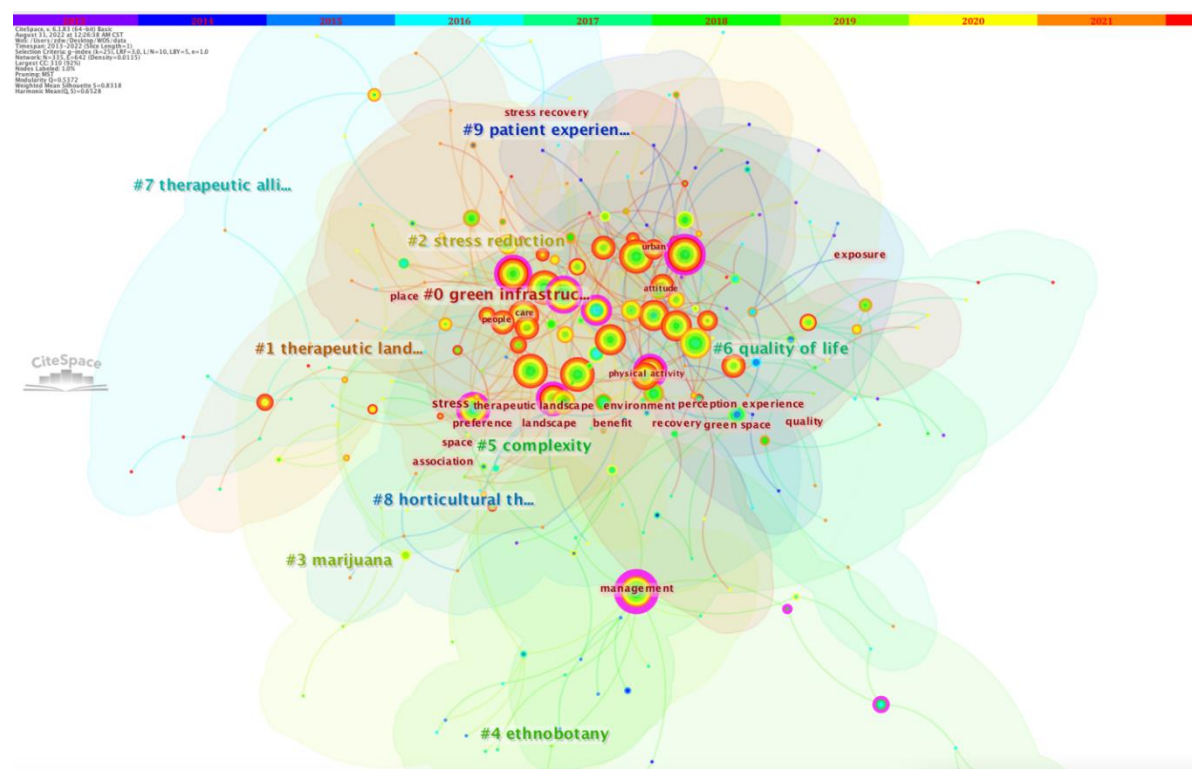
By Bao Guotai (2023)

Table 5：Therapeutic Landscape Research Trend overseas

Count	Centrality	Year	Keywords
95	0.03	2013	health
84	0.08	2013	therapeutic ...
79	0.09	2013	landscape
77	0.09	2013	environment
58	0.04	2013	benefit
52	0.04	2013	healing gar...
48	0.07	2014	recovery
48	0.14	2013	perception
46	0.12	2013	place
39	0.06	2015	preference
38	0.12	2013	stress
35	0.06	2013	green space
34	0.13	2014	experience
33	0.07	2014	care
30	0.08	2014	quality
30	0.06	2013	exposure
28	0.08	2013	physical acti...
27	0.11	2013	geography
26	0.15	2013	space
25	0.08	2017	mental health

By Bao Guotai (2023)

Studies in west have shown (Figure 16) that community gardens (2014-2017), medicinal plants (2015-2018) and healthcare (2015-2018) are the research topics with the longest citation peaks, whereas green spaces (2020-2022) and urban parks (2020-2022) have become popular research topics, which may be related to the COVID-19 pandemic. In contrast, studies in China showed that evidence-supported design (2013-2015) and horticultural therapy (2013-2015) were research hotspots until 2015. However, evidence-supported design was not considered as a research topic in overseas studies between 2013 and 2022.

Figure 16：Top14 Keywords with the Strongest Citation Burst Overseas

Keywords	Year	Strength	Begin	End	2013 - 2022
geography	2013	4.15	**2014**	2016	
community garden	2013	2.38	**2014**	2017	
united states	2013	2.67	**2015**	2017	
medicinal plant	2013	2.52	**2015**	2018	
place	2013	2.41	**2015**	2016	
attention	2013	2.22	**2015**	2017	
health care	2013	2.16	**2015**	2018	
horticultural therapy	2013	2.37	**2016**	2018	
therapeutic garden	2013	2.18	**2016**	2018	
urban environment	2013	2.78	**2017**	2018	
city	2013	2.6	**2017**	2018	
ecosystem service	2013	3.03	**2018**	2020	
green	2013	2.75	**2020**	2022	
urban park	2013	2.46	**2020**	2022	

By Bao Guotai (2023)

3. Therapeutic Landscape Character and User Needs

The preceding subchapter provides an analysis of the historical development and current status of therapeutic landscapes, focusing on both China and the West. This subchapter aims to delve into the therapeutic landscape's character, user needs and design approaches. By demonstrating significant events, theorists and publications pertaining to therapeutic landscapes over the past five decades, the main focus will be on elucidating the therapeutic landscape design approach.

3.1 Character of Therapeutic Landscape

Therapeutic landscapes are not only naturally occurring refuges but are often carefully designed in healthcare settings. They play an important role in a variety of medical contexts (Marcus, 2004). These spaces vary in form and function. Therapeutic landscape offers variety of interactions, both passive and active. For example, quietly observing one's surroundings is a passive interaction, whereas engaging in gardening activities is considered an active interaction. In addition, there are landscapes

supervised by therapy professionals that emphasize specific activities and exercises. Therapeutic landscapes not only provide medical effectiveness for patients, but also enhance the physical, mental and spiritual well-being of all users in the context of health promotion. In therapeutic landscapes other factors besides healing are considered. For example, in dermatology hospitals landscape design must prioritize protection from direct sunlight and UV exposure. In psychiatric hospitals the richness of landscape elements such as canopy and species diversity, need to be reduced to minimize patient irritation. In landscape design related to medical rehabilitation, Sun's (2021) study categorized the intensity of treatment, specialization and level of care into three tiers. The first tier involves the provision of high-intensity medical care in environments such as hospitals. The second tier focuses on providing medium-intensity care in places such as senior care centres or nursing homes. The third tier aims to provide general therapy services to the public in places such as parks and gardens with well-being enhancing power. These three tiers are considered as therapeutic landscapes and following research would give further explanation. Last but not least, we need to understand that therapeutic landscape is a continuous and dynamic development process. It evolved from a general landscaping tier 1 into therapeutic landscapes with specific therapeutic effects, categorized as therapeutic landscapes tier 1 and tier 2. Therefore, research on the therapeutic effects of general landscapes forms the foundation for shaping tier 1 and tier 2 therapeutic landscapes .

Figure 17:The tiered levels of medical care in therapeutic landscapes.
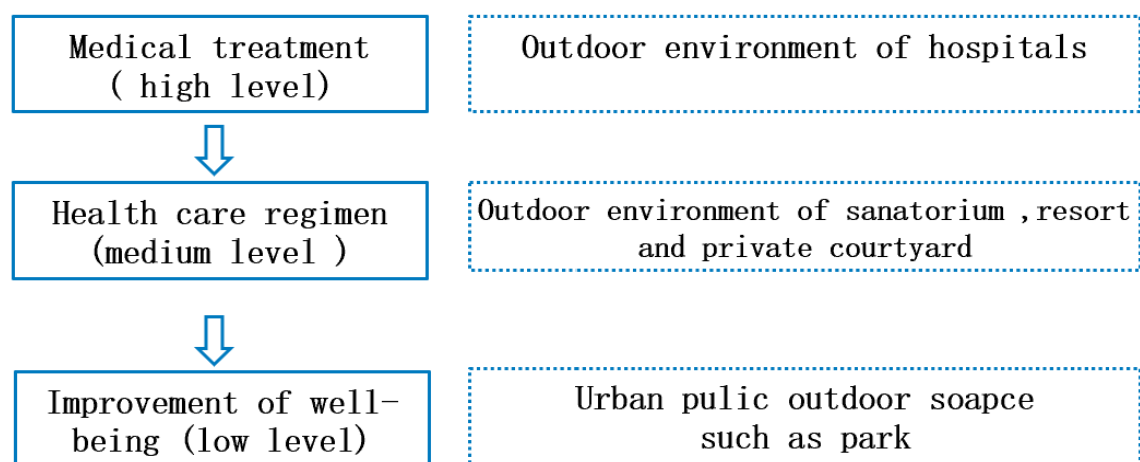
By Bao Guotai (2023)

3.2 User Need of Therapeutic Landscape

In the field of therapeutic landscape design the primary focus lies in meeting the needs of patients and vulnerable groups. Following closely are considerations for healthcare professionals, family members and individuals in suboptimal health conditions. Additionally, therapeutic landscapes must be specifically equipped to address the requirements of particular diseases and conditions. Based on Maslow's hierarchy of needs (1943) which illustrates a range of needs individuals possess, including

physiological, safety, love, esteem and self-actualization (figure 1); patients and vulnerable groups' needs are given the highest priority within the framework of Maslow's theory and the unique attributes of therapeutic landscapes. This means creating spaces that cater to their precise medical and health-related needs—forming the cornerstone of therapeutic landscape construction. Different groups encompass patients, vulnerable groups, healthcare professionals, and visiting family members.

Figure 18：Users Need Pyramid in Therapeutic landscape.

By Bao Guotai （2024）based on Maslow's hierarchy of needs

Considering our research focus on therapeutic landscape design for old-care facilities, the primary vulnerable group is the elderly. Given their limitations in mobility and physical strength, providing comprehensive accessible pathways, safety handrails, and

optimizing automatic door systems becomes essential. Moreover, the needs of healthcare professionals visiting family members need careful attention.

Addressing the needs of healthcare professionals and visiting family members carries multiple benefits. This includes enhancing efficiency and psychological well-being for healthcare workers, improving emotional and mental health for family members and fostering a more positive impact on patients and vulnerable groups. These outcomes involve reducing hospitalization and rehabilitation durations, diminishing feelings of loneliness, enhancing a sense of belonging and continuously improving the meaning of life. For instance, providing independent or enclosed spaces for healthcare workers and visiting family members to accompany patients is crucial since hospital environments are often crowded and noisy, especially in densely populated countries like China.

One aspect often underestimated in therapeutic environment design is skilfully managing specific diseases or conditions. Different diseases require tailored therapeutic approaches. Understanding how different design elements contribute to creating environments conducive to improving the health conditions of diverse patient groups is crucial (Westphal, J. M., 2018). For example, in geriatric care facilities targeting elderly populations, dementia is a prevalent condition. Therefore, outdoor healthcare spaces need simplified pathway designs, clear signage and moderately intense physical activity or recreational areas to reduce the likelihood of dementia episodes and alleviate concerns among the elderly. In summary, aligning with Maslow's model, the needs of users in therapeutic landscapes correspond to Maslow's hierarchy of needs theory as illustrated in figure 18 (Sun, 2021).

Figure 19 diverse needs of different users in therapeutic landscape

Adopted Sun (2021)

89
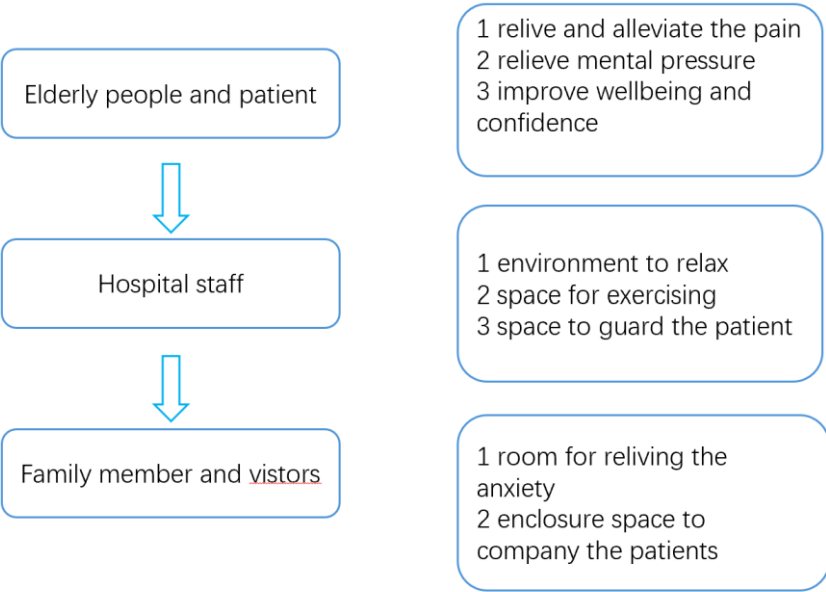
4. Important events and publications on Therapeutic Landscape in last 50s.

In the 1970s based on medical sociologist Aaron Antonovsky's "Theory of Physical and Mental Health" and other cognitive scholars' research, the "Environmental Behaviour Model" was invented. Roger Ulrich (1981), Mr. and Mrs. Kaplan (1983) and Clare Cooper Marcus (2014) developed the theory of healing landscapes incorporating evidence-supported design from an environmental psychology perspective. The theory of evidence-supported design is a combination of quantitative and qualitative methods from environmental psychology and evidence-supported medicine. Additionally, therapeutic landscapes were originally studied by medical geographer Wilbert M. Gesler (1996) and other human geographers examined how therapeutic landscapes affect psychological and spiritual aspects.

Roger Ulrich (1961), the founder of evidence-supported design for therapeutic landscapes, showed that natural landscapes, including water and greenery are beneficial to people. It helps release mental and physical stress. He (1961) compared two groups of patients after cholecystectomy. The only difference between the two groups of patients was that the first group had a view of nature through a hospital room window, while the second group faced only a brick wall. The results showed that the patients facing the natural landscape had fewer complications, took fewer medications and recovered more quickly. Stephen Kaplan (1983) and Jane Talbot (1983) from the University of Michigan developed the concept of restorative environments in 1983. The two scholars studied the effects of participants spending two weeks in nature. The results proved that restorative environments help alleviate negative emotions and improve mental and physical health. Kaplan (1989) proposed the Attention Restoration Theory (ART) in 1989. ART theory consists of four elements: away, range, attraction and compatibility. High intensity of the four elements will enhance the healing power of a restorative environment. These two theories support green spaces to improve mental and physical health. Based on the research of Roger Ulrich and Kaplan, Clare Cooper Marcus (1999) and Marni Barnes (1999) published "Therapeutic Gardens: therapeutic effects and design recommendations" in 1999. The book contains many case studies and provides advice and strategies on how to design therapeutic landscapes in different healthcare settings. Cooper Marcus and Naomi Sachs (2013) explain how to apply evidence-supported design methods to therapeutic landscape design, from concept to post-evaluation and also provide a comprehensive design guide for different users.

The American Horticultural Therapy Association (AHTA) was founded in 1973. They began publishing the Journal of Therapeutic Horticulture on a regular basis and partnered with the Chicago Botanic Garden and a number of universities to create the Horticultural Therapy Degree, a scientific degree in which qualified graduates are Horticultural Therapists who understand the fundamentals and advancements of horticulture-related work and know how to develop a treatment plan based on the

user's health condition. The degree prepares professionals to work in hospitals, vocational training centres for the intellectually disabled, childcare centres, nursing homes, convalescent homes and veterans' hospitals, among others. In 1999, a digital platform for therapeutic horticulture (www.healinglandscapes.org) was created to share up-to-date knowledge and information about therapeutic horticulture case studies and research findings. The American Society of Landscape Architects (ASLA), which focuses on health, nature and therapeutic landscapes, created the Healthcare and Therapeutic Design Professional Practice Network (HTD PPN) related to horticultural therapy and has a committee for sharing the latest research findings and outstanding projects in therapeutic landscapes. Recently, as an emerging concept, therapeutic landscapes have shifted from holistic and broad scoping studies to thematic studies. Examples of excellent designs serving different user groups have emerged in different countries, such as the Maggie's Centres in Manchester and West London, and the McIntyre Arboretum in Charlottesville, Virginia, USA.

In addition to research on therapeutic landscapes based on evidence-supported design theory and environmental psychology, is another area of research related to health geography and medical geography. Wilbert M. Gesler (1993) examined the relationship between health, healing and place and developed the concept of therapeutic landscapes. Gesler (2018) defines therapeutic landscapes as places that restore mental and physical health in his paper "The Origins of Therapeutic Landscapes".

Gesler notes that landscapes help to improve mental and physical health. A therapeutic landscape is a place of healing power and a meeting point for historical events, beliefs, social interactions, personal experiences, and in some cultures religion.

Gesler (1993) applied quantitative research methods such as semi-structured interviews and participant observation to study healing landscapes in depth. The three best known case studies are Epidaurus in Greece, Bath in England, and Lourdes in France. Since the 1990s, Gesler has published more than twenty books related to healing landscapes and more than one hundred articles in nearly thirty different academic journals.

In a recently published paper Gesler (2017) reviews the origins, development, transformation and prospects of therapeutic landscapes. He suggests that therapeutic landscapes are not just products used to improve health but should be analysed and evaluated in terms of locations (such as hospitals, clinics, or residences) to determine if they meet the criteria for being healing spaces.

On the other hand, Gesler realized the limitations of qualitative research. In the study of physical, social, and symbolic contexts, specific data and figures can be easily calculated and quantified in physical settings, but not in social and symbolic contexts, where the indicators of data are numerous and complex. Therefore, Gesler applied qualitative research methods to deepen the understanding of social and symbolic

contexts. Therapeutic landscape theory has influenced a large number of health geographers such as Joseph Scarpaci, Robin Kearns, Alison Willians and Richard K Wilson.

In health geography research, researchers study therapeutic landscapes from anthropological and sociological perspectives. Health geographers focus more on the effects of nature on the mind. In this approach, they summarize key elements in therapeutic landscapes in Table 5.

Table 6: Therapeutic landscape research in Health Geography

Author	Theory	Focus level	Key element	Method	Publish time
Gelser	Therapeutic theory in health geology	Psychological and spiritual level	Beautiful natural environment,water,sense of place,relieve daily pressure,meaning of the place,territory,history background,controversial reality belief,philosophy, hope,perceptive,symbolism,healing god.	qualitative research	1992
Gelser	Case study of ep-idarumus in thera-peutic landscape of health geology	Psychological and spiritual level	Pilgrimage Supernature healing power Shared ceremony Origin of spiritual reality		1993
Gelser	Therapeutic land-scape theory in health geology. Lour-des,case study	Spirit level	Transformation in recovery	qualitative research	1996
Alisen williams	Application of thera-peutic landscape in holistic medicine	Psychological and spiritual level	Sense of place , meaning of the place,social relationship,super-nature healing power , symbolism	qualitative research	1998
Robin	Therapeutic land-scape theory in health geology . metaphor apply in children hospital design	Spirit level	the reputation of healing power of the site ,belief , philosophy , hope ,perceptive,symbolism	qualitative research	1999
Joseph	Therapeutic land-scape in post social-ism	Psychological and spiritual level	Sense of place , meaning of the place, social relationship,supernature healing power , symbolism	qualitative research	1999
Robin		spiritual level	Sense of place , meaning of the place, social relationship,supernature healing power , symbolism	qualitative research	2000
Richard will-sion	Genius loci and ther-apeutic landscape	Psychological and spiritual level	Sense of place , meaning of the place,social relationship,supernature healing power , symbolism	qualitative research	2003

By Bao Guotai (2023)

5 Therapeutic Landscape Design Approaches

Figure 20: Brief Introduction of Relationship between Therapeutic landscape approach and previous study
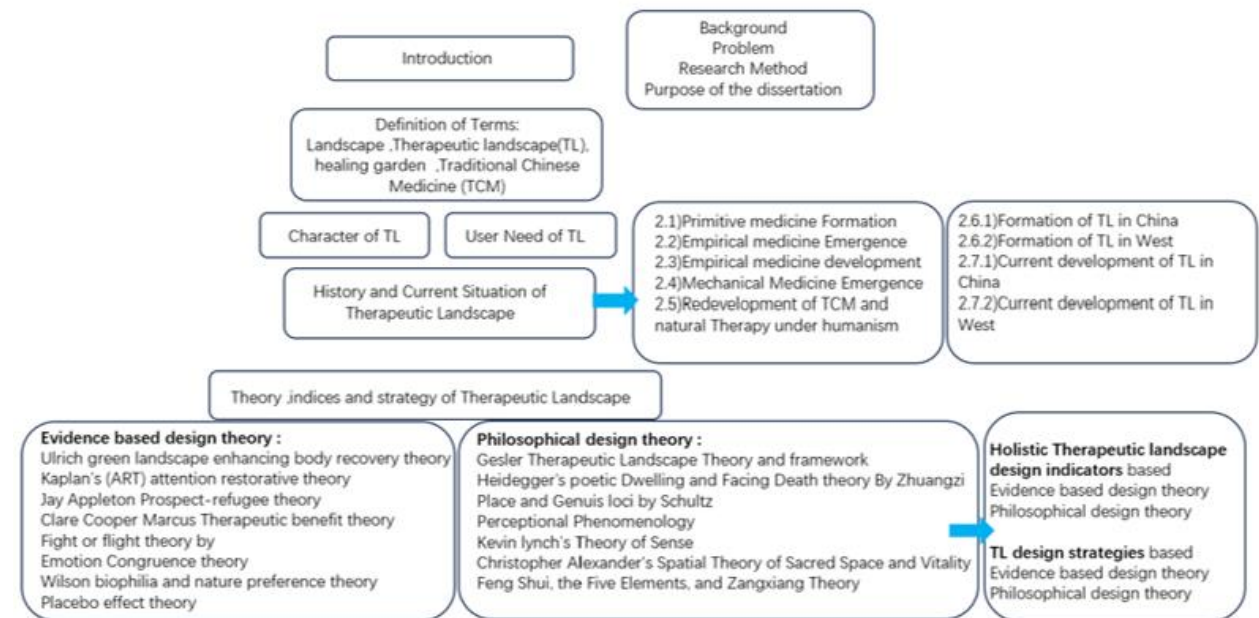
By Bao Guotai (2024)

Previous subchapter analyses the historical development of therapeutic landscapes and reviews the current status of therapeutic landscapes. Additionally, it highlights significant events and publications spanning the last five decades. Moreover, it scrutinizes the character and user needs in therapeutic landscape. From this analysis emerges a discernible pattern: each era has its scientific limitations and employing non-scientific philosophical methods can complement these scientific restrictions, enabling a more comprehensive understanding and exploration of therapeutic landscapes. In the realm of therapeutic landscape research, the scientific research methods of medicine have been supplemented by the philosophical methods of traditional Chinese medicine and natural therapy, yielding significant results. People sensed the benefits of natural environments, such as sunlight, plants, flowing water, despite being unaware of the existence of microbes. Our intuition was not mistaken, as subsequent theories like the germ theory and biophilia hypothesis have demonstrated the therapeutic benefits of nature on the human body. This highlights that the limitations of science can only prove certain aspects, prompting the conclusion drawn through the historical analysis of therapeutic landscapes in both Western and Chinese histories. This analysis concludes two methodological

approaches: evidence-based design approach from evidence medicine and philosophical approach in therapeutic landscapes.

Therapeutic landscape theories have been developed by these two approaches .

Evidence-based design refers to the role of the design in human recovery through empirical studies: observing patients' recovery states and changes, experimental evidence and inference. The following authors contribute to therapeutic landscape related theories based on evidence-based method.

A) Roger Ulrich

B) Stephan Kaplan and Rachel Kaplan

C) Jay Appleton

D) Clare Cooper Marcus

E) Walter Bradford Cannon

F) Silvan Tomkins

G) Edward O. Wilson

H) John Haygarth

The philosophical design theory in therapeutic landscapes involves exploring these landscapes through logical reasoning, conceptual analysis and discussions. It's based on non-biomedical models and evidence-based qualitative research. The following authors contribute to the therapeutic landscape related theories based on philosophical approaches.

A) Gesler

B) Heidegger and Zhuangzi's

C) Norberg-Schulz

D) Merleau-Ponty

E) Kevin Lynch

F) Cristopher Alexander

G) Guopu

H) Huangdi

These theories explained why and how therapeutic landscape positively impact human recovery from physiological, psychological and spiritual perspectives, forming

the theoretical foundation for building the indicators of holistic therapeutic landscapes(HTLD-indicators) and design strategies.

5.1 Evidence-based Approaches

The evidence-based approaches in therapeutic landscape refers to explore therapeutic effect on people through empirical research: questioning patients about their recovery status and observing their changes, experimental evidence and inferential deduction. It should also be clear that there are differences between the literature and actual design; so site-specific study is needed before design and none of any published research result would be suitable for all real design project. Thus, site-specific and user-specific is required in actual design phase.

The following theories are foundations of therapeutic landscapes with evidence-based approach.

5.1.1 Roger Ulrich

Based on Ulrich's groundbreaking research[32] and theory on therapeutic landscape (1984) as further expounded by Rehman in 2023, environments featuring vegetation and water bodies play a pivotal role in enhancing the overall physical and mental well-being of the general populace. Moreover, such spaces facilitate the expedited recovery of patients, leading to a reduced reliance on analgesics, minimized complications, improved mood, and enhanced flexibility of movement. This theory underscores the positive impact of natural elements on human health, advocating for the integration of green spaces and water features in both healthcare and public settings for holistic well-being.

According to Roger's research, we can summarize that physical and psychological recovery is better achieved in therapeutic landscapes that offer (1) a sense of control, (2) social support, (3) physical movement and exercise, and (4) positive natural distractions. We propose applying these four indicators to build Holistic Therapeutic Landscape Indicators (HTLD-indicators). When therapeutic landscapes score high on these indicators, users of these landscapes will have a positive mindset, improved mood, and better physical health. These research findings have been widely applied in the therapeutic landscape domain.

When therapeutic landscape exhibit high scores on the above indicators, users tend to experience a positive mindset, improved mood, and better physical health.

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[32] Ulrich, R. S. (1984). View through a window may influence recovery from surgery. Science, 224(4647), 420-421. https://doi.org/10.1126/science.6143402

Roger Ulrich's important study on the impact of window views on patient recovery popularized evidence-based design (EBD) and laid the groundwork for therapeutic landscapes. According to Ulrich's (1984) paper in Science, patients undergoing cholecystectomy with a view of vegetation were hospitalized for less time than those with a view of a brick wall, with an average length of stay of 7.96 days and 8.70 days per patient, respectively. Patients with a natural view of the landscape also required lower doses of analgesics, experienced fewer minor complications such as persistent headaches and nausea and received more positive comments from nurses during the postoperative period, including good mood and flexibility in activities. On the other hand, patients who saw a brick wall received more negative comments, such as being in a bad mood, crying and needing more encouragement. Ulrich's research has shown that exposure to the natural environment during surgical recovery has significant benefits for patients including shorter hospital stays, reduced doses of analgesics and fewer complications. At the same time, he was one of the first researchers to publish qualitative evidence in academic journals on how nature affects the health of people in hospitals. In his paper *Nature and urban scenes: some psychophysiological effects (1981)*[33]*,* he designed an experiment to examine the psychophysiological effects of three categories of outdoor visual environments (1) nature in watersheds, (2) nature dominated by vegetation and (3) urban environments without vegetation and watersheds. Each category set consisted of 60 slides. In the main experiment, subjects viewed the slide collection and recorded measurements of heart rate and alpha wave amplitude before, during and after slide exposure. Subjects rated their feelings before and after viewing using the Semantic Differences Scale and the Zuckerman Individual Response Scale (Zuckerman, 1977). Alpha wave amplitude was correlated with psychological stimuli. When alpha wave amplitude is relatively high, people feel relaxed and vice versa. Or, relatively more tense. The results showed that the mean values of alpha wave amplitude during the watershed and vegetation exposures were higher than during the presentation of the urban environment. People in urban and rural areas felt more awake and relaxed when viewing vegetation and watershed views, compared to viewing urban landscapes. People maintained more attention/interest on vegetation views and watershed views and less on urban views. It is widely recognized that leaving crowded urban areas for the countryside can be mentally, physically and spiritually restorative (Ulrich, 1997). His research has been experimentally demonstrated and developed by many therapeutic landscape scholars (McCarty,2000 & Berman,2015).

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[33] Ulrich, R. S. (1981). Natural Versus Urban Scenes: Some Psychophysiological Effects. Environment and Behaviour, 13(5), Page Range. https://doi.org/10.1177/00139165811350

Rachel and Stephen Kaplan' Attention Restoration Theory continues to build on Ulrich's theory.

5.1.2 Stephen Kaplan and Rachel Kaplan'

Based on Stephen Kaplan and Rachel Kaplan's environmental psychology theory, Attention Restoration Theory (ART), spending time in nature or observing therapeutic landscapes can help alleviate mental fatigue caused by prolonged work, study, or multitasking when these landscapes score high on coherence, legibility, complexity, and mystery. Therefore, these four ART-based indicators will be applied to construct Holistic Therapeutic Landscape Indicators (HTLD-indicators).

Mental fatigue differs from stress, which is caused by anticipated events perceived as threatening or harmful. Kaplan defines mental fatigue as directed attention used for mundane tasks. Engaging in interesting and enjoyable tasks requires voluntary attention and does not result in mental fatigue. For example, undergoing a wisdom tooth extraction might cause stress, but performing monotonous tasks over an extended period causes mental fatigue. However, voluntarily focusing on something interesting but not particularly challenging does not lead to mental fatigue, such as observing trees, flowers, and flowing water in nature.

As mentioned above, coherence refers to a harmonious environment where all elements are unified, like in theme parks or rock gardens. Legibility involves well-structured and easily understandable spaces that are navigable and recognizable, allowing objects to be identified and functional for any activity. Complexity is defined by the number of visual elements in the landscape, encompassing diverse plant life, colors, and varied outdoor furniture, offering possibilities for more activities and content. Mystery evokes curiosity and the desire to explore. To achieve this, cues encouraging exploration must be provided. For instance, pathways leading to more distant landscapes trigger a desire to explore. Conversely, closed-door houses do not attract exploration and are not considered good examples of mystery. The key is to provide cues that attract continued exploration. For example, a winding path leading to a bright area can create a sense of adventure and encourage exploration. Using (Figure 21) as an example, it is clear that the image illustrates the concept of mystery.

Figure 21 : Curve for attracting more exploration

By Neveln, V. (2019).

Based on the four elements of therapeutic landscape, Kaplan (1989) interpreted the characteristics of therapeutic landscape to be restorative, which aid in recovering from stress and mental fatigue as it has already referred.

Being away implies a mental separation from usual thoughts, concerns and physical environments, aiding in recovering from mental fatigue and stress. Extent encourages full engagement and involvement. This can be achieved through personal knowledge and imagination, such as immersive experiences in themed zoos or vast, boundless nature in small, designated landscape. In a natural setting, people can feel detached from everyday life and recover from mental fatigue.

Fascination means capturing attention effortlessly. In a restorative environment, attention doesn't require focus or direction. Fascination has two types: strong and soft. Strong fascination attracts attention through highly stimulating activities that don't offer reflection or introspection opportunities, while soft fascination attracts attention through less active or stimulating activities that provide opportunities for reflection and introspection. Natural environments offer soft fascination through their

light, water and breeze, encouraging individuals to contemplate and reflect on themselves.

Finally, compatibility is crucial for feeling pleasure and consistency in the environment. Individuals must choose to be there based on intrinsic motivations and personal preferences rather than external or imposed reasons. Higher compatibility occurs when engaged in familiar activities.

Therefore, when designing therapeutic landscapes, coherence, legibility, complexity and mystery should be considered as standards for psychological recovery.

5.1.3 Jay Appleton

According to Jay Appleton's "Prospect-Refuge Theory," when therapeutic landscapes provide a sense of safety and good visual experiences, users can achieve psychological recovery. Because the Prospect-Refuge Theory is widely applied and recognized in the field of therapeutic landscapes and evidence-based design, these two indicators are used to construct Holistic Therapeutic Landscape Indicators (HTLD-indicators).

In therapeutic landscapes, it's essential to design landscape where users feel safe while also having excellent visibility. For example, a bench placed in the corner in front of a large tree. The tree protects the user's back, its shade offers privacy and at the same time, it provides an excellent view to observe everything happening around.

In 1975, The British geographer and scholar Jay Appleton proposed Prospect-Refuge Theory, which suggests that humans seek spaces that satisfy their intrinsic desires within the environment [prospect] while feeling secure [refuge]. This theory is rooted in our evolutionary survival instincts, where predators needed to see prey without being detected (Figure 22). While we are no longer hunter-gatherers, our preference for aesthetically pleasing landscapes is still linked to our biological drive for survival.

Appleton's (1975) book *The Experience of Landscape*[34] explores people's preference for places where they can observe the surroundings (prospect) while feeling concealed (refuge). For instance, tired or sick individuals might seek a safer refuge. It also explains why certain landscapes are considered beautiful as they provide essential resources for our survival, such as secure spaces, food, water, light and air.

In conclusion, Prospect-Refuge Theory explains why humans find certain landscapes aesthetically pleasing, as they offer refuge, safe spaces and resources conducive to our survival. This theory holds significant importance in the design of therapeutic landscape, as designers should consider integrating elements that provide both

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[34] Appleton, J. (1975). The Experience of Landscape. Wiley, London

prospect and refuge to create an environment that is both aesthetically pleasing and fulfils biological needs.

Figure 22: Prospect-refugee Theory in Nature

By Slocombe, G. (2018) .https://landarchconcepts.wordpress.com/what-is-prospect-refuge/

5.1.4 Clare Cooper Marcus

Based on the research of Ulrich the Kaplans and Jay Appleton, Clare Cooper Marcus and Marni Barnes (1999) proposed guidelines for designing various types of therapeutic landscape based on extensive case studies and experimental data in their work *Healing Gardens: Therapeutic Benefits and Design Recommendations.*[35]. In 2014, they published a new book on therapeutic landscapes titled *Therapeutic Landscapes: An Evidence-Based Approach to Designing Healing Gardens and Restorative Outdoor Space*[36] which further expanded and developed their theory. Marcus introduced seven therapeutic elements that therapeutic landscape should possess: visibility, a sense of security, physiological comfort, opportunities for choice, interaction with nature, familiarity and clearly positive design features. These seven elements are broadly applicable to restorative landscapes and effective in evidence-based design, significantly enhancing users' psychological and physiological health. Therefore these elements are applied as indicators to structure holistic therapeutic landscape indicators (HTLD-indicators).

Marcus also provided numerous case studies of therapeutic landscapes for learning

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[35] Marcus, C. C., & Barnes, M. (1999). Healing Gardens: Therapeutic Benefits and Design Recommendations (1st ed.). Wiley.

[36] Cooper Marcus, C., & Sachs, N. A. (2014). Therapeutic landscapes: An evidence-based approach to designing healing gardens and restorative outdoor spaces. John Wiley & Sons.

and reference, showcasing how his theory applied into design practice.

Evidence-based design (EBD) thinking from Marcus posits that there is no fixed standard for designing landscapes that can meet the diverse needs of patients, families and clinic staff. Each space is independently designed to meet the needs of the medical complex and ultimately integrates these spaces together. The landscape architect is important In the design process of the Interdisciplinary Design Team in Interdisciplinary Design Team(IDT)[37]. In theory of therapeutic landscape design, Marcus proposed very clear design guidelines, summarized in the following Table 7.

Table 7 Design and construction guidelines for therapeutic landscape

Design and construction guidelines for medical centers from Cooper Marcus point of view	
Needs	**Recommendations**
Considering the whole site as a healing environment Landscape architecture as a part of IDT in the beginning of design process Design in order to service different patients Providing at least one distinct outdoor space for the staff Legible details from the entrance Garden in a silent place Proper proportion of the height of adjacent bui e width of open space Curved paths Minimizing the intense darkness and light areas on the ground Sufficient space for wheelchairs	Providing more than one garden Providing balconies or traces for the patients or residents Garden far from main traffic areas The garden is open in any climate condition and along the day or night More opportunities and choices in paths hierarchy 7 and 5 circle labyrinth Using trees for the reduction of building scale Using local plants for compatibility with ecosystem Desi r features somehow that could be easily maintained and avoid infection

Adopted Cooper Marcus（2014).

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[37] The IDT encompasses all stakeholders engaged in the programming, design, construction and ongoing management of a facility. This diverse group may comprise various staff members ranging from medical professionals to facilities personnel, administrative figures including board members and C-suite executives (CEO, COO, CFO) patients and their families, funders, designers, community members and more. The composition, vision and objectives of the IDT significantly influence the design process. In healthcare garden design projects, the IDT plays a crucial role in integrating input from all stakeholders, ensuring alignment and collective understanding.

5.1.5 Water Bradford Cannon

The fight or flight theory is proposed by Walter Bradford Cannon (1900). Stress-reducing environments need to be designed into the therapeutic landscape. The presence of stress disturbs sleep routine, increases heart rate and blood pressure, decreases immunity and prolongs wound healing time. According to Ulrich (1999), Marcus (2014), states that therapeutic landscapes need to be designed to create stress-free including four elements (1) a sense of control, (2) social support, (3) physical movement and exercise and (4) positive natural distractions. These will help to effectively alleviate anxiety.

American neurologist and physiologist Walter Bradford Cannon in the early 1900s proposed that the fight or flight response is an innate physiological response that has evolved to increase chances of survival in the face of danger. Although modern stressors are not as life-threatening as those faced by our ancestors, they still activate our stress response.

It is a specific process in which the sympathetic fibres autonomic nervous system is activated. This causes the endocrine system to release stress hormones [38]. Physiologically, the main effect of these hormones is to trigger a rapid and generalized reaction. This reaction may be triggered by a drop in blood pressure as a result of pain, physical injury, sudden emotional upset or a drop in blood glucose levels (hypoglycaemia), or by sensitivity disorders (e.g., phonophobia), which are characterized by an unusually strong negative reaction with low tolerance to specific sounds or stimuli associated with such sounds. The fight-or-flight response is characterized by increased heart rate (tachycardia), anxiety, increased sweating, tremors and increased blood glucose levels (due to glycogenolysis or hepatic glycogenolysis).

In order to promote wellness, the incorporation of natural elements and outdoor spaces when designing therapeutic environments can be effective in promoting wellness and reducing stress levels (Walter Bradford Cannon, 1900).

The following describes how to design methods to meet: (1) a sense of control, (2) social support , (3) physical movement and exercise and (4) positive natural distractions .

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[38] The adrenal medulla produces a hormonal cascade that results in the secretion of catecholamines, especially norepinephrine and epinephrine. The hormones estrogen, testosterone and cortisol, as well as the neurotransmitters dopamine and serotonin (the adrenal medulla produces a hormonal cascade that results in the secretion of catecholamines, especially norepinephrine and epinephrine. The hormones estrogen, testosterone, and cortisol, as well as the neurotransmitters dopamine and serotonin.

(1) a sense of control

To facilitate restoration through a therapeutic landscape, certain aspects are crucial. People must be aware of its existence and have easy access and the freedom to utilize it as they desire. This means the therapeutic landscape should be visible from main entryways or gathering areas and have clear signage if not directly visible. It should offer various options for enjoyment while ensuring visual and auditory privacy.

When treatment or patient rooms overlook the therapeutic garden, consideration for both building users and garden visitors becomes essential. Therapeutic landscapes often serve as a retreat for solitude, making the availability of diverse spaces critical. Offering different types of spaces prevents overcrowding and allows individuals to select where they feel most comfortable.

Choices within the therapeutic landscape, such as pathways, seating areas and visual focal points, contribute to a sense of control. Including staff and long-term care residents in the design process often instils a feeling of empowerment, fostering a deeper sense of ownership and responsibility for the garden. Studies by Francis (1989), Hester (1984) and Ware (1994) highlight the significance of this involvement in creating a landscape that promotes restoration and personal connection.

(2) social support

Therapeutic landscape in healthcare settings but also in public areas, serve as spaces that encourage social interaction. Studies reveal therapeutic landscapes within healthcare facilities that design elements like seating arrangements and location impact how these spaces are utilized. Having diverse spaces encourages various forms of interaction. Seating arrangements that face each other or can be adjusted facilitate conversations between a few individuals, while larger open spaces cater to larger groups for planned or spontaneous gatherings. In certain cultures, patients receive visits from extended family, emphasizing the need for accommodating larger groups. Design elements ensuring a sense of control, like privacy areas, also contribute to fostering social support. Placing landscapes near communal areas such as waiting rooms and cafeterias further encourages social interaction and support among visitors and staff.

(3) physical movement and exercise

Therapeutic landscape inside a healthcare facility can serve as a powerful motivator for patients. Just having a view of a therapeutic landscape or the journey to a window overlooking can encourage movement, even for patients unable to go outside. Therapeutic landscapes offer various incentives for exercise, such as different walking paths of varying lengths and difficulties, unique spots to reach like a gazebo and

engaging activities spread throughout the area. For children, spaces designed for running and playing reduce stress levels for both them and their parents. Additionally, structured features like game areas for activities such as bocce, miniature golf or group Taiichi practice provide not only exercise opportunities but also chances for social interaction.

(4) positive natural distractions

A therapeutic landscape should authentically resemble an outdoor space, offering ample opportunities for people to connect with nature. It serves as a refuge, providing a break from the sights, smells and sounds experienced indoors. This contrast creates a soothing environment that feels like a breath of fresh air. Research by Cooper Marcus and Barnes (1999) suggests an optimal balance, recommending around 30 percent of hard elements like paving or walls, complemented by 70 percent vegetation within the space.

5.1.6 Silvan Tomkins

Emotions can alter our perception of things around us. In therapeutic landscapes, it's essential to incorporate affirmative design elements. Images of beautiful natural space, positive and caring poems or quotes on boards, all exude positivity, strength, and love. These positive design elements facilitate holistic recovery of the human body within therapeutic landscapes (Niedenthal, 2016).

Positive design features will be applied as one indicator to structure holistic therapeutic landscape indicators.

Silvan Tomkins (1960) first introduced the emotional congruence theory, finding that happy individuals tend to view things more positively, while those experiencing stress or depression often perceive things as threatening or unappealing. This holds significance in the design of therapeutic landscape, suggesting that the visual elements of the environment significantly impact the emotional states of patients and visitors.

To create a positive and serene environment the selection of clear and straightforward visual elements is crucial. For instance, Ulrich (2014) suggests that nature images, such as landscapes or photographs (Figure 22), may positively impact the health of patients. On the other hand, abstract art (Figure 23) might be harder for patients to interpret and could potentially evoke negative emotional responses.

In an experiment conducted in a psychiatric hospital, patients and healthcare professionals were asked to interpret an abstract painting containing objects resembling apple seeds. One healthcare professional found the painting intriguing and wished to hang it in their home, while two patients interpreted the painting as burnt

skulls, with blood, flesh and injured individuals screaming (Ulrich, 2014). These different interpretations underscore the need for designers to be sensitive to the emotional and physiological needs of patients, selecting visual elements that have a positive rather than negative impact on their health.

In summary, the emotional impact of visual elements in the design of therapeutic outdoor spaces is significant. By choosing clear and positive visual elements, designers can help to create a tranquil and therapeutic landscape promoting the health and well-being of patients.

Figure 22 : Positive landscape photograph

By Bao Guotai (2023).

Figure 23: Abstract art with Ambiguous Theme, As kids Go (painting)

Gilliam, S. (1996).

5.1.7 Edward.O.Wilson

In therapeutic landscapes, psychological and physiological recovery is facilitated when there's a variety and abundance of plants.

Edward O. Wilson proposed the theory of Biophilia[39] suggesting that humans possess a genetic inclination towards nature. Studies have shown that increasing indoor and outdoor vegetation contributes to enhancing patients' memory and reducing blood pressure, hence the recommendation for incorporating more plants in therapeutic Landscape.

Voland & Grammer (2003) suggest that in therapeutic landscape, natural settings with available natural resources[40], shelter, cues for potential danger and navigational cues are perceived as aesthetically pleasing.

Wilson (1993) believed that whether people live in urban or rural areas, they inherently have an affinity for nature. Individuals generally feel safer in natural landscape and more anxious when distant from nature. This attraction and reliance on landscape might have a genetic basis stemming from human evolution.

Supporters of the Biophilia hypothesis link aesthetic responses to functional and adaptive values (Voland & Grammer, 2003). Ancestors evolved with the idea that environments, objects or situations that increased their chances of survival and reproduction were considered beautiful, while those reducing these opportunities were deemed unattractive (Russo et al., 2003; Ulrich, 1986; Thornhill, 2003).

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[39] Wilson, E. O. (1984). Biophilia. Harvard University Press.

[40] Natural Resources: include natural elements such as plants, sunlight, air, temperature, and water, from which the body benefits through biochemical and physiological processes. For instance, sunlight aids in vitamin D production and enhances calcium absorption, while plants through photosynthesis convert inorganic compounds into organic ones, releasing oxygen and other beneficial gases. Moreover, plants absorb harmful gasses. Studies also indicate that plants increase the concentration of negative ions in the air, kill bacteria, reduce oxidative cells, and slow down aging by promoting the transmission rate of electrical signals in the brain.

According to Heerwagen and Orians' (1995), humans evolved in different habitats based on their adaptive needs, favouring any natural environment conducive to survival, reproduction, and well-being. An ideal environment comprises four aspects: resource availability, shelter, cues for potential danger and navigational cues. These theories from Heerwagen and Orians are corresponding to the therapeutic landscape theory from Kaplans (1989), Marcus (2004) and Ulrich (1981), as shelter cues for potential danger and navigational cues are correspondingly to prospect-refugee, visibility and security.

Thus, abundant natural resources, good visibility and sense of security are indicators for therapeutic landscape.

5.1.8 John Haygarth

A well-designed, well maintained and appealing therapeutic landscape allows users to psychologically relax and feel confident in their recovery.

Due to the widespread application of these three elements in therapeutic landscape design and the positive feedback from evidence-based design, the psychological health of users of therapeutic landscapes has been improved. Therefore, these three will be applied as indicators to structure holistic therapeutic landscape indicators.

One thing that therapeutic landscape research has confirmed is that the way a place looks affects how people feel and how they behave, which is also known as the placebo effect theory which was first proposed by John Haygarth in 1790. An attractive, well-designed and well-maintained therapeutic landscape give a person peace of mind knowing they will receive the same high level of attention and care. Research has shown that the internal and external attractiveness of a facility is directly related to stress reduction, patient satisfaction and perceived quality of care (Becker, Sweeney and Parsons 2008; Dijkstra, Pieterse and Pruyn 2008). Esther Sternberg (2010) discusses the "placebo effect" in human responses related to aesthetics. Expectation plays a key role in the placebo effect: "When you feel better because you believe that something will heal you - whether that something is a drug, action, person, program, or place - you are experiencing the placebo effect"[41]

Another reason why therapeutic landscape has a therapeutic effect may have to do with preconceptions. Many people have had negative experiences in medical facilities. Even without direct experience, most people fear illness, pain and death, all of which occur in medical facilities - even beautifully designed ones. On the other hand, most people have positive experiences and positive associations in nature or garden settings. In addition to the influence of biophilia people seek nature because it is

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[41] Vallance, A. K. (2006). Something out of nothing: the placebo effect. Advances in Psychiatric Treatment, 12(4), 287-296. https://doi.org/10.1192/apt.12.4.287

familiar; they associate it with refuge, health and happiness. In two studies conducted by Francis and Cooper-Marcus (1991, 1992) when architecture and landscape architecture students were asked where they went when they felt sad or upset, a high percentage responded that they went to places in the natural environment. Barnes' (1994) follow-up study of the general public confirmed these findings.

5.2 Philosophical Approaches

The philosophical design approach for therapeutic landscape has been studied through logical reasoning and conceptual analysis. This approach departs from the biomedical model and evidence-based qualitative research. The qualitative research method expands the scope beyond evidence-based methods. It integrates spirituality as an additional dimension to comprehend how therapeutic landscape have spiritually therapeutic effect on individuals. Spirituality is a key component of holistic therapy and plays a significant role in the therapeutic landscape (Litva & Eyles, 1995; Kearns, 1993; Gesler, 1991).

Science is a belief system and while experiments can test hypotheses, many hypotheses cannot be proven experimentally. For example, Newton's first principle of physics, inertia, implies perpetual motion for anything, yet nobody can live eternally to witness an object in eternal motion. Hence, science has its limitations relying on a lot of logical reasoning. Understanding the nuances of the therapeutic landscape comprehensively is beyond the grasp of calculations alone discovering all the patterns within to build medical landscapes.

Heidegger argues that in modern society, people trust numbers more than anything else, sidelining art, philosophy and religion. However, numbers are just meaningless figures and cannot be endowed with descriptive meaning and value as in qualitative research in poetry, philosophy or art (Jijinqing, 2020). Therefore, the qualitative research method integrates social theory and spirituality into the scope of therapeutic landscape theory, surpassing evidence-based methods. It seeks a more holistic understanding of how landscapes can have therapeutic landscape on individuals physically, mentally and spiritually.

5.2.1 W. M. Gesler

According to Gesler (1992), through qualitative research methods in health geography, a therapeutic landscape has therapeutic effects linked to A) historical events, B) cultural beliefs, C) social relationships and D) personal experiences (Gesler, 1996).

Through the long-term research results of Gesler and scholars engaged in therapeutic landscape in health geography, it has been proven that the above four factors

influence physical, psychological, and spiritual health. Therefore, we use these four factors as indicators for holistic therapeutic landscape design (HTLD).

For instance, based on cultural beliefs and personal experiences, believers trust that divine intervention will occur at specific locations. Therefore, people visit these places on pilgrimages seeking healing such as at Fatima. Diseases and cures are believed to have supernatural causes. When physical and architectural environments, social conditions and human perception combine, they create a healing atmosphere, forming a therapeutic landscape. The term 'therapeutic' here is used in a broad sense, including biomedical therapy (physical healing), psychological well-being (psychological healing) and spiritual renewal (spiritual healing) (Gesler, 1992). At the same time mental and spiritual recovery are equally crucial; thus, spiritual and mental healing might accelerate the pace of physical recovery.

Gesler (1992) recognized that quantified methods are inapplicable in social science studies, thus opting for a descriptive method in his study of therapeutic landscapes. He used narrative and descriptive approaches rather than relying on calculations and numbers.

Gesler categorizes the therapeutic landscape into two types: the inner/meaning category, focusing on natural surroundings, the built environment, sense of place, symbolic landscape, and daily activities; and the outer/social context category, emphasizing belief philosophy, social relations and/or inequality and territoriality.

Through his research on Epidaurus, Gesler (1992) discovered that natural environments, built environments, sense of place, social relationships, relative equality, daily activities and territoriality are all crucial for improving physical, mental and spiritual health. In his study on the pilgrimage site of Lourdes, Gesler (1996) investigated the reasons for the influx of hundreds of thousands of people, including religious pilgrimage traditions, Lourdes' central role in French political, economic, social and cultural changes, belief in miraculous cures and the experiences of pilgrims. This study emphasized physical, mental and spiritual transformations, historical contingencies, the role of faith, the significance of the place and contested realities.

Gesler's characterization of the therapeutic landscape has been referenced and shared by other geographers and researchers. These features emphasize the importance of the therapeutic environment on a spiritual level. His *Therapeutic Landscape Theory* primarily focuses on the environmental qualities of the therapeutic landscape and the social and spiritual nature of this landscape.

In his research, Gesler conducted semi-structured interviews and observations in Epidaurus, Bath and Lourdes. He correlated cultural geography, sense of place, symbolic landscape, negotiated reality, hegemony and resistance, territory

legitimization and marginalization with the therapeutic landscape. Gesler noted that landscapes are symbolic, representing people's understanding of their physical environment. The therapeutic landscape is a process that seeks to understand how healing occurs in different locations.

The case of the therapeutic landscape mentioned in Gesler's study about Lourdes, France: according to legend, during one of the appearances of the Virgin Mary in France, she instructed an ordinary young girl, Bernadette, to dig in the ground of the cave. Bernadette followed the instructions and discovered a small stream, which eventually turned into a spring producing 30,000 gallons of water daily (Cranston, 1955). Mysterious springs hold a rich history in Catholicism; the Pyrenees have many thermal springs known for their healing properties for centuries (Neame, 1968). In Lourdes some entrepreneurs aimed to establish a spa competing with others in Europe, claiming through chemical analysis that the water possessed natural healing properties (Barbe, 1894). Despite conflicting reports on the water's chemical composition, an analysis negating natural healing elements was officially accepted. Consequently, authorities asserted and believers believed, that the cures caused by the water had to be supernatural.

The work of the Medical Bureau in Lourdes demonstrates the Church's desire to legitimize supernatural occurrences (Neame, 1968). In seeking legitimization, the Church appears to have yielded to the forces of science and rationalism it vehemently opposed in the 19th century. Ironically many scientists today argue that some cures may lack an immediate scientific explanation. However, it's noteworthy that the Bureau solely investigates physical illnesses, yet in Lourdes, spiritual and mental healing are equally crucial. Thus, spiritual and mental healing might accelerate the pace of physical recovery. Despite reservations held by some, the Bureau's work bolsters Lourdes' reputation as a distinguished healing centre.

Gesler's case study demonstrates that mental and spiritual recovery are equally crucial. Hence, spiritual and mental healing might accelerate the pace of physical recovery.

5.2.2 Heidegger and Zhuangzi

Heidegger's *Building Dwelling Thinking* [42] and *Time and Being* [43] delve into the discourse of existence and dwelling. Simultaneously, they interpret how individuals in therapeutic landscapes can recover spiritually amidst joy and how to confront death when recovery isn't feasible. Moreover, users of therapeutic landscapes must

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[42] Heidegger, M. (1971). Building, Dwelling, Thinking. In A. Hofstadter (Ed.), Poetry, Language, and Thought (pp. 143-162). New York: Harper & Row.

[43] Heidegger, M. (2008). Being and Time. HarperCollins.

recognize their own existential meaning and value. Only by attaining 1) self-identity and 2) fearlessness toward death can one achieve spiritual recovery, complementing physical and psychological therapeutic effect.

These elements are applied as indicators to structure holistic therapeutic landscape indicators.

Heidegger emphasizes the sacredness of therapeutic landscapes aiding users in recovery and enabling them to confront death gracefully. His philosophical views align with Zhuangzi, a Chinese philosopher, who in "Zhuangzi"[44] stated that death is a part of life and facing inevitable death should be approached calmly and gracefully (Zhuangzi, 476 BC; Han Peng jie, 2021).

As the religious beliefs of the Middle Ages such as Christianity faded, a new perspective was required rooted neither in traditional theology nor the external and materialist-based traditional materialism. Descartes proposed the viewpoint of "Cogito, ergo sum" (cognitive activity) using scepticism as the basis for Western modern rationalism. However, Heidegger questioned Descartes' concept of existence and introduced the concept of "Dasein."

In his work "Being and Time", Heidegger explains how individuals exist within their own context, where "Dasein" as a concept of existence that only humans can comprehend (sein), exists because of our consciousness and self-awareness. For example, people growing up in East Asian cultures, receiving education there, experiencing natural landscapes and perceiving politics through a unique perspective exist within their own context, possessing a Chinese-style Dasein. According to Heidegger's explanation of why only humans can understand Dasein, he presents three reasons. Firstly, humans understand the relationship between the environment and themselves because they live in it. Secondly, only humans can comprehend the concept of "existence" (Sein) due to their consciousness, self-awareness and understanding of their limitations. Thus, humans occupy a privileged position in ontology. Finally, humans exist by distinguishing themselves from things in the world, leading to their existence (Heidegger, 1927). Heidegger's ontological theory of Dasein is based on the concept of "being in the world" signifying that life isn't lived in emptiness but exists through interaction with the surrounding environment. In the context of therapeutic landscape this refers to the interaction of patients with people and things: other patients, relatives and various forms of life. Human Dasein in therapeutic landscape is meaningful and cannot be forsaken.

In his work Building Dwelling Thinking (1954) Heidegger proposes that "building" (buan) itself is a form of "dwelling" (Wohnen) which is existence. He considers

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[44] Zhuangzi (c. 369–286 BC) an influential Chinese philosopher, is the attributed author of the eponymous philosophical text, "Zhuangzi". This ancient work, dating back to the 4th century BCE, is celebrated for its profound insights into Daoism and philosophical thought. For more detailed content information, please refer to the Wikipedia page on Zhuangzi: https://en.wikipedia.org/wiki/Zhuangzi_(book)#Content

dwelling as a quadruple concept (sky, earth, morality and divinity). Human existence resides on the earth, under the sky, in front of the divine and at the same time belongs to human coexistence. Human dwellings are places where humans interact with the natural environment, gaining a deeper understanding and sense of belonging through dwelling and construction. Additionally, dwelling includes an attributive belonging of human coexistence[45] (Heidegger, 1954). Building and staying in therapeutic landscapes are a genuine form of existence. Therapeutic landscapes and their users become a gathering of belonging under the sky and on the earth.

Using the metaphor of a bridge, Heidegger explains how pathways connect surrounding landscapes and make them proximate. The bridge assembles and thus reveals its symbolic significance as a symbol of recovery in therapeutic landscapes. The bridge eternally and differently escorts the slow and hurried vehicles of humanity, allowing them to reach the other shore and ultimately guiding them to the divine. They are always walking on the path to the last bridge, fundamentally seeking to transcend their habitual or unredeemable state to present themselves before the sacred. These bridges are collective passages to the sacred. Regardless of whether the presence of these sacred beings is specifically contemplated and appreciated, as obvious in the sanctification of the bridge (Brückenheiligen) or if this is still camouflaged or even rejected (Heidegger, 1984).

This paragraph indicates that the bridge gathers or "collects" the dead and the divine. Escorting individuals back and forth, it either helps patients through the therapeutic landscape (bridge) to return to this shore (recovery) or if recovery isn't achieved, it will guide patients to the other shore (death). The bridge is a symbol of divine salvation and the therapeutic landscape is the bridge, possessing the sacredness of protecting life (each therapeutic landscape user).

Simultaneously the coexistence of healthcare institutions, therapeutic landscapes and users gives meaning because the absence of any one of these components would hide the significance of the therapeutic landscape. The combination of the three is symbolic, socially significant and culturally meaningful. Therefore, users of therapeutic landscapes must recognize the significance of their existence; without them, the therapeutic landscape wouldn't exist, nor would the healthcare institution (Deng Xiao, 1999).

Their practical significance includes contributions to the economic functioning of medical facilities and healthcare professionals. Their residence in healthcare institutions provides research value for therapeutic landscapes, aiding future patients to receive better care.

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[45] Heidegger, M. (1971). Building, Dwelling, Thinking. In A. Hofstadter (Ed.), Poetry, Language, and Thought (pp. 143-162). New York: Harper & Row.

Heidegger proposed that death is not an event but an "existence toward death" and only humans are "beings-toward-death". Humans are spiritual beings because only humans exist in a limited manner. Heidegger used the term "sanctuary" in "Thing" and stated, *Death is the sanctuary of nothingness... as the sanctuary of nothingness, death is the shelter of existence*[46] (Heidegger, 1954). Death shelters human existence and without death, humans would lose all aspects of their existence. Hence, death gives meaning to life and existence is an inevitable part. In other words, without death the existence and life itself would be meaningless and worthless. Helping patients understand that death is there to make them appreciate the value of life.

Heidegger's thoughts convey an attitude towards genuine human existence, a fundamental concept that should also be the underlying idea for constructing therapeutic landscapes. Therapeutic landscapes, as a "thing" are also a gathering of heaven, earth, humans and divinity. They provide users with poetic dwelling and serve as a sanctuary for those who eventually pass away (Thing).

5.2.3 Norberg Schulz

Under the influence of Heidegger's philosophy, Norberg-Schulz (1974) based on the phenomenology of architecture, applied the concept of "Dasein"—being in the world—to architecture and introduced the concept of "place". In the context of therapeutic landscapes, a place needs to incorporate three components to embody the spirit of place (genius loci) facilitating users' spiritual, psychological and physical recovery: 1. Environment: a highly specific environment. 2. Space: three-dimensional with a central existence, directionality and regional aspects. 3. Characteristics: including shape, materials, textures and a unique atmosphere. The existence of the spirit of place must be realized from a cultural perspective. In the context of therapeutic landscapes, this means that the place should be familiar to people, aligning with users' culture and providing a sense of belonging. The existence of the spirit of place must be realized from a cultural perspective. In the context of therapeutic landscapes, this means that the place should feel familiar to people, align with users' culture, and provide a sense of belonging.

When therapeutic landscapes exhibit high scores in the characteristics of A) Uniqueness, B) Irreplaceability, C) Experiential Quality, and D) User Involvement in Design, users will experience the spirit of place. This, in turn, allows users to achieve spiritual and psychological recovery and comfort. Therefore, we use these four factors as the four indicators of therapeutic landscape HTLD.

A)Uniqueness encompasses both tangible and intangible qualities of a place linking them with value. "Genius loci" represents another intangible heritage value present in environments where cultural resources are created and maintained. It constitutes

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[46] Heidegger, M. (1971). Building, Dwelling, Thinking. In A. Hofstadter (Ed.), Poetry, Language, and Thought (pp. 143-162). New York: Harper & Row.

the spirit of a place transmitting patterns, meanings and images, organizing the elements of the setting into a meaningful and comprehensible whole that lies at the boundary of consciousness or sensation—a totality that surpasses the sum of its constituent parts' meanings. "Genius loci" is aroused by the physical attributes of cultural resources in their environment and the dynamic activities carried out on various levels. By conveying the characteristics and importance of cultural resources within the landscape it conveys a strong perception of a place (Passfield, 2005, p.21).

B)Irreplaceability refers to the unique characteristics of a place that cannot be replicated or substituted. These intrinsic qualities contribute to the place's distinctive identity, making it irreplaceable. This includes unique cultural, historical, or natural elements that give the place its special significance and cannot be duplicated elsewhere.

C)Experiential quality constitutes an essential aspect as how the users feel the place (Vecco, 2018).

D)User involvement in design is crucial. Lokas (2023) expressed" there is no knowing or sensing a place except by being in that place, and to be in a place is to be in a position to perceive it"[47] (Lokas, 2023). This emphasizes that design in therapeutic landscapes must involve the users of these spaces; the designers themselves should be users of therapeutic landscapes.

Figure 24: How place is shaped based on

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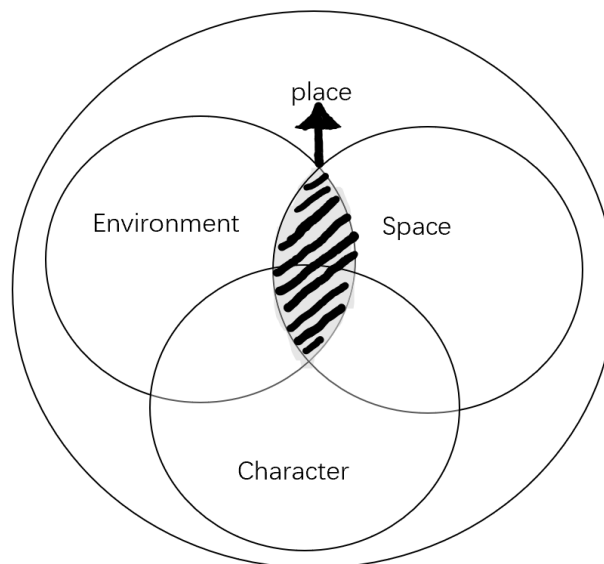
[47] Iva Lokas,(2023). The Essence of Place: Understanding Genius Loci Through Phenomenology, Conference: On Architecture - Challenges in Design: Proceedings ISBN 978-86-89111-34-7

By Bao Guotai based on Schultz (1974).

Norberg-Schulz (1974) utilized a phenomenological methodology to understand the true meaning of place. In his book "Existence Space and Architecture" (1974), Schulz introduced the concept of place, which defines as "a space with unique characteristics. Since ancient times, the spirit of place has been recognized as a concrete reality that human beings face in their daily lives. [...] ... A set of concrete things with their material substance, form, texture and colour. All these things together define an "environmental identity", which is the essence of place. Generally speaking, places are defined by their character or "atmosphere" [48]. Therefore, place is a qualitative phenomenon that is "total" and cannot be reduced to any of its individual characteristics, such as spatial relationships, without losing sight of its specific essence. While space indicates the three-dimensional organization of the elements that make up a place, "identity" indicates the overall "atmosphere", which represents the most comprehensive character of any place. It is important to recognize that, in general, all places have an identity, which is the primary mode of a priori "delivery/provision" of the world. The identity of a place is also to some extent a function of time: it varies with the seasons, the time of day and the weather conditions (Norberg-Schulz, 1980: 6, 8, 11, 14).

In "Genius loci" Schultz conducts a focused exploration of the concept of "place" introducing a holistic perspective that encompasses environment, three-dimensional space and identity. This comprehensive understanding is structured into three integral components: the centre, area and direction, which collectively elucidate the intricate relationship between individuals and their surroundings. Schultz delineates the facets of this holistic concept as follows:

Environment: Signifying a highly specific setting.
Space: Representing a three-dimensional realm.
Character: Encompassing shapes, materials, textures and distinctive atmospheres.

Illustrated in Figure 24, Schultz posits that a "place" is the convergence point of environment, space and character. Within this paradigm, individuals seamlessly integrate and adapt to their environment, shaping spatial identity and giving rise to existential space or footholds. Schultz's conceptualization positions existential space as a dynamic realm sculpted by the diverse needs of users, emphasizing the interconnectedness of people, their surroundings and the shaping of dynamic spatial experiences (Vecco, 2019).

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[48] Norberg-Schulz, C. (1974). Existence, Space and Architecture (New Concepts of Architecture). Littlehampton Book Services Ltd.

The environment implies a homogeneous area that becomes a place where people build communities. These three constituent elements are isomorphic: centre and place (proximity), direction and path (continuity), region and territory (closure) and constitute the way we understand the world (the cognitive model of the world): that is, starting from the centre and following the path, which divides the region into territories and finally one obtains a holistic perception of space. First, man wants to make natural structures more precise. He wants to present his understanding of nature and express the existential foothold he has gained by building; he builds what he sees. When nature indicates the direction, he builds the road. Secondly, man must supplement the given situation by adding what is missing. Finally, he must symbolize his understanding of nature (including himself). Symbolizing means that experienced meanings are transformed into another medium, where natural features are transformed into buildings that somehow exhibit characteristics (Schultz, 1974).

Figure 25: Structure of Place

Structure of the place				
	Nature character	Hint	Existential place	Visualization	Pace is the concretization of the nature by visualization and symbolization
Elements in the Space	Centre	Node	Centralization	Stone pillar	
	Orientation	Direction	Continuity	Path	
	Area	Homogeneous	Territory	Building community	

By Bao Guotai based on Schultz (1974).

The concept of "place" as a holistic idea constituted by the environment, space and characteristics emphasizes the importance of creating space that not only meets functional needs but also provides a unique atmosphere and a sense of identity.

"Genius loci", a Latin expression originated from ancient Rome was initially used to refer the spirit of dwelling. In a broader sense this concept relates to the spirit or essence within a space. It represents a mysterious, symbolic and magical space, similar spaces being found across various cultures and civilizations. At a public level it transcends mere living spaces, encompassing vast areas adjoining structures like temples, churches and towers. The unique genius loci of each place is defined by how a culture imbues its environment with different textures, forms and meanings (Karaman, 2007).

Norberg-Schulz described genius loci as a fundamental function in the construction of a place, employing philosophical concepts from phenomenology. In fact, this scholar began proposing experiential and psychological concepts related to "being" and "space" in 1971, continuing to utilize the concept of genius loci to reference the phenomenology of architecture in 1980. Place is a 'psychic' function. It relies on identification and implies a sense of belonging. Therefore, it constitutes the foundation of dwelling (Norberg-Schulz, 1980).

This concept describes the "genius loci" in architecture as generating a "sense of place" through the concept of dwelling. Norberg-Schulz based on Heidegger's essay "building, dwelling, thinking" (1971)[49] employed the concept of "dwelling": "When a person can distinguish oneself and connect oneself with the environment, humans dwell, or when one experiences the environment meaningfully" (Norberg-Schulz, 1980). In the context of therapeutic gardens, dwelling emphasizes the meaningful experience of the therapeutic landscape as a place .

As emphasized by Pitt (2014) "places are not abstract, static, self-contained points, strictly bounded and closed off but are material, dynamic, open and defined by their relationships with other places. Otherwise, they cannot be sites of knowledge production"[50] (Pitt, 2014). Hence following Barnes's argument, one can infer that therapeutic landscapes are not merely physically constructed spaces but also possess cultural, social and symbolic attributes, offering individuals a spiritually enriching landscape that provides a sense of belonging.

5.2.4 Merleau-Ponty

According to Maurice Merleau-Ponty's phenomenology of perception [51] , the experience of a therapeutic landscape is rooted in perception. Our perception, in turn, arises from the interaction between our five senses and the therapeutic landscape. Therefore, achieving spiritual recovery through a positive perceptual experience requires enhancing sensory experiences. Enhancing colour, shape, aroma, sound, texture and spatial experiences contributes to fostering a positive perceptual encounter.

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[49] Heidegger, M. (1971d). Building, Dwelling, Thinking. In A. Hofsdater (Ed.), Poetry, Language and Thought (pp. 143-162). New York: Harper & Row.

[50] Pitt, H. (2014). Therapeutic experiences of community gardens: putting flow in its place. Health & Place, 27, 84-91. https://doi.org/10.1016/j.healthplace.2014.02.006

[51] Merleau-Ponty, M. (1945). Phenomenology of Perception. Routledge.

Perception is applied as an indicator to structure holistic therapeutic landscape indicators.

This enhancement of sensory experiences leads to a holistic recovery encompassing physical, psychological and spiritual dimensions. Building upon Merleau-Ponty's phenomenology of perception, Steven Holl (2007) further categorizes landscape perceptual experiences into nine types: intertwining experiences, lived time, parallax in spatiality, colour, light and shadow, spatiality of night, water as a lens of perception, detail and tactile domains and sound[52] (table 7).

Table 8: Classification of Perceptual Experience

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[52] Holl, S., Pallasmaa, J., (2007). Questions of Perception: Phenomenology of Architecture. Rizzoli.

Concept	Definition	Classification
Intertwining	Architecture intertwines foreground, middle ground, and background, combining materials, light, and subjectivity, forming the basis of a "complete perception," an intertwined experience of various elements.	Holistic: Emphasizes holistic perception of place
Lived Time	People's experience of places and spaces is continuous, bridging discontinuous time through architectural spatial experiences, creating a "lived time."	Holistic: Emphasizes duration experience
Parallax	Perceptions arise from an endless series of overlapping perspectives, an incomplete perception point that remains forever experientially elusive.	Partial: Emphasizes instantaneous perception
Color	Contexts, climates, and cultures influence people's perception of colors, specific places evoke specific color concepts.	Partial: Emphasizes multifaceted perception of details
Light and Shadow	Architecture's essence, material textures, and characteristics are shaped by light.	Partial: Emphasizes perception of materials and details
Spatiality of Night	Modern cities teem with artificial nocturnal light and spaces, offering a new scale of urban experiences during nighttime.	Partial: Emphasizes perception of night spaces
Water as Phenomenal Lens	Water possesses reflective, refractive, spatially transformative qualities, offering diverse experiences through its various forms.	Partial: Emphasizes perception through water
Detail and Touch	Focuses on spatial materials and tactile sensations of details.	Partial: Emphasizes perception of materials and details
Sound	In the realm of auditory perception, it focuses on the resonance of sounds in space and materials' harmonies.	Partial: Emphasizes auditory perception

By Bao Guotai based on Holl (2007).

When good design methods are effectively applied in a therapeutic landscape users will experience spiritual recovery. Husserl proposed a descriptive phenomenological reduction method of "returning to the things themselves" establishing modern phenomenology. Merleau-Ponty regarded as Husserl's best explicator, developed the theory of phenomenology of perception under the influence of various philosophies including Gestalt psychology. Merleau-Ponty's phenomenology of perception starts from perception, asserting that the acquisition of perception and experience occurs through the perception of the body within spatial environments, termed "corporeal phenomenology". He proposed that all consciousness is induced by perception; in other words, the existence of things relies on human perception. Perception is a

holistic, indivisible sensation. The body exists within space and time with space existing within human consciousness as a mental dimension (Norberg-Schulz, 1971).

Ponty's theory inspired architectural phenomenology greatly. For instance, Swedish architect Palasmaa enumerated seven perceptual experiences of architecture in "The Seven Senses of Architecture" and extensively expounded on perception-related experiences and sensations using a phenomenological approach. These experiences encompass "sounds, silence, smells, the tactile perception of form and the perception of muscles and bones" (Holl et al., 2006). He opposed the pure emphasis on retinal image reproduction art concepts, suggesting that focusing solely on vision not only fails to let people experience existence in the world but also isolates them from it. This highlights the importance of other perceptions in architecture, known as "perceptive architecture" (Shen, 1998). Palasmaa also stressed that spaces should possess their own spiritual traits, with differences between various spaces reflected in perceptions like colour, texture, smell and sound (Yue, 2011). Furthermore, another architect directly influenced by Merleau-Ponty's phenomenology of perception is the American architect Steven Holl (Holl, 1989).

Under the influence of the theory of "place" Steven Holl attempted to use an operational phenomenological approach for specific place design, emphasizing the significance of places and perception (Xu, 2008). Holl believed that architecture should surpass mere physical constraints, be designed based on the inherent meanings of sites and integrated with experiences within the specific context to anchor architecture in a genuine understanding of place phenomena. He regarded architectural anchoring as relying on human perception to grasp the anchoring points of a place, combining external and internal perceptions, including conceptual and experiential anchoring (Holl, Pallasmaa & Pérez-Gómez, 2006). Holl emphasized that the significance of architecture lies in its direct impact on the experiences of the beholder and its essence, dissociated from metaphors and symbols.

Holl's theory of anchoring (figure 26) derived from the existential phenomenology of Nobert Schutz's exploration of sites developing the concept of "spirit of place" (genus loci). Through the exploration of the spirit of place it delves more intricately into specific landscape architectural phenomena, creating a tangible, experiential perception phenomenon directly related to landscape architecture through the lens of phenomenology, neither metaphorical nor symbolic, but tangible and perceivable. This includes intertwined experiences, lived time, incomplete perceptions in perspective spaces, colour, light and shadow, the spatiality of night, water as a phenomenal lens, the tactile domain of materials and details and sound.

Figure 26: Development of the Anchoring Theory
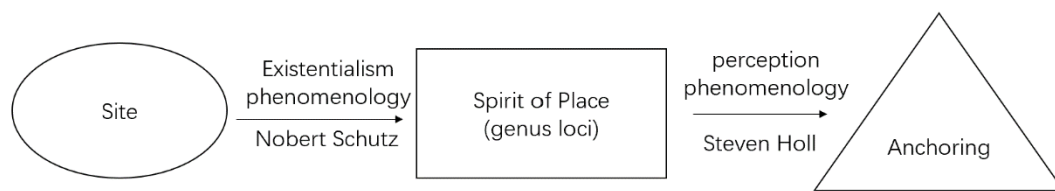
By Bao Guotai based on Holl, S. (1989)

5.2.5 Kevin Lynch

According to Kevin Lynch's assessment criteria for good spaces in "Good City Form"[53] landscape in therapeutic landscape with a heightened sense of perception can become sacred landscape capable of achieving spiritual therapeutic effects. The enhancement of perception is influenced by 1) clarity, 2) a sense of belonging and 3) sensational experience by Merleau-Ponty (1945).

In "Good City Form" Kevin Lynch(1960) enumerates seven performance dimensions to evaluate urban spatial forms: Vitality, Sense, Fit, Access, Control, Efficiency and Justice. Among these the second dimension -"Sense"- has the closest connection to spiritual recovery in rehabilitation landscapes.

Lynch believes perception allows residents to clearly understand a settlement and distinguish it psychologically in time and space. This psychological construction is related to their concepts and values forming a junction where the environment, our senses and our culture interact. This leads to a positive experience in a place providing a sense of belonging.

This concept aligns with Heidegger's notions of "dwelling" and "gathering" and corresponds to the characteristics of a place (Norberg-Schulz, 1971) encompassing good experience and a sense of place.

Lynch further discusses how many individuals have experienced being in an extraordinary place cherishing its rarity. Perceiving the world offers pure pleasure through light and shadow variations, the scent and sensation of the wind, touch, sound and colour. A good place engages all senses, making airflow visible and stimulating its inhabitants' perceptions. The simplest form of perception is identity, specifically the sense of place. Identity enables recognition or recollection of a place due to its unique, distinct or at least targeted features.

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[53] Lynch, K. (1981). A Theory of Good City Form. Cambridge, Massachusetts: The MIT Press.

In "The Image of the City"[54], Lynch initially summarizes spatial elements: Paths, Edges, Districts, Nodes and Landmarks. He emphasizes that these elements are interrelated and must combine to form an image. Lynch's theory directly and indirectly corresponds to the concept of "sacred" in phenomenology and assists in understanding and enhancing "sacred" spaces.

Lynch believes cities, landscapes and the entire built environment are experienced by people and the clarity of these experiences can be determined by individuals' psychological impressions of specific locations. The more profound individuals' impressions of a place, the higher the legibility of that place. Lynch also notes that some places in the world transcend everyday life, evoking distinct meanings. These "sacred" areas are highly active, intensely focused, subdivided into different parts and densely named. Lynch does not specifically specify whether this "sacredness" has a religious nature but he suggests that special places can be experienced by more than one cultural group, particularly landscapes that become spiritual places.

When a therapeutic landscape has high sense of perception, it improves spiritual recovery for its users. Sense of perception is enhanced through the aspects discussed by Kevin Lynch (1960) and Merleau-Ponty (1945): 1) clarity, 2) sense of belonging, and 3) sensory experience, as mentioned by Merleau-Ponty (1945). Due to the broad application of perceptual theory in therapeutic landscapes, we have included these three elements as indicators into the HTLD indicators.

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[54] Lynch, K. (1960). The Image of the City. MIT Press.

Figure 27: the City Image and Elements

By Lynch, K. (1960).https://busratanoglu.wordpress.com/2019/10/03/the-city-image-and-its-elements-kevin-lynch/
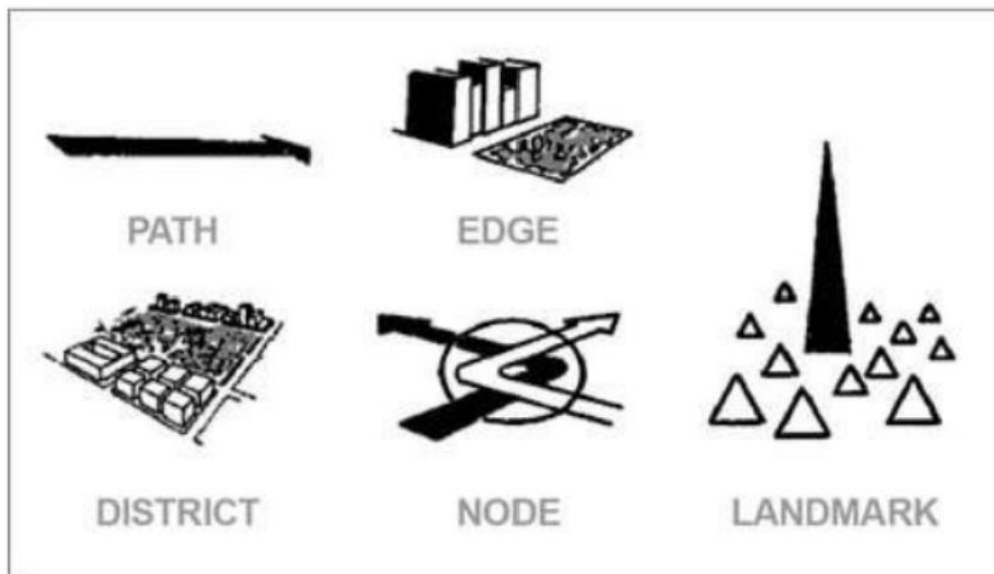
5.2.6 Christopher Alexander
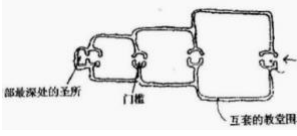
According to Alexander's works "A Pattern Language"[55] (1998) and "The Nature of Order (2002)"[56] when therapeutic landscapes possess sacredness and vitality, users experience spiritual recovery. These two will be applied as indicators to structure holistic therapeutic landscape indicators.

The ways to achieve the sacredness of therapeutic landscapes include three aspects (Table 8):

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[55] Alexander, C. (1977). A Pattern Language: Towns, Buildings, Construction (Centre for Environmental Structure Series). Oxford University Press.

[56] Christopher, C. (2002). The Nature of Order: The phenomenon of life. Berkeley: Centre for Environmental Structure.

Table 9: Sacred Space Pattern

Pattern Name	Pattern Description	Implementation Method	Pattern
Precious Places	The most effective way is for people to walk a distance to reach these places. This follows the principle of "the path bends and reveals".	Spatial Organization: Sequence	
Sacred Place	At each layer, there are gates as signs; entering the gates leads to deeper, more secluded, and sacred atmospheres. The deepest part is the holy place, accessible only after passing through several outer gates. The deepest part is the holy place, accessible only after passing through several outer gates	Spatial Organization: Sequence	
Zen Views	If viewing windows are placed just right, when people approach or pass by, they can catch a glimpse of the distant scenery. However, the distant view is not visible from where people pause. However, the distant view is not visible from where people pause.	Spatial Organization: Sequence	

By Bao Guotai based on Alexander. C. (1977).

And in order for the therapeutic garden to possess vitality, it needs to be enhanced across 15 structural attributes (table 9).

Table 10: Vitality of Space, Christopher Alexander's Fifteen Properties via Visualization and Analysis

name of character	explanation of character	diagram
level of scale	Centres intensify each other when they are different in size. The gap between different scales must not be very large, and practically, one centre would be half or twice the size of another. The gap between different scales must not be very large, and practically, one centre would be half or twice the size of another. If there is a well-ordered range of sizes, a field effect is formed, and then, a whole is made by tying the centres together.	
strong centres	A living whole contains strong centres within it. The concept of a strong centre is applied recursively; every strong centre is made up from multiple smaller strong centres. The concept of a strong centre is applied recursively; every strong centre is made up from multiple smaller strong centres. Nevertheless, there is often a principal strong centre in a whole.	
boundaries	The ring-like centre, made up from smaller centres, forms a field-like effect that intensifies the centre that is bounded. It also unites the centre that is bounded with the world beyond the boundary. It also unites the centre that is bounded with the world beyond the boundary. Note that the order of the magnitude of the boundary and the centre that is bounded needs to be the same.	
alternating repetition	Centres are intensified when they repeat with subtle variation. Alternating repetition is not just simple repetition because what is repeated is modified according to their positions as a whole. When this rule is applied recursively to all entities, spaces between the entities, and the process of repetition, beautiful harmony is created. When this rule is applied recursively to all entities, spaces between the entities, and the process of repetition, beautiful harmony is created. The pattern of repeating centres forms the field effect, and as a result, wholeness emerges	
positive shape	A living whole only has strong centres, where every part of space has the positive shape as a centre. There is never any leftover from an adjacent shape.	
good shape	A living whole has a good shape as a whole that is made up from multiple coherent centres. Good shape is the attribute of the whole, but the whole must be made up from intense centres that themselves are whole. Good shape is the attribute of the whole, but the whole must be made up from intense centres that themselves are whole. Note that the result of a good shape is not only to make things beautiful but also to make them more profound and effective	

local symmetries	A living whole contains various symmetrical segments that interlock and overlap with each other. This feature of symmetry is called local symmetry to distinguish from overall symmetry. This feature of symmetry is called local symmetry to distinguish from overall symmetry. Each local symmetrical segment consists of smaller centres and creates a coherence of the centres. Each local symmetrical segment consists of smaller centres and creates a coherence of the centres. Local symmetries are not distinct but overlap with each other.	
deep interlock and ambiguity	A living whole has some forms that interlock centres with its surroundings. The centres and their surroundings interpenetrate through a third set of centres that ambiguously belong to both. The centres and their surroundings interpenetrate through a third set of centres that ambiguously belong to both.	
contrast	A centre is intensified by the sharp distinction between the character of the centre and surrounding centres. For example, the forms of contrast are black/white, dark/light, empty/full, solid/void, and busy/silent. For example, the forms of contrast are black / white, dark/light, empty/full, solid/void, and busy/silent. The difference between opposites not only separates things but also brings them. The difference between opposites not only separates things but also brings them together.	
gradients	Qualities vary gradually, not suddenly, across space in a living whole. A graded series of different-sized centres forms new centres that have a field-effect as a whole. A graded series of different-sized centres forms new centres that have a field effect as a whole.	
roughness	A living whole has some local irregularities within them. The irregularities are caused by adapting to irregularities in the environment and the irregularities are caused by adapting to irregularities in the environment and responding to the demands and constraints from other nearby centres, not by arbitrary decisions in the design. In that sense, roughness is a form of perfection	
echoes	A living whole contains deep underlying similarities within it. These similarities do not exist merely at a superficial level, but they exist at a deeper level of the structure, derived from similarities in the process of creating them. These similarities do not exist merely at a superficial level, but they exist in a deeper level of the structure, derived from similarities in the process of creating them.	
simplicity and inner calm	A living whole has certain slowness, majesty, and quietness, i.e., a state of inner calm. This quality derives from inner simplicity, where everything that is unnecessary is removed. It does not refer to simplicity in the superficial sense but refers to the true simplicity of the heart	
not-separateness	In a living whole, any centres deeply connect and melt into their surroundings, not separate from them. To achieve this connectedness, the boundary between the centres and their surroundings are fragmented or gradient. a result of this deep coherence, things feel completely at peace	

By Bao Guotai based on Takashi, I. (2005) and Christopher, C. (2002).

Christopher Alexander delves into the relationship between architecture and the meaning of life in his 1977 publication *Pattern Language*57 and introduces his concept of a 'pattern language'. He believes that there's an inherent connection between the beauty of architecture and the meaning of life. He proposes certain nameless qualities such as aliveness, wholeness, comfort, freedom, precision and transcendence that exist in things and people with quality. According to Alexander a therapeutic landscape is an organic space that's alive and growing (Alexander, 1977).

In applying a pattern language Alexander emphasizes the significance of order where patterns need to be understood by repositioning them within a hierarchical network. For instance, when designing a therapeutic garden consideration of texture, plant types, space dimensions, sunlight exposure, user demographics, etc. form various levels. Each element in garden design constitutes a level, possessing a distinct pattern language.

Alexander defines order as the continual enhancement and unfolding of life, encompassing balance, beauty, abundance, happiness, comfort, sacredness, awe, a sense of community, emotional weight or appropriate ambiance and emotions aimed at encouraging specific moments and experiences in the built environment. He sees similarities in the structure of nature and the human body, where numerous organized centres act together as a whole. The vibrancy of a structure determines the structure and density of these centres and integrity can be found in function and form, the sole standard to test truth.

For Alexander the ultimate realm of design is a selfless realm with sacred spaces. A pattern language serves as a tool to help people achieve an ultimate state. In his four-volume work *The Nature of Order*[58], Alexander aims to create "living architecture" where every part, building, street and garden possesses life. Aliveness and the enhancement of space contribute to its sacredness.

To transform a living therapeutic landscape into a sacred one Alexander in *The Phenomenon of Life*[59] emphasizes the referred 15 structural patterns that form aliveness. They encompass levels of scale, strong centres, boundaries, alternating repetition, positive shape, good shape, local symmetries, deep interlock and

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[57] Alexander, C., et al. (1977). A Pattern Language: Towns, Buildings, Construction. Oxford University Press.

[58] Alexander, C. (2002). The Nature of Order: An Essay on the Art of Building and the Nature of the Universe, Book - The Phenomenon of Life (1st ed.). Centre for Environmental Structure

[59] Christopher, A. (2002). The Nature of Order: The phenomenon of life. Berkeley: Centre for Environmental Structure.

ambiguity, contrast, gradients, roughness, echoes, simplicity, inner calm and not-separateness (Alexander, 2002).

5.2.6. Guopu

Guopu is the earliest scholar who proposed Fengshui and Yingyang Concept in Traditional Medicine. Many researchers continued to develop fengshui and Yinyang theories after him.

In the therapeutic landscape achieving balance according to the Fengshui Philosophy, the sub theories of Yin-Yang and Five Elements in traditional Chinese medicine can enable holistic recovery in individuals. When a person is in a stable balanced therapeutic landscape, it promotes physical and mental and spiritual health. Through the balance of Yin-Yang between humans and the natural environment, stability can be attained in the body, leading to holistic recovery in physical, psychological and spiritual aspects.

Through the balance of Yin-Yang between humans and the natural environment, Balance can be attained in the body, leading to holistic recovery in physical, psychological, and spiritual aspects. Due to the importance of balanc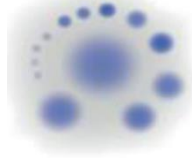e in traditional Chinese medicine for human recovery, and its widespread application in Chinese Feng Shui and therapeutic landscapes, we have included balance as one of the indicators for constructing Holistic therapeutic landscape indicators (HTLD-indicators).

A) According to Yin-Yang theory, there's a mutual generation and constraint between Yin and Yang and they coexist and restrict each other, existing in all things or phenomena. For instance, the proportion of Vegetation and pavement, the areas of light and shadow and the ratio between open and concealed spaces in the site all manifest balance.

B) According to the "Five Elements" theory the element configuration in the therapeutic landscape is targeted for therapeutic effect based on the body's physical attributes. The layout of the site and plant selection are also chosen based on the users' attributes to achieve coordination and equilibrium.

C) By designing and altering the spatial aura of the therapeutic landscape, the site's "Five Elements" attributes and the user's "Five Elements" attributes are correspondingly enhanced resulting in physical, psychological and spiritual recovery.

D) Selecting a therapeutic landscape address involves seeking the dragon inspecting sand, observing water, pinpointing acupoints and selecting an auspicious Feng Shui site. The 'dragon' refers to the main dragon, mainly indicating higher mountain ranges where winds and energies gather. 'Sand' refers to smaller mountains around the main dragon with roles in defending water, blocking winds and gathering energy. 'Water'

represents rivers where gentle and meandering flow is favourable, while turbulent and direct flow is unfavourable. 'Acupoints' indicate residential areas where vitality gathers and develops.

E) Selecting plants with both Yin-Yang attributes and "Five Elements" attributes. The attributes of plants are judged based on their therapeutic effects on the human organs, plant colour and form and seasonal changes in plants. Spring corresponds to wind, summer to heat, long summer to dampness, autumn to dryness, and winter to cold. The five elements correspond to the five organs and viscera, namely spring wind corresponds to the liver and gallbladder, summer heat corresponds to the heart and small intestine, long summer dampness corresponds to the spleen and stomach, autumn dryness corresponds to the lung and large intestine and winter cold corresponds to the kidney and bladder (Figure 28).

The history and theoretical explanation of "Yin-Yang" and the "Five Elements" says they originated in the Xia Dynasty containing the theories of "Yin-Yang" and the "Five Elements", representing ancient philosophical thoughts used to understand and explain nature. The theories flourished in the Spring and Autumn Period and the Warring States Period also marking the gradual development of traditional Chinese medicine theory. Ancient Chinese medical practitioners extensively applied them in medicine to explain the physiological phenomena and changes in the human body, thereby finding therapeutic methods for human treatment, leading to their gradual theoretical development. With the progression of time the connotation of Yin-Yang and the Five Elements theories was continuously perfected. Their main content is summarized as follows:

A) "Yin-Yang" theory: Firstly, Yin and Yang are mutually opposite, and their relationship is mutually balancing. For example, if Yin is excessive Yang weakens. When the body is internally stable and balanced the external state presented by the organism will be excellent. Conversely an imbalanced internal state will undoubtedly harm the body. Additionally, the alternation of seasons and the uninterrupted day and night are results of mutual restriction between Yin and Yang. Only when Yin and Yang oppose each other can nature thrive. Secondly, Yin and Yang depend on each other. They must be based on the existence of the other, such as stillness and motion, upper and lower; both are mutually existing. Lastly, in certain situations, Yin and Yang transform into each other. Yin contains Yang and Yang contains Yin, as stated in "Su Wen"[60]: 'Excessive Yin must result in Yang, excessive Yang must result in Yin'. Only by ensuring the mutual transformation of Yin and Yang can the natural world develop

[60] Duan, Y. (2001). 《素问》全元起本研究与辑复 [Research and Compilation of the Complete Yuan Edition of Suwen]. Shanghai Science and Technology Press. ISBN 9787532357536.

more stably. Additionally, "Yin-Yang" possesses four major characteristics: universality, correlation, definitiveness and relativity. Their universality is evident in how Yin and Yang can manifest as two opposing phenomena or within the same phenomenon. They can explain and describe human tissue structure, physiological functions, pathological changes, diagnosis and treatment. Their correlation refers to the two opposing sides of things, which are not only opposed but also interrelated. For example, spatial up and down, inside and outside, and time's spring-summer and autumn-winter, day and night and temperature's cold and heat are all two sides that are both relative and interconnected, all represented by Yin and Yang. Their definitiveness explains that "Yin-Yang" attributes have relatively clear definitions and are immutable, such as the centre of Yang in the human organs and the Yin of the heart, the Yang of the kidney, etc., all having specific meanings. Relativity refers to the mutual change of Yin and Yang along with changes in one another (Duan，2001).

B) "Five Elements theory": Generally, the "Five Elements" mutually generate and restrain each other. Their generation mainly refers to the mutual nurturing and mutual assistance between substances and systems. The changes between the "Five Elements" follow a certain order and rule, such as metal generating water, water generating wood, wood generating fire, fire generating earth and earth generating metal, with the five substances circulating endlessly. Their restraint mainly indicates the mutual restraint between metal, wood, water, fire and earth, with any two elements having a mutually restraining relationship. Therefore, in subsequent landscape designs, one should try to avoid spaces and elements that counteract each other. Additionally, the basic characteristics of the Five Elements are mainly derived from ancient people's direct observation and simple cognition of the five basic substances, like the characteristics of wood mainly referring to the natural extension of tree branches with growth, softness, the ability to be bent or straight. It concludes that things with an unrestricted nature are categorized as wood, those with bearing properties as earth, those with sediment properties as metal, and those with cold properties as water.

The "Yin-Yang" and "Five Elements" theories utilize the characteristics of dialectical thinking to elaborate on the balance constraints between the whole and the parts, as well as between different wholes and it has played a tremendous theoretical advantage in studying human physiology and pathology. The core of traditional Chinese medicine theory is established on the foundation of "Yin-Yang" and the "Five Elements". If traditional Chinese medicine theory is likened to a tree, then the theory of "Yin-Yang" and the "Five Elements" can be seen as the trunk or roots. Hence, the theory of "Yin-Yang" and the "Five Elements" plays a foundational role in the combined rehabilitation landscape with traditional Chinese medicine theory. In the "Yellow Emperor's Inner Classic" it is mentioned: 'Human life has forms that cannot be

separated from Yin and Yang[61]. In the early stages of design preparation, a detailed analysis of human characteristics and understanding of the needs of the user group must be conducted. Since the theory of "Yin-Yang" and the "Five Elements" is the foundation of human beings, the research process for human healing inevitably Involves both theories (Qian，2022).

Moreover when the human body is within nature, the theories of "Yin-Yang" and the "Five Elements" describe physiological diseases and bodily changes. Additionally the relationship and interaction between humans and nature can also be analysed through the alternation of "Yin-Yang" and the restraint of the "Five Elements". Finally, the most significant feature of traditional Chinese medicine theory in treating diseases lies in differential diagnosis and treatment based on the differentiation of organs. Scholars in the field propose that the fundamental principle of differential diagnosis and treatment lies in "Yin-Yang". Through relevant clinical experiences, it is concluded that by adhering to fundamental diagnostic principles, certain therapeutic effects can be achieved for physiological symptoms in the human body.

Figure 28: "YinYang" & "Five Elements" Transformations and Phases

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[61] Qian, C. (Ed.). (2022). 黃帝內經版本通鑒·第二輯（全 19 冊）　[A Comprehensive Study of Versions of Huangdi Neijing - Volume 2 (Complete 19 Volumes)]. Tianjin Ancient Books Publishing House.

5.2.7. Huangdi

The design of therapeutic landscapes grounded in " Zangxiang theory "of traditional Chinese medicine, aims to attain holistic therapeutic effect on physiological, psychological and spiritual well-being. While Huangdi is credited as the principal author of the "Zangxiang theory", it is important to note that it is essentially a compilation of insights from numerous medical scholars. The main concept of Zangxiang from Huangdi is holism.

Holism in therapeutic landscape is the entire space of the therapeutic landscape, akin to the human body, requires coordination of various parts, mirroring the harmonization of the internal organs. This means that the therapeutic landscape needs to establish a unified system among historical context, geographical environment, regional culture, functional zoning and landscape systems to provide psychological and spiritual recovery for the users of the therapeutic landscape. Due to the extensive application of holism in traditional Chinese medicine, Feng shui, and Chinese therapeutic landscapes, and its role in the psychological and spiritual recovery

of users, we have included holism as one of the Holistic Therapeutic Landscape Indicators (HTLD indicators).

By analysing the physical responses and needs of the human body to the environment, it is possible to study the intrinsic specifics or regularities of environmental planning. The Zangxiang theory, as a core part of traditional Chinese medical theory, is established on the foundation of traditional Chinese philosophical thought. Its purpose is to study the relationship between external manifestations of the human body and the internal workings of visceral activities, effectively guiding health preservation, disease prevention, diagnosis, treatment and recovery. The Zangxiang theory integrates the holistic view and the physiological characteristics and connections of the internal organs into the design, enabling the landscape environment to be more rational and systematic with theoretical support.

"The formal establishment of the "Zangxiang theory" system originates from the Yellow Emperor's Inner Canon"[62]. Zangxiang, also known as 'visceral appearances', refers to the manifestations of the physiological functions and pathological changes of the internal organs exhibited externally. It involves human body morphological structure, physiological activities of internal organs, related spiritual interactions, physical organ apertures, natural environmental factors, etc. 'Zang' refers to the qi[63] hidden among the internal organs of the human body, while 'xiang' refers to the external manifestations. Therefore, Zangxiang theory advocates deriving internal functional activities from external appearances to grasp the developmental status and rules of things. 'Zangxiang' is a unique concept in Chinese medicine, distinct from the concept of organs. The formation of the Zangxiang theory firstly originated from ancient anatomical knowledge; secondly, it was derived from people's studies of physiology and pathology. For instance, when people exhibit symptoms of a cold and cough, it triggers associations with the lungs, thereby recognizing the existence of 'zang' and 'xiang.'

The Zangxiang theory system stands out for its distinctiveness, as it goes beyond mere anatomical concepts, delving into both physiological and pathological aspects within the human body's system. Despite sharing names with human organs, the 'zang' and 'fu' in Zangxiang carry unique physiological and pathological meanings. In essence, the Zangxiang theory holds a crucial position within the Chinese medical theoretical

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[62] Qian, C. (Ed.). (2022). 黃帝內經版本通鑒·第二輯（全 19 冊）[A Comprehensive Study of Versions of Huangdi Neijing - Volume 2 (Complete 19 Volumes)]. Tianjin Ancient Books Publishing House.

[63] Qi (pronounced "chee") is a fundamental concept in traditional Chinese medicine, representing the vital life force or energy that flows through the body. It is believed to be essential for maintaining health and balance, affecting a person's physical, emotional, and spiritual well-being.

framework. Its exploration of specific internal organ issues is rooted in the external physiological and pathological manifestations of the human body, providing valuable insights into understanding the body's physiological and pathological characteristics.

CHAPTER II – Proposal of a Holistic

Therapeutic Landscape Design Approach

CHAPTER II – Proposal of a Holistic Therapeutic Landscape Design Approach

1. Objective and Mechanism of Holistic Therapeutic Landscape Design

The objective of therapeutic landscape design is to assist users in experiencing different tangible and intangible landscape elements within the landscape, thereby achieving holistic therapeutic effect on physical, psychological and spiritual aspects. Tangible factors include greenery, water bodies, sunlight, air, etc; while intangible factors encompass the ambiance, familiarity, self-identity, etc; all have been summarized as indicators in table 11 (Ulrich, 1984; Kaplan & Kaplan, 1989; Appleton, 1983; Cooper Marcus, 2010; Cannon, 1995; Wilson, 2002; Grammer, 2008; Becker & Sweene, 1998; Gesler, 2005; Heidegger, 1980; Norberg-Schulz, 1992; Merleau-Ponty, 2007; Holl, 1999; Lynch, 2000; Alexander, 2014).

Physiological therapeutic effect involves utilizing natural elements to improve physical health. According to biophilia and natural preference theory, sunlight, air, temperature and water are crucial for our survival. We absorb their health benefits through biochemical and physiological processes, aiding in therapeutic effect on users (Ulrich, 1984; Wilson, 2002; Grammer, 2008). For example, sunlight contributes to vitamin D synthesis and enhanced calcium absorption, while plants, through photosynthesis, release beneficial oxygen and other gases. Additionally, plants absorb harmful gases, capture dust on leaves and eliminate bacteria, essential for our health. Research also indicates that plants increase the concentration of negative ions in the air, crucial for respiratory health (Yixun Guo, 2020). Furthermore, based on traditional Chinese medicine theories (herbal plants having pharmacological effects) many plants have medicinal properties. For instance, honeysuckle can treat fever, headaches related to cold, cough, inflammation, throat pain, skin infections, and tumour necrosis. On the other hand, ginkgo leaves can lower blood pressure and blood sugar levels, eliminate blood stasis and promote vascular circulation. Additionally, physical activities and gardening are beneficial for the body, promoting the neuroendocrine-immune system and enhancing physical recovery.

Psychological Therapeutics: psychological therapeutics based on Ulrich's stress reduction theory, Kaplan's attention restoration theory, Silvan Tomkins' affective consistency theory and Jay Appleton's prospect-refuge theory, emphasizes the positive impact of a natural environment on emotions, aiding stress relief. When individuals experience positive emotions, hormones such as dopamine, endorphins

and peptides are released, helping alleviate tension and promoting psychological recovery. People perceiving natural landscapes trigger positive responses in the sensory areas of the brain cortex and neural pathways, enhancing psychological experiences.

Spiritual Therapeutics: spiritual therapeutics at the mental level involve enhancing perceptual experiences through sight, hearing, touch, smell and taste (Merleau-Ponty,2007;Holl,1997). It also involves sparking curiosity and improving recognition, thinking, understanding, prediction, expectation, and communication skills. Creating spaces with a sense of familiarity and belonging helps individuals self-identify with value and meaning. According to the theories of Yin and Yang and the Five Elements, achieving a balanced state in the landscape environment also influences the spiritual aspect of the human body. This enables individuals to attain a state of balance in yin and yang as well as the Five Elements. Understanding the history of therapeutic landscapes and personal religious beliefs plays a positive role in spiritual recovery (Gesler, 1980).

Table 11: Objective and Mechanisms of Therapeutic effect on well-being of users .
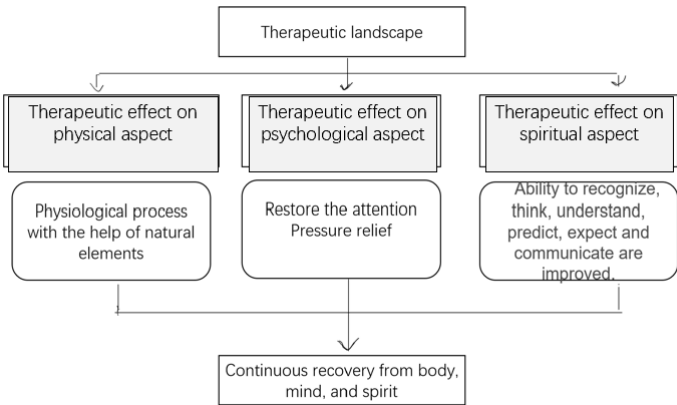
By Bao Guotai(2024).

2. Indicators for Holistic Therapeutic Landscape Design-HTLD

The discussed indicators included in 16 theories on therapeutic landscapes will be applied to the holistic indicators of therapeutic landscapes:

A. Roger Ulrich

B. Stephan Kaplan and Rachel Kaplan

C. Jay Appleton

D. Clare Cooper Marcus

E. Walter Bradford Cannon

F. Silvan Tomkins

G. Edward O. Wilson

H. John Haygarth

I. Gesler

J. Heidegger and Zhuangzi's

K. Norberg-Schulz

M. Merleau-Ponty

N. Kevin Lynch

O. Cristopher Alexander

P. Guopu

Q. Huangdi

2.1 Indicators and Explanation

First, each authors "indicators" are summarized and explained. Next all the indicators, authors and therapeutic effect on physical or psychological or spiritual dimension are demonstrated in a table for better understanding and future application (Table 10).

A. Roger Ulrich

Sense of control: people must be aware of existence of therapeutic landscape, have easy access and the freedom to utilize it as they desire. This means the therapeutic landscape should be visible from main entryways or gathering areas and have clear signage if not directly visible.

Social support: therapeutic landscape should support different level of social interaction. Studies reveal therapeutic landscapes within healthcare facilities that design elements like seating arrangements and location impact how these spaces are utilized.

Physical movement and exercise: therapeutic landscapes offer various incentives for exercise, such as different walking paths of varying lengths and difficulties, unique spots to reach like a gazebo and engaging activities spread throughout the area.

Positive natural distractions: a therapeutic landscape should authentically resemble a natural outdoor space offering ample opportunities for people to connect with nature.

It serves as a refuge, providing a break from the sights, smells and sounds experienced indoors.

B. Stephan Kaplan and Rachel Kaplan

Coherence: refers to a harmonious setting where all elements unite as a whole like in theme parks or any gardens.

Legibility: involves well-structured and easily understandable spaces that are navigable and recognizable, allowing objects to be identifiable and functional for any activity.

Complexity: is defined by the number of visual elements in the landscape, encompassing diverse plant life, colours and varied outdoor furniture, offering possibilities for more activities and content.

Mystery: evokes curiosity and wonder, prompting individuals to explore further. Cues encouraging exploration must be provided. For instance, pathways leading to more distant landscapes trigger a desire to explore. Conversely, closed-door houses don't attract exploration and are not considered good examples of mystery.

C. Jay Appleton

Sense of safety (refuge): a bench placed in the corner in front of a large tree. Tree trunk supports the back.

Good visual experiences (prospect): have a good view of the therapeutic landscape and understand the environment easily.

Prospect: refers to the ability to perceive a wide, open view of the environment. It involves having a clear line of sight that allows individuals to see into the distance and observe their surroundings. Environments with good prospect often evoke feelings of expansiveness, freedom and exploration. Prospect can contribute to a sense of excitement, curiosity and engagement with the environment.

Refuge: refuge, on the other hand, pertains to the sense of safety, security and protection that a physical element or feature of the environment provides. This could be a sheltered area, such as the shade of a tree, a nook in a rocky outcrop, or a secluded spot surrounded by vegetation. Refuge offers individuals a feeling of being shielded from potential threats or dangers in the environment. It fosters relaxation, comfort and a sense of being at ease, allowing individuals to rest, reflect and recharge.

D. Clare Cooper Marcus

Visibility: refers to the ability to see and perceive elements within an environment. In Clare Cooper Marcus's theory, visibility encompasses not only the physical line of sight but also the clarity and legibility of the environment. Spaces with good visibility allow

individuals to understand their surroundings easily, contributing to a sense of orientation and safety.

Sense of Security: refers to the feeling of safety and protection that individuals experience within an environment. This includes both physical safety from potential hazards or threats and psychological comfort derived from the design and layout of the space. Spaces that foster a sense of security are characterized by features such as clear sightlines, well-defined boundaries and a lack of hidden or obscured areas.

Physiological Comfort: relates to the physical well-being and comfort of individuals within an environment. It encompasses factors such as temperature, humidity, air quality and ergonomic design that affect the body's physiological responses. Environments that promote physiological comfort support relaxation, stress reduction and overall well-being.

Opportunities for Choice: refer to the availability of options and decision-making opportunities within an environment. Clare Cooper Marcus emphasizes the importance of empowering individuals to make choices about their surroundings, such as selecting where to sit, how to move through a space, or which activities to engage in. Environments that offer opportunities for choice promote autonomy, engagement, and a sense of personal control.

Interaction with Nature: involves the presence of natural elements and the opportunities for individuals to engage with them within an environment. This includes features such as plants, water, sunlight and natural materials that evoke connections to the natural world. Clare Cooper Marcus emphasizes the restorative and therapeutic benefits of interacting with nature, which can enhance mood, reduce stress and promote overall well-being.

Familiarity: refers to the degree to which an environment is known, recognizable and predictable to individuals. Clare Cooper Marcus highlights the importance of designing environments that feel familiar and welcoming, drawing on elements of cultural or personal significance. Familiar environments promote a sense of belonging, comfort and emotional attachment.

Clearly Positive Design Features: are elements of an environment that contribute positively to the overall experience and well-being of individuals. These features may include attributes such as natural light, comfortable seating, attractive landscaping, and well-maintained amenities. Clare Cooper Marcus advocates for the intentional integration of such features into the design process to create environments that support human needs and preferences.

E. Walter Bradford Cannon

The indicators drawn from the fight or flight theory aim to reduce the pressure experienced by users of the landscape, thereby alleviating stress. Roger Ulrich's attention restoration theory (ART) further contributes to stress relief. Consequently, elements derived from ART serve as indicators for mitigating the flight-or-fight response among users of therapeutic landscapes. Thus, the indicators here are from Roger Ulrich .

Sense of control: ensuring individuals feel a sense of control within the therapeutic landscape involves making it easily visible from main entryways or gathering areas. Clear signage should be provided if the landscape is not directly visible, empowering individuals to navigate and utilize the space with confidence.

Social support: therapeutic landscapes should facilitate various levels of social interaction. Research indicates that design elements such as seating arrangements and location significantly impact how these spaces are utilized within healthcare facilities, emphasizing the importance of fostering social connections and support networks.

Physical Movement and Exercise: therapeutic landscapes are designed to encourage physical activity and exercise. They offer diverse incentives, including different walking paths of varying lengths and difficulties, as well as unique features like gazebos and engaging activities spread throughout the area, motivating individuals to stay active and maintain their well-being.

Positive Natural Distractions: a key aspect of therapeutic landscapes is their ability to authentically replicate natural outdoor spaces. By providing ample opportunities for people to connect with nature, these landscapes serve as refuges, offering a break from the indoor environment and allowing individuals to immerse themselves in the sights, smells and sounds of the natural world, promoting relaxation and rejuvenation.

F. Silvan Tomkins

Positive Design Features: by choosing clear and positive visual elements, designers can help create a tranquil and therapeutic landscape.

G. Edward O. Wilson

Natural Resources: include natural elements such as plants, sunlight, air, temperature and water, from which the body benefits through biochemical and physiological processes.

H. John Haygarth

Well-Designed: therapeutic landscape has good functionality.

Well Maintained: after the therapeutic landscape is built.

Appealing: it looks attractive and users like this therapeutic landscape.

I. Gesler

Historical Events: history related to the site of therapeutic landscape.

Cultural Beliefs: the users' beliefs which is related to the site and cultural background of the users.

Social Relationships: how the therapeutic landscape is viewed by the society.

Personal Experiences: Each patient dialogues with the therapeutic landscape and lives in it in their own way. Their past, their childhood and their beliefs and experiences influence the communication between them and the therapeutic landscape.

J. Heidegger and Zhuangzi

Self-Identity: users feel they are accepted in the therapeutic landscape and they accepted therapeutic landscape and themselves. They feel they have purpose of meaning of life in the therapeutic landscape.

Fearlessness Toward Death: therapeutic landscape helps them to understand how death is and they do not feel fear in the therapeutic landscape.

K. Norberg-Schulz

Uniqueness: encompasses both tangible and intangible qualities of a place, linking them with value. "Genius loci" represents another intangible heritage value present in environments where cultural resources are created and in social, political and historical contexts.

Experiential Quality: constitutes an essential aspect as how the users feel the place.

User Involvement in Design: this emphasizes that design must involve the users of these spaces; the designers themselves should be users of therapeutic landscapes.

M. Merleau-Ponty

Perception: enhancing sensory experiences. Enhancing color, shape, aroma, sound, texture and spatial experiences contributes to fostering a positive perceptual encounter.

N. Kevin Lynch

Clarity: therapeutic landscape are experienced by people and the clarity of these experiences can be determined by individuals' psychological impressions of specific locations. The more profound individuals' impressions of a place, the higher the legibility of that place.

Sense of Belonging: within a therapeutic landscape as the feeling of attachment, familiarity and connection that individuals develop towards their healing environment. It encompasses the sense of being an integral part of the therapeutic landscape, where individuals feel accepted, understood and valued.

This sense of belonging is influenced by factors such as the legibility and coherence of the therapeutic landscape, the presence of recognizable landmarks and nodes within it and the ease with which individuals can navigate and make sense of their healing surroundings. When people feel that they can easily understand and navigate the therapeutic landscape, recognize significant features and elements within it and develop mental maps that anchor their sense of place, they are more likely to experience a strong sense of belonging to their healing environment.

O. Cristopher Alexander

Vitality: according to Alexander, is the life force or energy that animates spaces and makes them feel alive, vibrant and harmonious. Precious Places, Sacred Place, Zen Views would achieve vitality.

Sacredness: Therapeutic landscape encompasses levels of scale, strong centers, boundaries, alternating repetition, positive shape, good shape, local symmetries, deep interlock and ambiguity, contrast, gradients, roughness, echoes, simplicity, inner calm and not-separateness

P. Guopu

Balance - a key principle in Holistic Therapeutic Landscape Indicators (HTLD-indicators) is derived from traditional Chinese theories:

A) In Yin-Yang theory, balance is reflected in aspects like the proportion of soft and hard landscapes, light and shadow areas and open to concealed spaces.

B) Following the Five Elements Theory, balance is achieved through element configuration targeting therapeutic effects based on users' physical attributes.

C) Altering the spatial aura and Five Elements attributes of the therapeutic landscape leads to holistic recovery in physical, psychological and spiritual aspects.

D) Selecting a therapeutic landscape address involves Feng Shui principles like finding the main dragon, observing surrounding mountains, understanding water features, pinpointing vital residential areas and choosing an auspicious site.

E) Plant selection emphasizes balance by choosing plants with both Yin-Yang and Five Elements attributes, considering therapeutic effects on human organs and seasonal changes.

Q. Huangdi

Holism: the therapeutic landscape, like the human body, requires coordination among various elements—historical context, geographical environment, regional culture, functional zoning and landscape systems.

Table 12: Therapeutic landscape indicators

PS：H-physical   P-psychological   S-spiritual

Approach	Main author	Therapeutic effect aspects			Indicators for Therapeutic landscape
Evidenced based	Roger Ulrich (1981)	H	P		a sense of control social support physical movement and exercise positive natural distractions
	Stephan Kaplan & Rachel Kaplan (1981)		P		Coherence legibility complexity mystery
	Jay Appleton (1970)		P		a sense of safety (refugee) good visual experiences(prospect)
	Clare Cooper Marcus (2014)	H	P		Visibility a sense of security physiological comfort opportunities for choice interaction with nature familiarity clearly positive design features.
	Edward O. Wilson (1985)	H	P		natural resources good visibility sense of security
	John Haygarth (1700)	H	P		well-designed well maintained. appealing
philosophical method	Gesler (2005)		P	S	historical events cultural beliefs social relationships personal experiences

Heidegger (1986)			S	self-identity fearlessness toward death
Norberg-Schultz (1992)			S	Uniqueness. Irreplaceability Experiential quality User involvement in design.
Merleau-Ponty (1996)		P	S	Perception
Kevin Lynch (2000)			S	clarity a sense of belonging
Christopher Alexander (2001)			S	sacredness vitality
Guopu (300)	H	P	S	Balance
Huangdi(BC26)	H	P	S	Holism

By Guotai Bao (2024).

Table 13: Holistic Therapeutic Landscape Indicators (HTLD-Indicators)

H-physical   P-psychological   S-spiritual

Physical & psychological (14)	psychological (6)	Psychological spiritual (5)	Spiritual(6)	Physical psychological &spiritual(2)
a sense of control	Coherence	historical events	self-identity	Balance
social support	Legibility	cultural beliefs	fearlessness toward death	Holism
physical movement and exercise	Complexity	social relationships	clarity	
positive natural distractions	Mystery	personal experiences	a sense of belonging	
a sense of security	a sense of safety (refugee)	Perception	sacredness	
physiological comfort	good visual experiences(prospect)	uniqueness	vitality	
opportunities for choice		User involvement in design		
interaction with nature				
familiarity				
clearly positive design features.				
natural resources				
well-designed				
well maintained.				
appealing				

By Bao Guotai (2024).

The built 33 indicators from therapeutic landscape theories, from 16 authors offers possibility to improve well-being of therapeutic landscape users. And after the 33 indictors are built, next is to give strategies which would help improve each indicator to realize a well-designed therapeutic landscape to achieve holistic therapeutic effect of the users.

3. Therapeutic Landscape Design Strategies

How could we improve the Holistic Therapeutic Landscape Indicators (HTLD-Indicators)? The therapeutic landscape design strategies are the answers to improve indicators from physical, psychological and spiritual aspects.

3.1 Five Senses Design Strategy

Five Senses Design Strategy improves physical, psychological and spiritual indicators.

The "Five Senses" design strategy can effectively improve positive natural distractions in HTLD-indicators (Roger 1984). Simultaneously, it can elevate perceptual experiences through enhanced sensory experiences (Merleau-Ponty, 1996; Steven Holl, 2001). Additionally, it can indirectly impact various indicators, but specific and measurable enhancements need to be derived based on the actual results of therapeutic landscape design and the user's own experiences. For example, different colours, shapes or scents may elicit varied responses due to individual experiences, cultural backgrounds and social contexts (Gesler 1980).

People primarily experience their environment through their senses, with the most crucial organs being the eyes, ears, nose, tongue and skin. Therefore, visual, olfactory, auditory, tactile and gustatory aspects are the five dimensions of focus in therapeutic landscape design.

3.1.1 Vision

According to W. Gerber (1990), L. Cheskin (1978) and Li Shuhua (2019), research by Wang (2020) demonstrates that in rehabilitation landscapes, alterations in colour, shape and size based on the physiological and emotional state of the users can have therapeutic effects.

Specific colours are associated with different emotions and events across cultures: red and purple with celebrations, blue with excellence, purple with dignity, green with nature and yellow with sunshine. Pink is often linked to health, while white symbolizes purity and black conveys darkness.

Among our five senses, vision is most sensitive to colour. Colour psychologist W. Gerber suggests that colourful artwork might have therapeutic effects due to each colour possessing a unique electromagnetic spectrum, stimulating the brain physiologically and psychologically through the optic nerve. For instance, L. Cheskin demonstrated the influence of different colours on the body and mind. Red accelerates heart rate, blood pressure and odour perception, invoking excitement and joy. In contrast, blue has an opposite effect, reducing heart and breathing rates, inducing calmness but sometimes causing depression and negativity. Similarly, black

induces fear and depression, while orange uplifts moods, promoting positivity and optimism. Generally, warm colours like orange and red can energize and sustain emotions, while cool colours like cyan and blue induce tranquillity and relaxation. Balance in colour usage is crucial.

Apart from colours, the shapes, sizes and textures of landscape elements significantly impact visual perception and evoke various psychological feelings and emotions. Circles and curves symbolize unity and protection, being friendlier and inviting, while triangles signify energy and dynamism, suitable for representing motion and direction. Squares and rectangles, being associated with lines and right angles evoke feelings of reliability and security, often contributing to a sense of structure and stability in landscapes.

Understanding the psychological effects of different shapes helps designers create visually appealing landscapes that positively influence our psyche and emotions. Integrating different shapes strategically fosters harmony, balance and a sense of tranquillity, aiding in relaxation and stress relief. According to Gestalt psychology, our brains simplify information in our environment to aid better understanding. However, this process requires energy and high cognitive ability. Simple and regular shapes are easier to recognize, while complex shapes may trigger negative emotions and worsen the health conditions of individuals with mental and cognitive disorders. Hence, simplicity and clarity should be paramount considerations in designing therapeutic landscapes. Natural elements and simple shapes of artificial elements are often used to enhance readability. Studies by Ulrich and others indicate that people prefer natural elements in their environment. Viewing water and plants assists in regaining attention and reducing stress levels. An experiment conducted by E.H. Kim and R.H. Mattson from the Kansas State University's Horticulture Department observed 150 college students experiencing stress from visual stimuli. They were asked to observe flowering geraniums and geraniums with only green leaves. The experiment demonstrated that flowering plants had a better stress-relief effect than the ones with only green leaves.

3.1.2 Smell

According to Li Shuhua (2020), smell plays a crucial role in perceiving the environment and planting different plants in therapeutic landscapes can have a therapeutic effect. Smells can be perceived from a distance and trigger various psychological and physiological responses, including accelerating the recovery process. Many pleasant smells in nature come from plants and the aromas released by various plants can bring about physiological, psychological and spiritual changes.

In communal activity areas, flowers such as lilies *(Lilium candidum)*, daffodils *(Narcissus tazetta var. orientalis)*, lemon trees *(Citrus limon)* and other plants that uplift, delight and enhance a collective sense of participation can be planted. On the other hand, in private, quiet and meditative areas, it is advisable to plant pine trees *(Pinus tabulaeformis Carr)*, oriental arborvitae *(Platycladus orientalis)*, padauk *(Pterocarpus indicus)*, cinnamon *(Cinnamomum pedunculatum)*, lavender *(Lavandula angustifolia)*, and lilacs *(Syringa aromaticum)*, which have soothing and calming effects. Additionally, plants with insect-repelling and antimicrobial scents, such as camphor trees (*Cinnamomum camphora*), golden showers (*Murraya paniculata*), geraniums (*Pelargonium hortorum*), lemongrass (*Cymbopogon citratus*) and mugwort leaves (*Folium Artemisiae argyi*), are suitable for planting. Plant aromas are not limited to flowers; leaves of plants like mint (*Mentha*), sage (*Salvia officinalis*), thyme (*Thymus*), oregano (*Origanum vulgare*), rosemary (*Rosmarinus officinalis*), basil (*Ocimum basilicum*) and lemon balm (*Melissa officinalis*) also emit pleasant scents. Aromas from plants are also used for therapeutic purposes. For instance, cloves (*Syringa aromaticum*) have analgesic properties, relieving toothaches; jasmine *(Jasminum sambac)* flowers' aroma can alleviate depression and cold symptoms; and osmanthus (*Osmanthus fragrans*) aroma is believed to have therapeutic effects for mania. Understanding the therapeutic effects of different plant aromas can guide the selection of plants in therapeutic landscapes (Li, 2020).

Table 14:Different Plants Correspond to Cure the Diseases

Plants and Diseases	Perilla	Birch tree	Dianthus	Cedar	Jasmine	Sage	Cypress	Eucalyptus	Geranium	Grapefruit	Jasmine	Round	Bay leaf	Lavender	Lemon	Peppermint	Citrus	Mint Mint	Pine tree	Rose	Rosemary
asthma	√			√	√	√	√							√	√	√		√	√	√	√
Pollen disease								√						√					√	√	
high blood pressure					√	√								√	√	√				√	
low blood pressure				√			√	√	√					√				√	√		
circulatory system	√	√				√	√	√	√			√	√	√	√	√	√	√	√	√	√
influenza	√						√	√					√	√	√	√	√	√	√		√
Cerebral congestion	√						√	√			√			√	√	√	√	√	√		√
Arthritis		√		√	√		√	√				√	√	√	√	√		√	√		√

Muscle soreness	√			√		√	√		√	√	√	√	√	√	√		√		√
fatigue	√				√		√	√	√	√	√	√	√		√	√	√		√
anxious	√		√	√	√	√		√		√	√	√			√				
headache	√			√	√		√						√		√		√		
insomnia				√	√			√		√			√		√				
Depression	√	√		√	√			√	√	√	√		√	√	√	√		√	
Sadness										√			√		√				√
Digestive system													√	√	√	√	√		

By Li Shuhua (2020)

3.1.3 Sound

Within therapeutic landscapes, artificial elements like man-made waterfalls, small water channels or plants reacting to weather conditions can create natural sounds, such as the rustling of leaves in the breeze or the patter of banana leaves in the rain. Simultaneously, it's crucial to isolate these areas from traffic noise (Feng, 2013).

Hearing is a vital sense for interacting with the environment. Daily exposure to artificial sounds like traffic noise and hospital equipment often leads to negative emotions, while natural sounds are associated with positive moods and can be integrated into therapeutic landscapes to promote health (Xiao Ren Feng, 2013). Natural elements like plants and water produce soothing sounds that positively impact patients. Wind-blown plants, such as bamboo and broad-leaved plants like palms, along with elements like fountains, artificial waterfalls and streams, create pleasant sounds. These elements also attract insects and birds, further enriching the ecosystem. Additionally, adding elements like wind chimes and rain chains enhances the variability of natural sounds. However, it's noteworthy that different sounds in therapeutic landscapes may suit different users' preferences. Aesthetic preferences are crucial considerations in discussions regarding the beneficial mechanisms of nature's emotional recovery potential (Han, 2010; Hartig & Staats, 2006; Purcell, Peron, & Berto, 2001; van den Berg, Koole, & van der Wulp, 2003; Van Hedger, 2019). Overall, incorporating elements of natural sounds into therapeutic landscapes positively influences patients' emotions and overall well-being. Integrating natural elements to create environments that promote health and recovery is essential. For

instance, Suzhou's Humble Administrator's Garden has a feature called the "Listening to Rain Pavilion," where banana plants create soothing sounds during rainfall.

3.1.4 Touch

Touch is the perception of sensory information on the body's skin. In rehabilitation landscapes, planting various textured plants and raising small animals increases the potential for user-plant/animal contact, enhancing the rehabilitative effect.

Research by Kahn indicates that tactile experiences effectively improve physiological and psychological rehabilitation. However, studies suggest that touching animals yields more significant rehabilitative effects than touching plants in natural settings (Kahn, 1997). Pets increase pain tolerance, reduce loneliness, aid stress recovery and decrease the need for medical care (Kellert & Wilson, 1993). Animals are known to provide tactile comfort, contributing to this effect. Therefore, having small animals like cats or dogs in rehabilitation facilities can increase physical contact between users and animals, thus enhancing recovery. However, it's important to note that the non-animal aspects of nature through touch, such as feeling grass or water, may also reduce blood pressure and enhance happiness (Franco, 2017).

For individuals with visual impairments, touch is a primary way to interact with the environment. Different object textures evoke various psychological feelings. Therefore, therapeutic landscape design should encourage users to touch natural and artificial elements. Plants offer various textures like smoothness, fuzziness, roughness, thickness and thinness. Warmth from sunlight on water, soil or stones can spark imagination. Good tactile experiences with artificial items should focus on the detailed textures of chairs, landscape walls, handrails and floors.

3.1.5 Taste

In therapeutic landscape, planting sweet-tasting fruits and vegetables while minimizing bitter-tasting ones is recommended. Research also indicates that self-grown and organic food brings more happiness and satisfaction to individuals (Lockie et al., 2004).

Taste primarily originates when substances react or stimulate taste receptor cells on the tongue. Taste buds perceive five different taste qualities: sweet, sour, salty, bitter, and umami, significantly influencing people's emotions. Positive emotions are associated with enhanced sweetness and reduced sourness, while negative emotions are linked to enhanced sourness and reduced sweetness (Noel C., 2015). Taste is also associated with reward and aversion mechanisms, where sweetness brings pleasure, and bitterness evokes aversion (Yamamoto, 2008).

Different tastes affect emotions differently; saltiness stabilizes emotions, spiciness causes instability and bitterness induces discomfort. Moreover, people's emotions influence their taste perception. Depressed individuals are highly sensitive to sweetness and bitterness, distinguishing between bitter and sour tastes well, while highly anxious individuals are less sensitive to bitter and salty tastes.

In therapeutic landscapes it's advisable to use edible and medicinal plants. User engagement in planting, picking and tasting fruits and vegetables significantly enhances rehabilitation. Studies have shown that those who grow their own food are happier than those who do not (Church et al., 2015). Growing one's food is linked to various benefits, including self-fulfilment, identity affirmation and better-quality food (Crouch and Ward, 1999). Plants with edible fruits, leaves and flowers such as blackberries, elderberries, raspberries, mint, thyme, rosemary, basil and bee balm offer experiences that stimulate taste, smell, vision and touch.

3.2 Natural Therapy Design Strategies

Natural therapy in therapeutic landscape includes horticultural therapy, Landscape Element therapy, art therapy, physical activity and mindfulness meditation.

It directly enhances physiological and psychological indicators in the HTLD-indicators, including a sense of control, physical movement and exercise, positive natural distraction, opportunities for choice and interaction with nature. Indirectly, it may improve spiritual indicators self-identity, fearlessness toward death clarity, a sense of belonging, sacredness, vitality, self-identity as they are more related to their personal experience and interaction with nature.

3.2.1 Horticultural Therapy

The aim is to positively impact various health outcomes like improving mood, self-esteem and social interaction (Gonzalez et al., 2011). Horticultural therapy includes plant therapy, aromatherapy, flower therapy and artistic therapy involving flower arrangements. Research shows the effectiveness of horticultural therapy in treating a wide range of symptoms like depression, anxiety, dementia and chronic pain (Gonzalez et al., 2011). Engaging in plant-related activities in gardens enables individuals to recover and improve physical, psychological and spiritual health. Horticultural therapy is a comprehensive treatment involving nature, art and psychological therapies, encouraging active participation within groups. Gardens for horticultural therapy can take various forms like greenhouse gardens, nurseries, vegetable gardens or courtyards, depending on the therapy project. Gardens should have irrigation systems, planting beds of different heights; should be accessible to

disabled individuals and provide general gardening tools. Gardens must be supervised by horticultural therapists (Clare Cooper Marcus, 2018; Zhou, 2012, p. 24-25).

Horticultural therapy assists participants to learn new skills or regain those that are lost. Horticultural therapy helps improve memory, cognitive abilities, task initiation, language skills and socialization. In physical therapy, horticultural therapy can help strengthen muscles and improve coordination, balance and endurance. In vocational horticultural therapy settings, people learn to work independently, problem solve and follow directions (American Horticultural Therapy Association, 2022). Horticultural therapy in therapeutic landscapes requires facilities like plant gardens, such as greenhouse gardens, nurseries, vegetable gardens or courtyards, depending on the horticultural therapy project. General gardening tools should also be available. Gardens must be supervised by horticultural therapists (Clare Cooper Marcus, 2018; Zhou, 2012, p. 24-25).

3.2.2 Landscape Element Therapy

It involves using natural elements including various other therapies such as mud therapy, natural light therapy, forest therapy and mineral water therapy, applicable in various settings like hospitals, nursing homes, rehabilitation centres, as well as natural environments like forests, beaches and mountains. Therapeutic treatments can be conducted in landscapes of any scale, encouraging the use of nature as a means to improve health and well-being (Zhou, 2012). The relationship between humans and the environment is a crucial aspect of Landscape Element therapy and its impact on overall health and well-being. The goal of Landscape Element therapy is to create a therapeutic landscape using natural surroundings that positively influence physical, psychological and spiritual health. Research shows that landscape therapy can serve as an effective adjunct therapy for various health conditions, including chronic pain, depression, anxiety and stress. It can also enhance overall quality of life and well-being (Bratman et al., 2012). A study by Li et al. (2008) found that spending time in forests increased natural killer cell activity and expression of anticancer proteins in the body, highlighting the potential benefits of landscape therapy in improving physical health. In conclusion, landscape therapy emphasizes using natural elements to create a healing environment that positively impacts physical, psychological and spiritual health. Given its potential benefits in improving health and well-being, landscape therapy can be an effective adjunct therapy for various health conditions. Diverse plants should be planted to encourage interaction between users and plants.

3.2.3 Art Therapy

It is a form of treatment that utilizes creative expressions like painting, drawing and sculpting to help individuals cope with emotional and psychological issues. In

therapeutic landscapes, art therapy promotes recovery and well-being by encouraging individuals to express themselves through artistic means. Art expression provides individuals with a safe, non-verbal way to convey their emotions and experiences, particularly for those who find it challenging to express themselves through traditional talk therapy. Research shows therapeutic benefits of art therapy for individuals with various mental health issues or physical disabilities. For instance, art therapy has been used to assist individuals with depression, anxiety, post-traumatic stress disorder (PTSD) and chronic pain. It has also been used in therapeutic settings to aid individuals recovering from physical injuries or illnesses. An example of art therapy in therapeutic landscapes is through creating murals or sculptures (Malchiodi, 2006). These art pieces serve as a way to enhance landscape aesthetics while providing a therapeutic outlet for individuals. For instance, individuals may be encouraged to create murals or sculptures representing their personal experiences or emotions, allowing them to process and express their feelings in a concrete way. Art therapy can also be used in conjunction with other forms of therapy such as cognitive-behavioural therapy (CBT) or mindfulness-based therapy (Grossman, 2010). This comprehensive approach helps individuals address their emotional and psychological issues from multiple perspectives, leading to more comprehensive and effective therapeutic outcomes (Rubin, 2018). In summary, art therapy can be a valuable tool in therapeutic landscapes, providing individuals with a creative outlet to express themselves, reduce stress and improve overall health and well-being. Professional teachers should be provided along with materials like paper-cut flowers and flower arrangements.

3.2.4 Physical Activity

Therapeutic landscapes encouraging physical activity have gained popularity in recent years. These landscapes aim to promote physical activity in natural environments like walking, cycling or practicing yoga, contributing to optimal physical and mental health. Research shows that regular physical activity brings many health benefits, including improving cardiovascular health, increasing bone density and reducing the risks of chronic diseases like obesity, diabetes and heart disease. Additionally, physical activity is associated with improved mental health, reducing symptoms of anxiety and depression and enhancing overall well-being (Malm et al., 2019). Therapeutic landscapes encouraging physical activity can be found in various settings, including parks, gardens and even urban areas. These landscapes aim to encourage individuals to engage in physical activity and can be customized according to the needs of individuals with different physical abilities (Hefferon & Petrides, 2012). For example, therapeutic landscapes can be designed with wheelchair-accessible walking paths or offer outdoor yoga classes suitable for individuals with physical disabilities. By promoting physical activity, therapeutic landscapes can help individuals maintain a

healthy lifestyle, reduce stress and enhance overall quality of life. Exercise facilities or running paths should be provided.

3.2.5 Mindfulness Meditation

Mindfulness meditation is a technique that involves focusing attention on the present moment without judgment or distraction and has shown to have many therapeutic benefits. Conducting mindfulness meditation in therapeutic landscapes can be particularly effective as it provides a calm and tranquil environment to support this practice. Research indicates that mindfulness meditation can alleviate symptoms of anxiety and depression, improve sleep quality, reduce stress and enhance overall health and well-being (Chiesa & Serretti, 2009). A study found that mindfulness meditation significantly reduced anxiety and depression symptoms in individuals with generalized anxiety disorder (Hoge et al., 2013). In therapeutic landscapes, mindfulness meditation can be practiced in various environments including gardens, parks and other natural settings. These environments provide a sense of tranquillity helping individuals focus their attention on the present moment, thereby alleviating symptoms of anxiety and depression. Moreover, mindfulness meditation can also be practiced in group settings providing social support and fostering a sense of community. Therapeutic landscapes can offer group mindfulness meditation sessions providing individuals with a safe and supportive environment for practice.

3.3 Sacredness Design Strategies

An increase in the sacredness of space can directly increase spiritual indicators of HTLD-indicators. Self-identity, fearlessness towards death, a sense of belonging, sacredness and vitality, perception, balance and holism .

To reflect the therapeutic landscape as sacred, it needs to be designed spatially, according to Stefan Holl's anchoring effect and Alexander's Pattern Language. Sacredness can be achieved by designing the Four Elements of the therapeutic landscape: *entrance, boundary, centre, order* (Alexander, 2014; Holl, 1999).

Entrances serve as transitional spaces that prepare individuals on a physical, mental and spiritual level so that they are ready for a therapeutic experience. Boundaries separate sacred space from the ordinary world. The *centre* is an object or landmark with symbolic and metamorphic purpose that triggers reflection on the meaning of life, leading to spiritual healing. Order is the foundation, expressed through continuity and rhythm on the physical, mental and spiritual levels, with increasing sacredness from border to centre. The process of moving from the entrance to the centre and from the centre to the entrance again is a pilgrimage.

Gaston Bachelard's (1994) The Poetics of Space explores the meaning of space and its impact on human experience, including how space shapes our thoughts, memories and emotions and the power that architectural and landscape spaces have to connect us to the divine and evoke a sense of the sacred.

3.3.1 Entrance

The entrance is a key element in creating a therapeutic landscape. It serves as a transitional space from the everyday environment into the sacred world with its healing power. An entrance can take the form of a vertical surface such as a door, pathway or corridor. It spiritually, mentally and physically prepares the individual for what they are about to experience (Sun, 2021).

Figure 29: Therapeutic Landscape Entrance as a transition to enter Sacred Place

By unknown author, https://allevents.in/port%20alberni/access-the-power-of-manifestation-and-healing-within-you/10000732434941627.

3.3.2 Boundaries

Boundaries include physical and symbolic boundaries that separate sacred space from the ordinary world. According to Bachelard (1994), physical boundaries such as walls, doors and other physical separations can create a sense of separation and exclusivity. Symbolic boundaries, such as thresholds or ritual purification ceremonies can also contribute to the creation of sacred space. In therapeutic landscape, physical boundaries can be marked by trees and shrubs.

Boundaries point to the centre of the territory, which can have deep symbolic and metamorphic purposes, such as fountains, trees, sculptures or open spaces. The

Monolithic Circle of Almendres, also known as Stonehenge in Portugal, is an example that demonstrates the sacred relationship between centre and boundary.

On a trip organized by the Erasmus Project at the University of Evora, we had the opportunity to visit the Almendres Megalithic Circle (figure 30). We stood in a circle holding hands and each person made a wish in their native language. It was a deeply spiritual and sacred moment and we felt transformed by the experience.

Figure 30: The Almendres Megalithic Circle, the Relationship between the Centre and Border

By unknown author,https://www.escapadarural.pt/blog/cromeleque-dos-almendres-o-stonehenge- portugues/.

3.3.3 Centre

In therapeutic landscapes the centre refers to the physical, psychological and spiritual dimensions. The centre can be an object or landmark with a symbolic and metamorphic purpose, such as a fountain, a tree, a sculpture or an empty central space. When a space is surrounded by a number of structures, that space becomes the centre, which can create a psychological sense of belonging, as in the case of the Monolithic Circle of Almendres. On a spiritual level the centre can be the material point that connects the origins of life and the relationships between living things. It can naturally trigger reflection on the meaning of life and relationships with oneself and others, leading to spiritual healing or life's "epiphanies" (Bachelard, 1994).

Figure 31: Centre of Scared Place, Medina, Marrakech, Morocco.
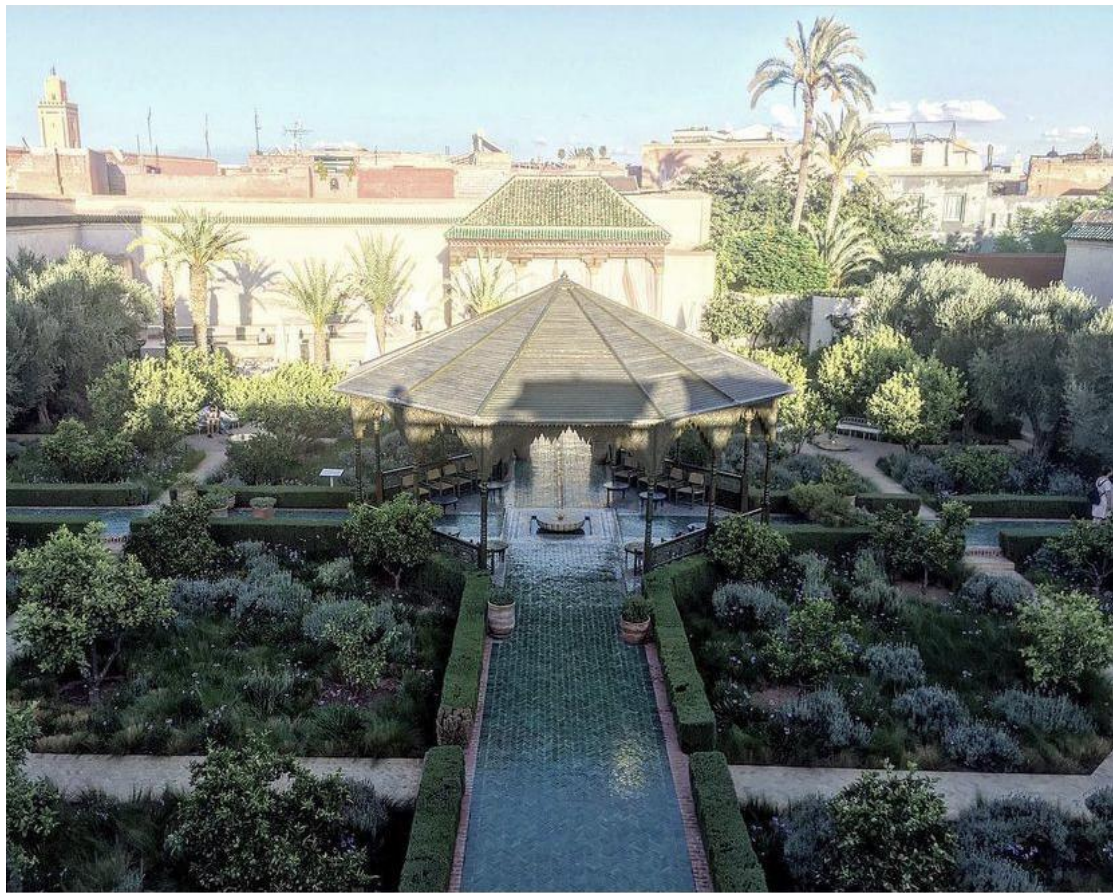
By Bao Guotai, (2018).

3.3.4 Order

Order is an essential feature expressed through continuity and rhythm on the physical, mental and spiritual levels, where the centre is the most sacred place. As one moves from the boundary to the outer centre, the sense of sacredness increases and reaches the centre, which represents the place furthest removed from the mundane. Symmetry is a way of demonstrating order and people often seek axial symmetry as a symbol of authenticity and natural order. Symmetry provides a sense of stability and order, and when found in buildings or landscapes, such as church fire temples, it can evoke a sense of solemnity, even sanctity. The beauty of symmetry is mesmerizing and transports us to the realm of ultimate divinity and a sense of the sacred; the symmetry of our bodies enhances our integration with the environment, resulting in a strong sense of harmony.

Figure 32: Order of Sacred Place, Hallgrímskirkja Church , Reykjavik, Iceland.

By Bao Guotai (2023).

From a psychological point of view, this integration stems from the "isomorphism" or "heteromorphic" of form and structure between the external world and our internal world. The formal structure of symmetrical things and the physiological and psychological structure of people trigger the same electrical impulses, generating a sense of beauty and even sacredness. As De Lucio Meyer (2002) once said, "Symmetry symbolizes harmony and serenity" (De Lucio-Meyer, 2002). According to the Yin-Yang and Five Elements theories of Chinese medicine, the experience of the "sacred" is the harmony between nature and man, a concept of the unity of heaven and man. Order

creates balance and balance gives us a sense of stability, calm and contentment, making symmetry an important aspect of order and harmony in the therapeutic landscape evoking a sense of sacredness and balance in those who experience it.

The formal structure of symmetrical things and people's physiological-psychological structure cause the same electrical impulses resulting in aesthetic pleasure and even a sense of sanctity. The formal structure of symmetrical things and people's physiological-psychological structure cause the same electrical impulses, resulting in aesthetic pleasure and even a sense of sanctity.

3.4 Space Organization Design Strategies

Space organization design strategies can directly enhance the physical, psychological and spiritual indicators of HTLD-indicators. A sense of control, social support, physical movement and exercise, positive natural distractions, a sense of security, physiological comfort, opportunities for choice, interaction with nature, familiarity, clearly positive design features, natural resources, well-designed, well maintained, appealing, coherence, legibility, complexity, mystery, a sense of safety (refugee), good visual experiences(prospect).

And possibly improve the spiritual indicators depends on the users in the therapeutic landscape. Indicators include perception self-identity, fearlessness toward death, clarity, a sense of belonging, sacredness, vitality, balance and holism (Walter Brandord, 1995), (Cooper Marcus, 2010), (Roger Ulrich, 1984).

3.4.1 Openness

Open, semi-open and closed spaces improve the well-being of users (Gehl, 2011).

Open area in therapeutic landscape offer space and emptiness. It is an escape from the tiny, shared inward with other inpatients in over- crowded countries such as China.

Close area provides a sense of control and reduce anxiety. These areas can be created through shrubs, trees and walls . When the inpatients search for some peaceful and undisturbed moment, these areas are also seen as a way of escaping from being around others and noise.

Semi-open spaces are the transition between the two, and can also be divided using shrubs, walls, sculptures and fountains, but leaving the space partly open and partly closed.

When these three forms of openness are used in therapeutic landscape, users feel more in control and have more choices psychologically.

Figure 33: Three Spatial Forms in Therapeutic Landscapes
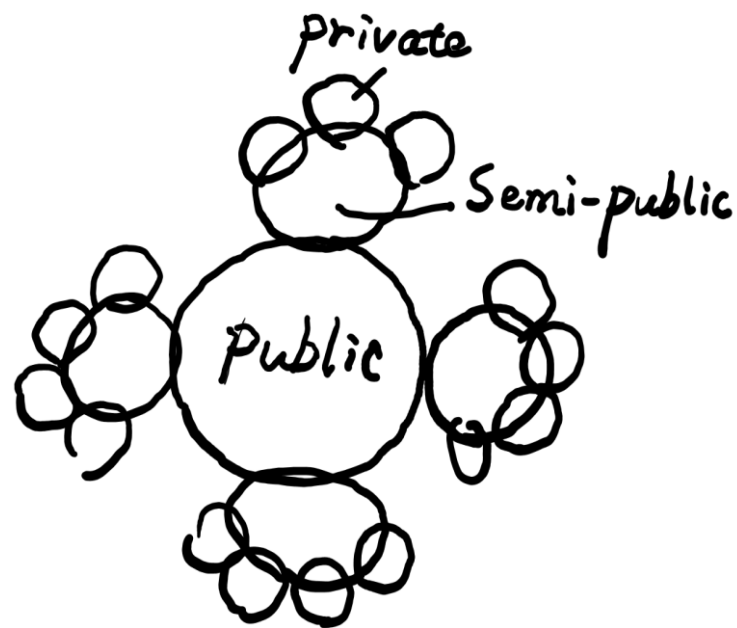
By Bao Guotai based on Gehl (2011).

Activities in the therapeutic landscape are divided into three main categories: necessary, optional and social. Gehl (2011) explained necessary activities are not affected by the quality of the physical environment.

Necessary activities in the care centre or hospitals are get medical treatment.

While access to therapeutic landscapes is optional, it raises the question: how can we encourage more people to visit these landscapes and gain greater benefits from them? In ample spaces, we should provide a variety of spatial forms, from open to enclosed areas, and offer diverse activities such as horticultural therapy, landscape therapy, and games.

"Socialization" is a result of the quality and duration of the other two activities and occurs spontaneously when people gather in therapeutic landscape. Socialization can include games, conversations, shared activities and simply observing others.

Therapeutic landscapes should consider versatility and user-friendliness. In healthcare environments such as hospitals, users of therapeutic landscapes include patients, their families, medical staff and any potential users. To be effective, the outdoor therapeutic landscapes must be designed as an integrated system with a clear sequence from public to semi-public to private spaces. It can help to enhance individual and collective interactions, which can help to reduce psychological stress.

Visual continuity between indoor and outdoor spaces should be carefully considered. Windows, doors and corridors can serve as a bridge between indoor and outdoor spaces. The transparency of glass can help users connect psychologically with nature (Figure 33).

Windows need to be provided so that patients in the wards, healthcare workers in the offices, and outpatients in the waiting areas can enjoy natural views and improve their health (Figure 33).
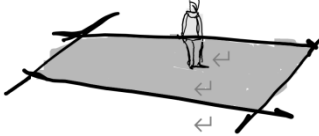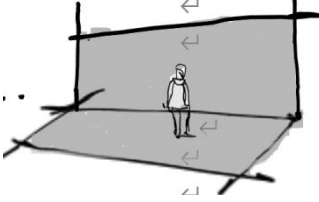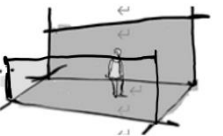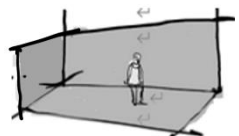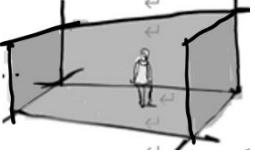
Figure 34: Some Space Design Strategy of Therapeutic Landscape Design
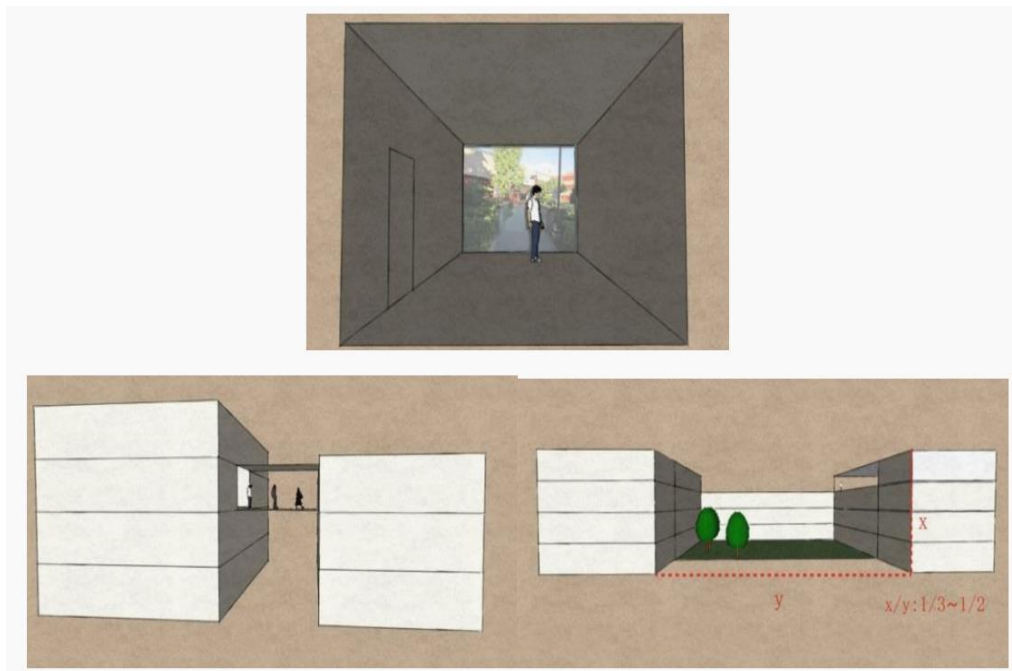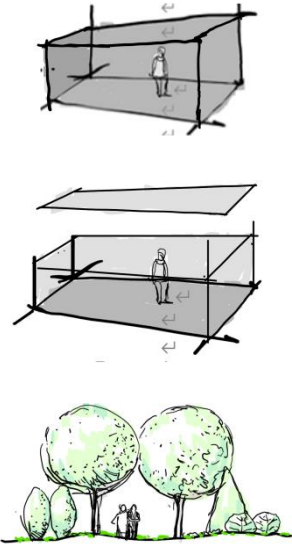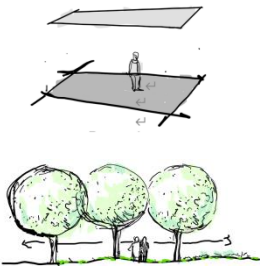
By Sun (2022).

Openness is also created to affect the user's psychology. Plants, like buildings, define space. In the design of therapeutic landscapes, plants are more often used to shape different spatial features because spaces shaped by plants are more vibrant and alive (Zou,Y. 2014).The different physical attributes of plants, such as shape, structure, density, colour, and texture, create a softer, more growing environment. The primary form of space is surrounded by plants. It should include open space, semi-open space, closed space, covered space and vertical space and its forms of constituting spatial sequences include dispersed linear and groups (Table 14).

Table 15: Plant-Shaped Spaces

Space form	Diagram	Character of the space
Open space (Ground cover and low height shrub)	Base plane Single vertical plane Shrub and groundcover form open space	A lawn with tall trees in the background offers a broad view and a sense of freedom. However, open spaces are rare in therapeutic landscapes. In the 17th and 18th centuries, European mental illness treatment centres also the hospitals to recover from tuberculosis or bones diseases were exception as doctors required patients to look at distant pastoral and agricultural landscapes as part of their remedy.
Semi open space (Medium height shrub)	Parallel planes L-shaped plane U-shaped plane	Semi-open spaces are created by plants and terrain, forming a transition from open to closed space with parallel, L-shaped, and U-shaped planes. They're widely used in therapeutic landscapes, with trees and bushes forming a plant wall that's semi-transparent, creating mystery and attraction in therapeutic landscapes, Different compositions of trees, shrubs, and ground cover in small therapeutic landscapes can create interesting designs. Semi-open space is highly visible and accessible.

	 Semi open space	
Closed space (trees with dense leaves, small and medium trees and shrub)	 Closed space	Fully closed space creates an indoor feeling in nature. It soothes the people. The passive therapeutic landscape activities are recommended such as meditation.
Top covered space (tree crown with dense leaves)	 Space covered by tree crown	Top covered space is shaped by dense tree crowns. Covered spaces give the people a sense of privacy and also provide a shelter for sunlight and rain.
Vertical space (Tall and fine plant with cone shape)	 Vertical opened space	Top is opened, vertical space is closed. It use to define the oaths and applied to a transitional space in therapeutic landscape

By Bao Guotai based on of Zou, Y. (2014).

Plants with elliptical and conical shapes point towards the sky, guiding people to look up. Such sightlines can help maintain a positive mindset. Irregularly shaped plants can be independently planted. Unlike other elements like buildings, plants change

throughout the year. Their growth creates open or enclosed spaces, variations in density result in areas with natural light or less light. Changes in the contours of plant clusters and the skyline create a genuine experience for visitors through repetition and rhythm. Each plant varies in size, colour, (Yuan, K. 2009) texture, and shape. Trees, shrubs, climbers and grass differ in height and density. Spherical plants suit backgrounds as their shape doesn't point in any direction. Planting methods—individual, in pairs or in clusters—along with the height and density of foliage, alter visitors' perspectives. Plants with different shapes are summarized in figure (Figure 35).

Figure 35: Plants with Different Shapes
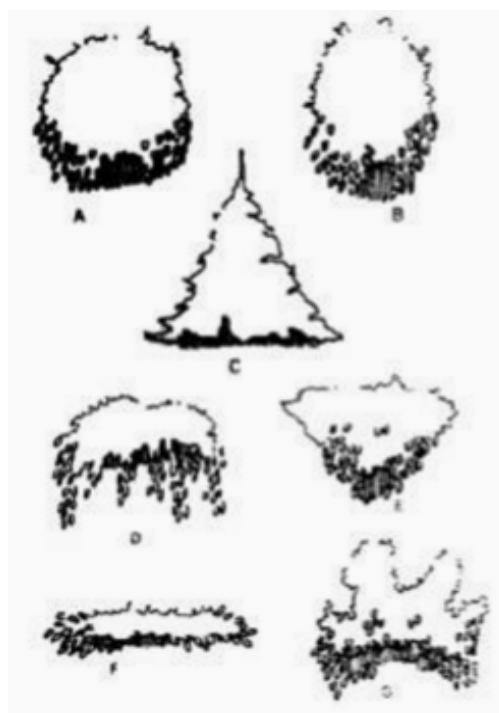
Different plant shape
- A ball shape
- B oval shape
- C cone shape
- D umbrella shape
- E Fan shape
- F horizontally extend
- G irregular shape

By Yuan, K. 2009

Simultaneously, when designing plant spaces, priority should be given to native flora to promote species diversity. This familiarity enhances users' sense of belonging and familiarity in therapeutic landscape. Plant design involves simulating natural ecosystems and using only one plant in a landscape can result in poor ecological quality. Thoughtful arrangements of trees, shrubs and grass enhance stability. Pairing plants of different heights maximizes sunlight improving ecological benefits and environmental quality. Each plant holds a unique ecological niche in the ecosystem, including its function and spatial occupation. Encouraging mutual symbiosis avoids

competition among species and between species and the environment (Francis & Lorimer, 2011).

Plants bear significant symbolic meaning in various cultures integrating them into therapeutic landscapes can create a spiritual environment reflecting the harmony between land and people. In Chinese culture, pine, bamboo and plum are known as the 'Three Friends of Winter' symbolizing loyalty, friendship and resilience in harsh weather. Pine, praised for its toughness and ability to thrive in harsh conditions, aligns with Confucius' famous saying: 'The pine stays green in winter.'

Similarly, in Europe, flowers symbolize emotions, evident in the Victorian-era 'language of flowers'. The meanings of each flower are typically based on myths, biblical tales or ancient folklore. For instance, snowdrops symbolize hope, while an orange tree represents generosity. Incorporating local culture and symbolic plant meanings in therapeutic landscape design helps create artistic concepts, enhancing people's awareness of the environment's connotations and spiritual experiences. Examples of using symbolic plant meanings in therapeutic landscapes can also be found in Sir Terence Conran's Peace Garden, where white flowering plants and crimson poppies symbolize peace, war or remembrance (Li Dandan, 2017).

In conclusion, integrating the symbolic meanings of plants into the design of therapeutic landscapes helps foster local spirit, deepen people's understanding of indigenous culture and enhance their happiness at a spiritual level.

3.4.2 Accessibility

Accessibility directly enhances physical and psychological indicators in HTLD-indicators and indirectly improves spiritual indicators. According to the Chinese national standard for accessibility design specifications (GB50763-2012) [with article explanations], therapeutic landscapes must accommodate individuals using walkers and wheelchairs. Primary walkways should be wider than 1.8 meters, while secondary paths should be at least 1.2 meters wide to facilitate wheelchair manoeuvring. To accommodate two wheelchairs passing simultaneously, the minimum pathway width should be 2.5 meters, although 3 meters is more ideal. In terms of slopes, longitudinal gradients of paths should not exceed 5%, while transverse slopes should be between 1.5% to 2%. For gradients exceeding 6%, accessible ramps should be provided for wheelchair users, avoiding steps.

Handrails should be consistent and easy to grip, pathways should be easily identifiable and clear signage for navigation should be installed. Pathway edges can be highlighted with vivid colours and sidewalks should be smooth and non-slip. Gaps between paving should be less than 0.3 centimetres to prevent wheelchairs or canes from getting stuck. When selecting paving materials, comfort and safety for users are crucial

considerations (GB50763-2012, China's National Standard for Accessibility Design Specification).

Concrete is a good choice, while asphalt paving may become excessively hot in summer due to heat absorption. Rubber paving offers high elasticity but is not suitable for wheelchairs. Patterns and colours in paving should be simple and natural, avoiding overly stimulating designs for users. Minimizing light reflection and conducting tests for the visually impaired are essential. Lastly, cobblestone paving can stimulate acupoints on the soles of feet but should not interfere with primary pathway use (Sun, 2021).

Figure 36: Barrier-free Requirement in Therapeutic Landscape Design
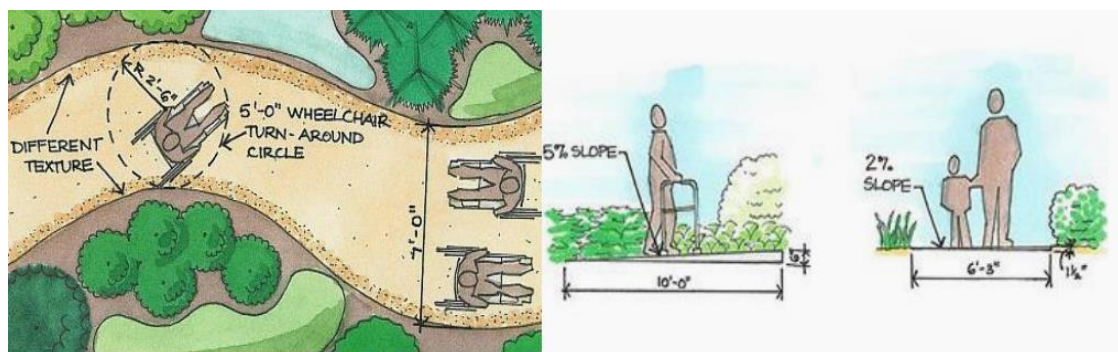
By University of Minnesota. (2001).http://www.extension.umn.edu.

Accessible landscape infrastructure like planting beds, water features and benches must be considered for wheelchair users; the lower part of planting beds should be designed with grooves for wheelchairs and designed according to the height of the wheelchair users (figure 37); there should be space for wheelchairs to stay next to the seating area and some landscape amenities engraved in Braille (li Yunpeng, 2014), (figure 38).

Figure 37: Raised Therapeutic Landscape Flower Bed for the Wheelchair Users

By unknown author ,https://greenthumbs.cedwvu.org/media/1176/raisedbeds.pdf.

Figure 38: Sitting Space for Wheelchair Users

By Li Yunpeng (2014).

4. Example on Holistic Therapeutic Landscape Design Approach

Two therapeutic landscape examples are shown in below as showcase and application of holistic therapeutic landscape design approach. The first one is the therapeutic landscape in Panzhou, Guizhou province. It is a nearby city of Guiyang. As these two cities are close geographically, this example would be ideal to be a good example to learn from for improving the therapeutic landscape in Yunyan district in Guiyang. It applies therapeutic landscape design approaches and strategies and integrates the balance and holism concept from Traditional Chinese Medicine theory . The second example is a worldwide known case study for therapeutic landscape. It is a therapeutic landscape which is designed for all the age and all type of users. A wonderful well-maintain and designed therapeutic landscape inside a botanical garden and it is divided into three parts and well considered the physical, psychological and spiritual well-being of users.

4.1 Therapeutic Garden of Panzhou Chinese Medicine Hospital

The Chinese Medicine Therapeutic Garden fulfils the overall indicators of the HTLD-indicators. This therapeutic landscape serves as an external environment linking the various hospital buildings. It provides users with natural interactions and positive natural distractions, while the design provides physiological comfort according to different groups of people with planting beds at wheelchair height for disabled people and seats and guardrails at the height of children and the elderly. Therapeutic landscapes are all designed with positive clarity and no abstraction. There is good visibility of the walkways and a sense of security is provided by the surrounding hedges and the space as a whole. Exercise facilities are provided in the Exploration Garden. The horticultural garden provides social support and is unique in that it incorporates

the Chinese medical theories of the five elements, yin and yang and Zangxiang theory for reaching balance and holism . This therapeutic landscape applies local and herbal plants and Chinese style pavilion to improve the familiarity and sense of belonging. More than that the spaces are well considered in open, semi open and closed spaces for giving users more choices. However, the spiritual indicators are improved based on the individual users more than other physical and psychological indicators.

Project Name	Therapy Through "Qi" and "Earth": The Gardens of Panzhou Traditional Chinese Medicine Hospital
Landscape Architecture company	MIND STUDIO 迈德景观 (https://mooool.com/en/designer/mind-studio-en)
Completion Year	2020
Built Area	32,600 square meters
Location	Panzhou City, Guizhou Province, China
Program	Hospital Landscape Design
Awards	German Design Award Special 2022

The design[64] team analysed the functional relationships between hospital structures, focusing on linking their landscape nodes to support pedestrian flow. Through three strategies they aimed to create a design that embodies harmony between nature and humanity: 1) creating practical and human-centric environments based on relationships between building clusters; 2) establishing interaction between people and nature within each garden; 3) utilizing local materials, including rusted rock slabs, gravel and scenic rocks, to blend with the local landscape. The design also incorporates traditional Chinese medicine concepts by using herbal plants and abstracting acupuncture and moxibustion as landscape elements (Terren, 2022).

Traditional Chinese medicine is founded on the philosophy of understanding the universe and harmony between humans and nature. Its holistic concepts and clinical thinking have gained global recognition, emphasizing natural healing with "Qi" and "Tu" as fundamental mediators—where "Qi" represents the primary substance constituting everything in the universe, and "Tu" represents the environment where the universe resides (Terren, 2022).

The concepts of "Qi" and "Tu" have been carefully integrated into the landscape design of Panzhou City Traditional Chinese Medicine Hospital. Situated one kilometre from the centre of Panzhou's old city area, the hospital is one of China's most renowned urban traditional Chinese medicine health centres. The landscape design

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[64] Terren, S. (2022, May 5). Healing Through "Qi" and "Earth": The Gardens of Panzhou Traditional Chinese Medicine Hospital. World Landscape Architect.

team aimed to fulfil the hospital's functional needs by creating modern therapeutic spaces for patients and medical staff, enhancing their healing potential. Understanding the impact of environmental factors on the human body, the project team used local materials, adapting to plant growth and seasonal changes.

The newly designed terraced entrance garden, courtyard garden and rooftop garden now form a series of landscape nodes connecting independent hospital buildings, providing outdoor spaces for medical staff and patients to immerse themselves in nature. To address the ten-meter height difference in front of the outpatient building this project integrated an American with Disabilities Act (ADA) ramp[65] and terraced planting beds into the entrance terraced garden, creating an inviting open green space for relaxation and interaction. The Stone Garden, surrounded by the outpatient department and medical technology building, offers a tranquil area for visitors and staff to experience the healing power of nature, enjoying subtle shade changes from trees throughout the day. The largest green space, the Desert Garden, conveys the beauty of natural growth through a design featuring low-maintenance mixed woodlands and locally sourced materials.

The Wind Garden offers meticulously maintained lawns, trees and social areas at the garden's edge. In the Light Garden's centre the arrangement of lamp posts symbolizes traditional Chinese medicine elements of acupuncture and moxibustion. Five terraced gardens around the medical technology building and sanatorium employ lush local plants and wooden benches providing an alternative space for patients and staff to interact with nature.

As one of China's most significant traditional cultural symbols, traditional Chinese medicine reflects the country's long-standing concepts of health care and practical experience. By interpreting the core elements of "Qi" and "Tu" in traditional Chinese medicine, the design team has created a therapeutic landscape for Panzhou residents while conveying China's philosophy and traditions to the world.

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[65] The Americans with Disabilities Act (ADA) says it must be set at a Pitch of 1:12. This means that for every 1 inch of rise or step height there must be at least 1 foot length of ramp.

Figure 39: Master plan of Panzhou Therapeutic Landscape

▼平面图 Plan

GENERAL PIANE

1 MAIN ENTRANCE
主入口
2 TERRACE GARDEN
阶梯花园
3 GATE GUARD
门卫处
4 STONE COURTYARD
石之庭
5 LIGHT COURTYARD
光之庭
6 WIND COURTYARD
风之庭
7 SAND COURT
砂之庭
8 PARKING LOT
停车场
9 UNDERGROUND PARKING LOT
地下停车场
10 NATURAL GARDEN
自然花园
11 BUILDING ENTRANCE
病房楼入口

By Jing studio (2020), https://mooool.com/en/panzhou-traditional-chinese-medicine-hospital-health-garden-by-mind-studio.html
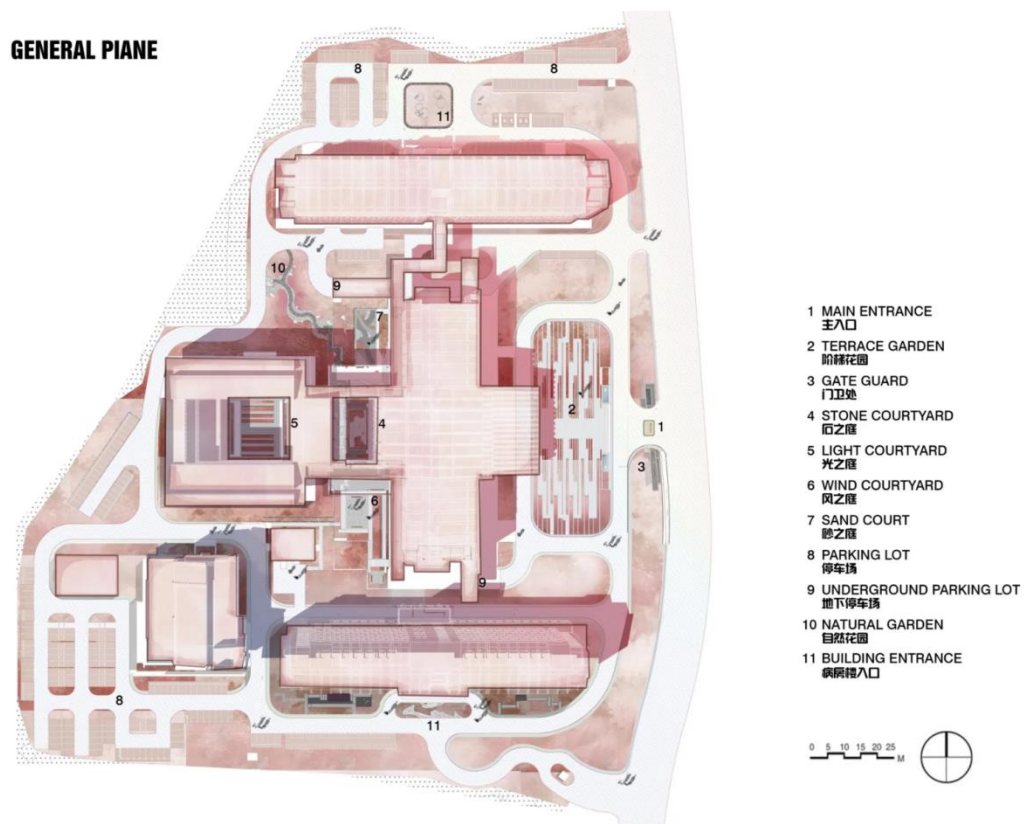
Figure 40: Sandy Garden in Panzhou Therapeutic Landscape

By Jing studio (2020). https://worldlandscapearchitect.com/healing-through-qi-and-earth-the-gardens-of-panzhou-traditional- chinese-medicine-hospital/?v=35357b9c8fe4**.**
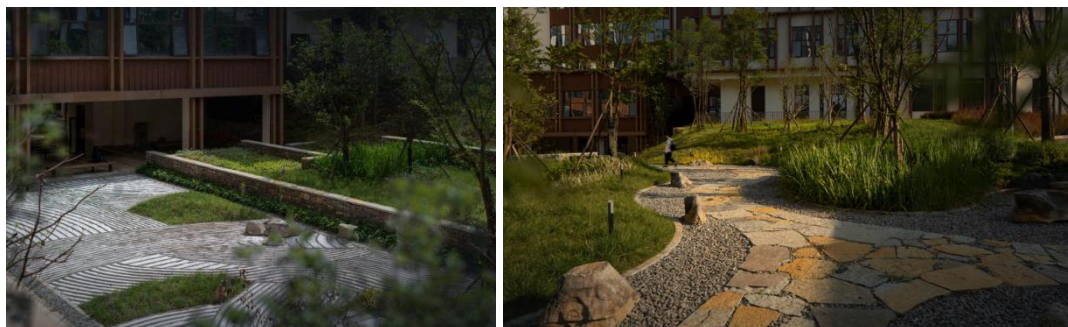
After the completion of the therapeutic landscape in Panzhou Hospital, surveys conducted on both patients and medical staff regarding the physiological aspects of the Panzhou Hospital's rehabilitative landscape have shown accelerated recovery from illnesses among the landscape's users (Wang, 2021).

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4.2 Elizabeth and Nona Evans Therapeutic Garden

Elizabeth and Nona Evans therapeutic garden, according to the HTLD-indicators, fulfils the physical, psychological and spiritual dimension of therapeutic landscape. The three distinct small gardens within the therapeutic garden are the Contemplation Garden, the Exploration Garden and the Horticultural Therapy Garden. Situated within the Cleveland Botanical Garden, the Elizabeth and Nona Evans therapeutic garden is positioned to cater to individuals including people with disabilities, older adults, those in suboptimal health conditions and the general public. It offers users options, natural interactions, positive natural distractions and is designed to provide physiological comfort. The gardens in the therapeutic garden are deliberately and positively designed. Pathways offer visibility, hedges around and throughout the space offer a sense of security. The Exploration Garden provides physical movement and exercise, while the Horticultural Therapy Garden offers social support.

Table 16: The Elizabeth & Nona Evans Restorative Garden Project

Project Name	The Elizabeth & Nona Evans Restorative Garden
Project Location	Cleveland, Ohio, United States
Project Area	1114.8 square meters
Construction Year	2005
Program	Healing garden in Botanical Garden
Design Team	Dirtwork P.C., United States

By Guotai Bao (2020).

Figure 41: The Elizabeth & Nona Evans Restorative Garden

By Dirtwork (2006).

Overall Planning of the Elizabeth and Nona Evans Restorative Garden: the rehabilitative garden within the botanical garden serves various groups including people with disabilities, older adults, those in suboptimal health conditions and the general public. It comprises three gardens: A. the Contemplation Garden, B. the Exploration Garden and C. the Horticultural Therapy Garden.

Figure 42: Master plan of Elizabeth Nona Evans Restorative Garden

A. The Contemplation Garden is a serene space aimed at promoting relaxation, contemplation and inner tranquillity. It includes quiet water features, winding paths and comfortable seating areas to create a tranquil atmosphere. Such a garden might be particularly helpful for individuals dealing with stress, anxiety or depression. Within the Cleveland Botanical Garden, the Contemplation Garden offers a peaceful space with reflecting pools, fountains and a mature magnolia tree. The design emphasizes simplicity and elegance, with soft colours and minimized floral and aromatic elements. This garden is open to everyone including wheelchair users, with stone pathways and braille poetry on handrails. A vine-covered stone wall provides privacy and frames

views, allowing glimpses of serene scenery. The Contemplation Garden is a timeless and welcoming oasis suitable for visitors' seeking reflection and inner peace.

Figure 43: Meditation Garden detail (left Image), the pool in the meditation garden; and (right Image) the poem in Braille language.

By Dirtwork, (2006). https://universaldesigncasestudies.org/outdoor-places/parks-gardens/elizabeth-and-nona-evans-restorative-garden.

B. The Exploration Garden aims to inspire curiosity and engage the senses. These gardens are often used for educational purposes, particularly beneficial for children with learning disabilities. They foster exploration, discovery and learning through various plants, textures, colours and fragrances. They also serve as spaces for physical therapy offering different surface textures for walking. Hidden behind the serene Contemplation Garden, the Exploration Garden offers a secluded space that provides unique privacy. The towering stone wall, about 1.83 meters high, was designed in close collaboration with the botanical garden's horticultural therapists and director to create interactive and captivating experiences. Local stones, water features and carefully selected plants provide ample opportunities for visitors to touch, smell and listen, whether sitting or standing. Hanging plants and filled niches encourage visitors to exercise and develop motor skills while enjoying the simple pleasures of the Exploration Garden. It's a space for individual exploration and group activities, immersing visitors in a sensory-rich environment.

Figure 44: Interactive Wall in the Exploration Garden

By Dirtwork, (2006).https://universaldesigncasestudies.org/outdoor-places/parks-gardens/elizabeth-and-nona-evans-restorative-garden

C. The Horticultural Therapy Garden aims to enhance physical and mental well-being. It includes raised planting beds of varying heights, adaptive tools and wheelchair-accessible paths to facilitate therapeutic activities. These gardens are specifically designed for therapeutic purposes, aiding in treating a range of psychological and physical ailments such as dementia, post-traumatic stress disorder, depression and anxiety. They are also used for injury or illness recovery, providing a therapeutic environment that promotes social interaction, physical activity and emotional well-being.

The Horticultural Therapy Garden is a vibrant, sunny space designed to stimulate the senses. It's an area where clients can interact with carefully selected plants and crafts including various widths, heights and specially displayed basil plants that offer a prolonged growing season. With varying plant heights and flowering seasons, visitors, whether walking or in wheelchairs, can experience the scents through their eyes and noses. Activity areas, pathways and welcome areas are spacious, offering ample room for everyone. The dynamism of therapeutic activities and participation in public environments was carefully considered, a testament to the collaboration between botanical garden staff and landscape designers. Fun and privacy are created using plant walls and mounds while allowing the public to enjoy this part of the garden without disturbing or diverting attention from groups or activities. Medical staff and other individuals are also welcome to explore horticultural therapy, plants and

gardening. The Horticultural Therapy Garden is a practical and beautiful space, providing a place for individuals to explore the joys and benefits of gardening (Figure 37).

Figure 45: Horticultural activity and Basil plant display in Therapeutic Landscape

By Dirtwork, (2006). https://universaldesigncasestudies.org/outdoor-places/parks-gardens/elizabeth-and-nona-evans-restorative-garden.

5.Experiments on Psychological Component of Holistic Therapeutic Landscape Approach

As for exploring the psychological therapeutic effects of the therapeutic landscape, two experiments are demonstrated in Iceland and Portugal and the results are published in two scientific journals .

One study has been published in the scoups collection of the journal : Turyzm/Tourism which focuses on Tourism, Geography and Landscape Architecture issue [66].

5.1 Study on the Therapeutic Effects of Icelandic Natural Landscape Images: A Case Study of Chinese Tourists

The study employs a comprehensive experimental methodology, utilizing a diverse collection of photographs organized into 18 distinct groups. There are three main objectives. First, it explores the cultural and psychological factors that make Icelandic landscapes so therapeutic for the Chinese. Second, it aims to prove how photographs of natural landscapes (two-dimensional images) can have a healing effect on individuals. Third, it strives to create a model for sorting healing photographs and

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[66] Bao, G. (2023). Study of the therapeutic effects of Icelandic natural landscape images: a case study of Chinese tourists. turyzm/Tourism, 33(2), 157-166 . https://doi.org/10.18778/0867-5856.33.2.13

making them useful for selecting images for healing albums. A Likert-scale questionnaire was distributed to 1,000 participants from China, 500 individuals who have visited Iceland and 500 who have not. This diverse pool consists of 500 males and 500 females, spanning ages from 10 to 80.The results reveal the top-ranked landscapes and significant improvements in participants' psychological well-being after viewing the pictures. The findings support the therapeutic nature of the curated collection of forty photographs, providing inspiration and promoting well-being through the beauty and transformative power of nature. This experimental investigation contributes to an understanding of healing landscapes and their potential in assisting psychological therapy and landscape design.

Introduction

The investigation into therapeutic landscapes, which possess substantial potential to improve overall well-being, has gained notable attention in the fields of well-being geography and environmental psychology. Pioneering research conducted by Kaplan, the founder of the Attention Restoration Theory (ART), has emphasized that exposure to aesthetically pleasing environments is pivotal for mental well-being, aids in recovering from cognitive fatigue and enhances mood (Kaplan, 1989). Additionally, Ulrich's studies (1995) highlight the transformative effects of even a modest view of natural surroundings through a window in clinical settings. Patients with access to such views experience shorter hospital stays and significant enhancements in their overall well-being (Ulrich, 1995).

Within the domain of therapeutic landscapes, gardens in healthcare facilities are essential components, varying from small window boxes to vast terrains covering extensive acres. Sensory experiences, such as olfaction, audition and tactile sensations, play crucial roles in enhancing overall well-being (Ziegler, 2015).

Gunnar's (2016) research highlights those auditory experiences, such as the gentle rustling of leaves, the murmuring of streams and the melodic calls of birds, significantly contribute to both physical and mental well-being (Gunnar, 2016). In a parallel vein, Baik's (2018) investigation explores the impact of *Abies holophylla* Max leaves' fragrance on the autonomic nervous system, providing insights into its effects on parameters like blood pressure, heart rate, heart rate variability and vascular

function (AIX[67], FMD[68]). Furthermore, Baik's study establishes its potential to alleviate stress and facilitate vascular relaxation (Baik, 2018).

Hyun-Ju, the scent of pine forests was collected and utilized to replicate an authentic pine forest environment for experimental purposes. The results demonstrated a significant enhancement in emotional states, cognitive acuity and perceptual abilities in response to the scent of pine trees. Survey outcomes further indicated that the fragrance of pine forests induces positive emotional states and alleviates feelings of confusion (Jo, 2010).

Kaplan and Kaplan's (1989) research in environmental psychology has demonstrated that images, films and window views of natural elements engender relaxation, emotional equilibrium, cognitive rejuvenation and psychological and physiological regulation in individuals (Kaplan and Kaplan, 1989). Agnes' (2003) findings further emphasize that even the act of gazing at outdoor green landscapes through windows induces feelings of serenity and tranquillity. Kahn's research on visual landscapes indicates that individuals in a mildly distressed state, when afforded the opportunity to view natural landscapes through office windows, are more likely to experience a higher level of serenity and tranquillity. Kahn's research on visual landscapes indicates that individuals in a mildly distressed state, when afforded the opportunity to view natural landscapes through office windows, experience a reduction in heart rate compared to participants with views limited to white walls. Furthermore, with an extended duration of observation, the effectiveness of heart rate recovery escalates (Kahn et al., 2008).

In synthesizing Kaplan's (1989) "Content Interpretation Methodology" (CIM) environmental psychology research method, O. Medvedev's comparative research method and Hyun-Ju's straightforward survey questionnaire analysis, this study employs a quantitative analytical approach to ascertain the positive impact of two months of environmental psychology intervention (Kaplan, 1989). Furthermore, a mathematical model has been developed to assess and predict the influence of specific photographs on healing, demonstrating the model's efficacy. This paper undertakes a comprehensive investigation to determine whether photographs of natural landscapes have a discernible impact on human mental health.

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[67] AIX: Augmentation Index, which is a measure used in vascular physiology to assess arterial stiffness and wave reflection. It provides information about the efficiency of the cardiovascular system and can be indicative of cardiovascular health.

[68] FMD: Flow-Mediated Dilation, which is a technique used to assess endothelial function. It measures the ability of blood vessels to dilate in response to increased blood flow, typically induced by a stimulus such as cuff inflation. FMD is an important marker of vascular health and is often used in research and clinical settings to evaluate endothelial function and cardiovascular risk.

Reason for Chinese fond of Iceland

Chinese travelers are attracted to the natural beauty of Iceland, aligning with Kaplan's theory of healing landscapes, which emphasizes qualities like fascination, coherence, legibility, compatibility, complexity and mystery (Kaplan, 1989). The enchanting glaciers, majestic waterfalls, geysers, volcanic eruptions and vibrant northern lights of Iceland captivate their senses, creating a sense of wonder and fascination. Stepping into this Nordic realm feels like entering a magical sanctuary, providing a break from everyday routines and a source of psychological rejuvenation (Kaplan, 1989).

To understand the cultural significance behind the Chinese fascination with the natural landscapes of Iceland, it is important to delve into their appreciation for natural harmony and poetic, mystical imagery. Tao Yuanming's "Record of the Peach Blossom Spring" portrays a landscape characterized by meandering springs, abundant wildlife and the melodious chorus of birdsong (Tao, 421). This concept of an idyllic, harmonious landscape has roots in Chinese culture, where nature is revered and celebrated for its transformative and rejuvenating qualities. Iceland's nature landscapes resonate with Chinese travelers' cultural appreciation for the restorative power of nature, making it a highly sought-after destination (Tao, 421).

Furthermore, Yu Kong (2014) explores the rooted Chinese appreciation for natural landscapes, encompassing the imagery of mountains, water bodies and lush vegetation. These captivating and enchanting images closely align with natural landscapes with certain natural elements.

Additionally, the historical novel "The Story of Mu Tianzi" from the Warring States Period (476 BC to 221 BC) exemplifies the allure of natural landscapes, a depiction widely acknowledged in landscape architecture, particularly in the highly regarded academic book "The Chinese Classic Landscape History" (Zhou, 1990). It serves as a paradigmatic example of breathtaking panoramas within palaces, representing the quintessential essence of Chinese classic gardens.

Within the pages of this literary work, a mesmerizing panorama unfolds, extending far beyond the boundaries of the Queen Mother of the West's palace. Nestled within its confines lies a resplendent jade pool embraced by emerald-green waters, accessible only to winged chariots traversing swift currents. The surroundings are adorned with a tapestry of lush foliage, creating an awe-inspiring spectacle. In perfect harmony with this landscape, the palace of the Yellow Emperor flourishes with an abundance of blossoms, plants and majestic trees, evoking the essence of wetland landscapes (Zhou, 1990). Such ethereal splendor evokes profound serenity, akin to the enchanting vistas found in certain realms of Iceland.

The allure of Iceland's natural landscapes for the Chinese can be attributed to their longing for tranquility, harmony and beautiful healing vistas, as well as their affinity for poetic and mystical imagery (Zhou, 1990). These landscapes hold a special place in the hearts of Chinese tourists, reflecting a shared appreciation for the therapeutic effect of nature and the timeless allure of scenic beauty.

Anecdotes from Chinese tourists exemplify their experiences in Iceland. One tourist described the Skogafoss waterfall as a place of wonder and vitality: "As I stepped into this magnificent waterfall, the mist of water spread all around. In just one hour at this waterfall, I witnessed more rainbows than I had seen in my entire life. Is it the Penglai Fairy Island[69] or the enchanted realm of the Western Kunlun Mythology's Queen Mother's Yaochi? The natural aura here surely keeps me healthy and full of youthful vitality."

Within the embrace of Iceland, Chinese travelers can personally experience the power and serenity of nature, feeling transported to another realm where the complexities and wonders of the landscape bring a sense of tranquility and rejuvenation. This longing for the natural landscapes represents the sincere expression of the Chinese people's pursuit of pure, unique and mystical natural beauty, fulfilling their desire for a healing and transformative experience.

Chinese Tourism in Iceland

Chinese tourism in Iceland has experienced significant growth in recent years. In 2006, Chinese tourists accounted for 1.1% of Iceland's international visitors, with

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[69] Penglai Fairy Island holds a prominent place in Chinese folklore as a mythical paradise. Described as a captivating and everlasting haven, it is said to be "inhabited by immortals and gods". The island is revered for its association with immortality, longevity, and spirituality, adorned with enchanting features such as immortal herbs, fruits and rejuvenating springs, bestowing eternal youth upon its visitors. Serving as a symbolic link between the mortal world and the realm of immortals.

Within Chinese culture and literature, Penglai Fairy Island carries profound significance, embodying humanity's aspirations for longevity, happiness and an idyllic paradise. Its allure has permeated various art forms throughout history, appearing in evocative paintings, enchanting poems and captivating theatrical works. Furthermore, Penglai Fairy Island serves as an origin of Chinese classical gardens and landscapes. These meticulously designed gardens have been designed with the aim of providing an ideal environment for the people of Penglai. meticulously designed gardens draw inspiration from the island's inherent beauty and tranquility, seeking to recreate its serene atmosphere on a smaller scale. The concept of the Chinese classical garden takes root in the vision of Penglai Fairy Island, featuring thoughtfully arranged natural elements, intricate rock formations and a variety of other features. The concept of the Chinese classical garden takes root in the vision of Penglai Fairy Island, featuring thoughtfully arranged natural elements, intricate rock formations, meandering pathways and serene water features. These gardens endeavor to evoke a profound sense of harmony, balance and spiritual connection with nature, reflecting the enduring influence of Penglai Fairy Island on Chinese art, culture and aesthetics.

approximately 10,000 Chinese tourists visiting the country (Lanteigne, 2010; Icelandic Tourism Board, 2020). However, starting in 2015, there was a noticeable increase in Chinese visitors. By 2017, the number of Chinese tourists had grown by 80% (Icelandic Tourism Board, 2020). In 2019, the number reached nearly 100,000, representing a tenfold increase compared to 2006 (Icelandic Tourism Board, 2020; Lanteigne, 2010). However, the COVID-19 pandemic had a significant impact on tourism, with the number of Chinese visitors dropping to 26,400 in 2022 (Icelandic Tourism Board, 2022).

Chinese tourists are increasingly drawn to the healing power of nature and the opportunity to explore Iceland's unique landscapes and cultural experiences (Figure 44). This growing interest in nature-based tourism aligns with the broader trend of Chinese travellers seeking meaningful and rejuvenating experiences (Wang, 2018). Moreover, the strong bilateral relations between China and Iceland have played a significant role in facilitating the growth of Chinese tourism to Iceland (Þórhallsdóttir & Ólafsson, 2017). The rise in Chinese tourism can be attributed to factors such as increased affordability of travel, improved transportation links and relaxed visa regulations. The pristine natural landscapes of Iceland, offering activities like glacier hiking, exploring volcanic landscapes, bathing in hot springs and witnessing the northern lights, appeal to Chinese travellers seeking awe-inspiring and rejuvenating experiences.

Figure 46: Number of Chinese tourists that travelled to Iceland between 2008 and 2022
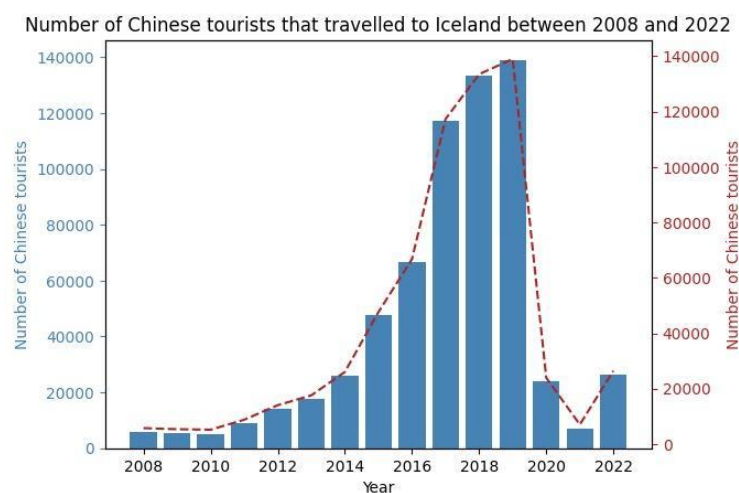
By Bao Guotai (2023).

Methodology

This study employed a comprehensive methodology to investigate the impact of Icelandic landscapes on individuals' well-being. A collection of photographs was utilized, encompassing pictures captured by the researcher as well as sourced from

online platforms and books. Identifying methodology Content Interpretation Methodology (CIM) [70] as a methodology from environmental psychology in *The Experience of Nature, A Psychological Perspective* by Rachel Kaplan and Stephen Kaplan (Kaplan 1989). Our hypothesis is that specific type of natural landscape images have a positive impact on individuals' mental well-being .These photographs were organized into 18 distinct groups, each comprising 8 pictures, to cover a wide range of *iconic natural elements evolved landscape pictures* in Iceland. The themes explored included moss-covered fields, glaciers, ice caves, waterfalls, geothermal areas and geysers, the Blue Lagoon and natural hot springs. Lagoon and natural hot springs, wildflower fields, dramatic cliffs and coastal formations, tranquil lakes and ponds, peaceful rivers and streams, forests and woodlands, the Lagoon and the Blue Lagoon, mountain peaks and panoramic views, remote highland areas, charming traditional villages and pristine black sand beaches.

Photo Selection

The process of selecting photos involves a shift from large-scale to small-scale spaces and from images with multiple elements in the landscape to a focus on a single reference element in the landscape. The emphasis is on green, blue and white landscapes. This choice is driven by the known positive impact of greenery and water

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[70]CIM Category Identification Methodology is a specific aspect of the Content Interpretation Methodology (CIM). In this methodology, the researcher focuses on identifying and categorizing scenes or environments based on participants' preferences.

The determination of the appropriate number of instances and types to include in a study involves considering various factors, including feasibility and manageability.

When selecting scenes for the study, the researcher needs to articulate clear criteria. Factors such as photographic quality, detail, seasonal variation and climatic variation should be considered. Starting with a larger number of scenes and gradually narrowing it down based on explicit criteria can lead to more efficient selection.

The richness and usefulness of the preference procedure depend on the types of environments sampled. Content knowledge, experience and familiarity with relevant literature can aid in selecting appropriate categories. While it is desirable to have empirically derived categories align with initially designated types, including a variety of types ensures the inclusion of diverse scenes.

The process of environmental sampling involves considerations such as avoiding scenes that stand out significantly, including multiple scenes representing each category, spanning the range of preferences within each category, and accommodating alternative interpretations for scenes that could be interpreted in various ways.

In terms of data analysis, calculating the mean rating for each scene is a common approach. Analyzing the most and least preferred scenes can be informative. In terms of data analysis, calculating the mean rating for each scene is a common approach. Correlation-based data reduction procedures are often used to identify these patterns, with the correlations between scenes indicating their interrelatedness. The selection of which correlations to focus on affects the final outcome, and different statistical procedures may yield different results.

bodies on people's physical and mental well-being (Douglas, 2012; Woodlas, 2017; Wood, 2017). Additionally, white landscapes have also been found to have therapeutic effects (Brooke, K., Williams, 2021).This results in a total of 18 categories, each comprising eight photos.

- The green category includes scenes like moss-covered lava fields, tundra landscapes, wildflower fields, forests, charming traditional villages and remote highland areas.

- The blue category features scenes such as waterfalls, the Blue Lagoon, natural hot springs, tranquil lakes, peaceful rivers, streams and pristine black sand beaches.

- White category encompasses ice caves and glaciers.

- The remaining red category encompasses dramatic cliffs, mountains, auroras and volcanic eruptions.

A Likert scale survey was conducted to evaluate the impact of Icelandic landscape pictures on participants' well-being. Participants used a 1 to 7 rating scale to score their perceptions of the pictures. The survey questions were crafted in line with Kaplan (1989) and Marcus's (1992) healing landscape standards, along with Lynch's (1960) criteria for spatial safety and legibility. These standards cover attributes like being away, extent, fascination, compatibility, readability and a sense of security. Lynch stressed that spatial legibility, which involves ease of understanding and navigation, enhances a sense of security. Kaplan argued that spaces with high readability reduce uneasiness from environmental confusion. Factors like familiarity and prospect refuge contribute to the sense of security. The survey questions were designed to comprehensively address various elements of psychological therapeutic effect in natural landscapes.

Following the selection, the 40 pictures were printed and shared both in physical form and online to gather feedback from the local Chinese population. During March 2023, over ten days, 100 participants per day were selected, 1,000 participants, with 500 having been to Iceland and 500 not having been to Iceland. To ensure data accuracy and mitigate potential duplication or abnormalities, five additional questionnaires were added to each daily group as safety measures.

The participants were requested to give detailed feedback on their experience viewing the pictures and their perceived level of health and well-being after exposure. This categorization aimed to distinguish the impact of the Icelandic landscape pictures from the influence of participants' recollections of their previous trips.

The collected data underwent both semantic and statistical analyses. The semantic analysis involved categorizing participants' responses based on their perceptions of the Icelandic landscape pictures and their corresponding levels of health and well-being. The statistical analysis included relevant tests to analyse quantitative data, identifying any significant relationships or patterns.

If the 40 pictures demonstrate a positive impact on well-being, they will be compiled into a therapeutic landscape Album of Iceland. This album will incorporate quotations from the viewers of the photo albums, creating a self-guided and self-selected collection of therapeutic landscapes shaped by the individuals themselves, free from external influence or researcher intervention. The primary objective of this book is to tap into the inner therapeutic power within individuals, leveraging the beauty and love rooted in their hearts, along with the transformative power of nature. Readers will experience therapy and inspiration through the enchanting and poetic world of Iceland. Furthermore, these findings can offer theoretical support for understanding the psychological therapeutic effects of specific natural elements in landscapes.

Figure 47: Photographs of pristine mountain, forest, waterfall and ice cave, Iceland
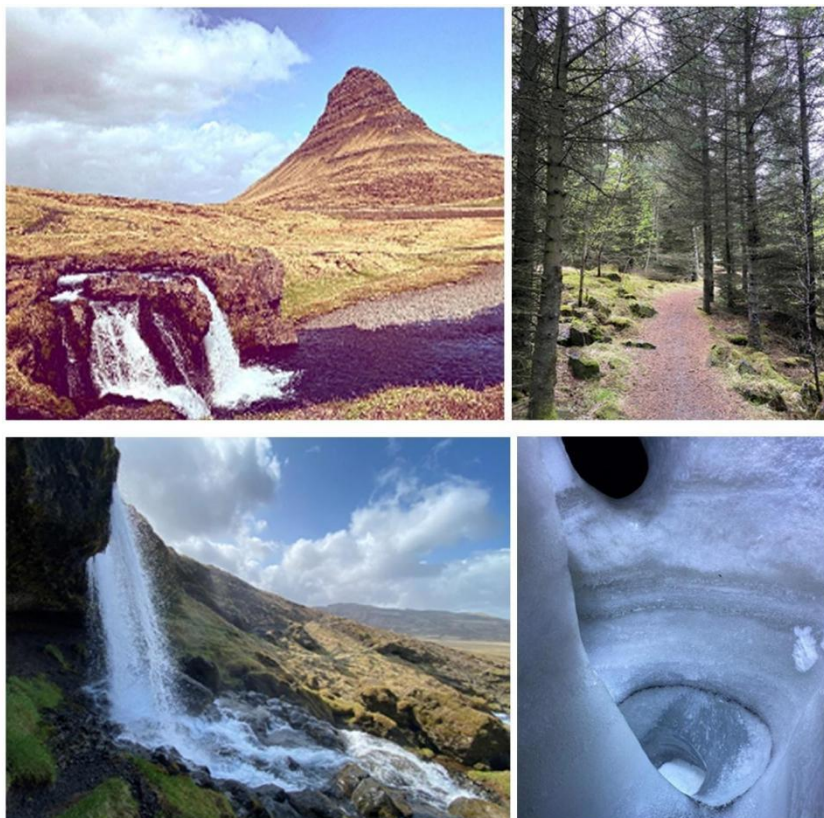
By Bao Guotai(2023).

Figure 48: Photographs of waterfall, pristine black sand beach and geothermal lake, Iceland

By Bao Guotai(2023).

Descriptive Statistics of Sample Data

The following is a description of the characteristics of 1,000 surveyed individuals, comprising 500 who have been to Iceland and 500 who have not been to Iceland.

1. Gender distribution is equal .

2. The majority of respondents are young, with 33.21% falling in the 18-30 age group and 27.08% in the 31-40 age group.

3. Enterprise employees constitute the largest occupational group, accounting for approximately 44.04%.

4. Many individuals work extended hours, with 47.29% working 8-10 hours per day and 16.25% working over 10 hours.

5. Monthly income levels are relatively high, with most earning around 1300 euros or more.

6. Educational attainment is notable, with nearly half of respondents holding a university degree or higher.

Table 15 presents descriptive statistics of the surveyed individuals' demographic characteristics, showcasing key insights into gender distribution, age groups, occupations, working hours, educational levels and monthly income.

Table 17: Sample data descriptive statistics.

Demographic variables		Number of respondents	Percent
Gender	male	500	50
	female	500	50
Age	10-18	77	7.74
	18-30	332	33.21
	31-40	271	27.08
	41-50	120	12.01
	51-60	93	9.31
	61-70	81	8.12
	71 and above	25	2.53
Occupation	student	65	6.5
	government or public sector employee	322	32.21
	private sector employee	440	44.04
	freelancer	115	11.5
	full-time	58	5.75

	homemaker / stay-at-home parent		
Daily working hours	0-3 hours	100	10.01
	4-6 hours	144	14.45
	7-8 hours	303	30.28
	9-10 hours	170	17.01
	more than 10 hours	283	28.25
Educational level	elementary school or below	31	3.14
	middle school	155	15.52
	high school	322	32.21
	college	490	49.01
	graduate school or above	11	1.12
Monthly income (living expenses)	less than 1000 RMB	25	2.51
	1000-5000 RMB	32	3.21
	5001-10000 RMB	395	39.5
	10001-15000 RMB	512	51.2
	more than 15000 RMB	36	3.58

By Bao Guotai (2023).

Analysis of Related Results

The study employed a two-group design, dividing the participants into Group A (those who had been to Iceland) and Group B (those who had not visited Iceland). The average scores for different landscapes, as ranked by the participants, were collected from each group. The scores were calculated by summing the individual ratings for each landscape and dividing it into two groups. The scores were calculated by summing the individual ratings for each landscape and dividing it by the total number of participants in that group. For example, the score for "Jökulsárlón, large glacial lake" in Group A was determined by summing the ratings for each participant and dividing it by the total number of participants in Group A, calculated as follows: ((7+6+6+7+6+7)/5 + (6+5+6+7+7)/5 + ... + (6+7+6+7+7)/5) / 500, resulting in a score of 6.45.

Table 16 presents the ranking and scores of the top landscapes in both Group A and Group B. The landscapes are listed in descending order based on their average scores. The scores range from 1 to 7, with higher scores indicating a greater preference for the landscape.

Table 18: Ranking and Scores of Top Landscapes in Groups A and B

Landscape	Group A Ranking	Group A Score	Group B Ranking	Group B Score
Glacial lake	1	6.45	1	6.46
The Blue Lagoon	2	6.44	2	6.45
Ice caves	3	6.44	3	6.35
Serene forests	4	6.35	9	5.90

and woodlands				
Peaceful rivers and streams	5	6.34	5	6.24
Auroras	6	6.23	6	6.23
Mountain	7	6.21	10	5.89
wildflower fields	8	5.92	8	5.91
waterfalls	9	5.82	4	6.34
Cliffs and coastal formations	10	5.81	7	5.92

By Bao Guotai (2023).

Note: Feedback on psychological well-being.

- group A: 89% of 445 participants reported feeling happier after viewing the pictures.

- group B: 88.4% of 442 participants reported feeling happier after viewing the pictures.

Scores are based on a scale of 1 to 7, with higher scores indicating greater preference.

In both Group A and Group B, the top-ranked landscapes were similar, with "Glacial Lake" and "The Blue Lagoon" occupying the first two positions. Other highly ranked landscapes included "Ice caves", "Serene forests", "Peaceful rivers" and "Auroras. However, there were slight variations in the rankings between the two groups, indicating some differences in preferences.

Furthermore, feedback regarding the improvement of psychological well-being was collected from the participants in both groups. In Group A, 89% of the 445 participants reported feeling happier after viewing the pictures, while in Group B, 88.4% of the 442 participants reported a similar improvement. 445 participants reported feeling happier after viewing the pictures, while in Group B, 88.4% of the 442 participants reported a similar improvement. These findings suggest that exposure to the selected landscapes, regardless of prior visitation to Iceland, had a positive impact on the participants' psychological well-being.

The Pearson correlation coefficient formula was applied to calculate the similarity matrix between the two groups, resulting in a similarity value of 0.95. This indicates a high degree of similarity in landscape preferences and ratings between Group A and Group B suggesting a significant level of agreement in their choices and evaluations of landscapes. This indicates a high degree of similarity in landscape preferences and ratings between Group A and Group B, suggesting a significant level of agreement in their choices and evaluations of landscapes.

To further investigate the healing effects of photos and the impact of different landscape categories on these effects, this study utilized a questionnaire analysis to gather data for processing, modelling and result analysis. The following steps were undertaken.

Firstly, a questionnaire analysis was employed to explore the healing effects of various landscape categories. The collected data underwent preprocessing, which involved removing outliers and filling in missing values. Normalization was then applied to ensure data compatibility for analysis. The pre-processed data was input into SPSS and a stepwise regression method was utilized to select the influencing factors.

Based on the selected influencing factors, a regression model was established using SPSS to predict whether a photo possesses therapeutic effects.

Model is as follows: Healing Effect of Photos = 0.62 + 0.33 Question A + 0.24 Question B + 0.19 Question C - 0.08 Question D + 0.12 Question E. In this model, the independent variables are normalized Question A, Question B, Question C, Question D, and Question E. The dependent variable represents whether the photo has a healing effect, denial of the healing effect, and whether the photo has a healing effect.

The dependent variable represents whether the photo has a healing effect, denoted as 1 if it does and 0 if it does not.

The coefficients in the stepwise regression model signify the strength and direction of the relationship between each question (independent variable) and the healing effect of the photos. According to the results of this model, the interpretations of the impact of each question on the healing effect of photos are as follows:

Question A:

This question evaluates whether the photo provides a sense of escape from the everyday environment and stress.

The coefficient of 0.33 suggests that when respondents believe the photo can deliver this feeling, there is a higher likelihood of the photo having a healing effect.

The p-value of 0.002 indicates that the impact of Question A on the healing effect of photos is statistically significant, suggesting an association between respondents' answers to this question and the healing effect of the photos.

Question B:

This question assesses whether the open and spacious environment depicted in the photo brings a sense of freedom and relaxation.

A coefficient of 0.24 suggests that when respondents perceive the environment in the photo to possess these characteristics, there is a higher likelihood of the photo having a healing effect.

Question C:

This question examines whether the visual elements in the photo capture attention and stimulate interest.

The coefficient of 0.19 indicates a correlation between respondents' level of attention and interest in the visual elements of the photo and the healing effect of the photo.

Question D:

This question explores whether the depicted landscape aligns with personal preferences and needs.

The coefficient of -0.08 suggests that when respondents perceive the depicted landscape to be incongruent with their personal preferences and needs, the likelihood of the photo having a healing effect is lower.

Question E:

This question investigates whether the photo evokes a sense of security.

The coefficient of 0.12 indicates that when respondents feel a sense of security from the photo, there is a higher likelihood of the photo having a healing effect.

The R-squared value of the model is 0.74, indicating that the included questions explain 74% of the variance in the dependent variable. The adjusted R-squared value of 0.70, considering the number of predictive variables in the model, suggests a good fit and the model's ability to make accurate predictions on the test dataset. Additionally, the average difference between the predicted values and the actual observed value in the model is 0.2.

A random 10% of the dataset was reserved for testing purposes and the model accurately predicted whether photos had a healing effect, yielding a Mean Squared Error (MSE) of 0.0167.

The study identified the top ten natural landscape types in Iceland, which encompassed glacial lakes, the Blue Lagoon, ice caves, serene forests, peaceful rivers, auroras, mountains, wildflower fields, waterfalls and cliffs and coastal formations. From each category, the four highest-ranking images were selected, resulting in a carefully curated collection of forty photographs for the healing Icelandic landscape photo album. Examples of the album's pictures are presented below.

Figure 49 : Upper left image: Large Glacier Lake, Jökulsárlón, Lower left image: Large Glacier Lake, Jökulsárlón, Upper right image: Ice cave, Lower right image: Aurora.

By Eyewitness (2022).

Discussion

The study identified the top ten natural landscape types in Iceland, forming a curated collection of forty photographs for a therapeutic Icelandic photo album. The analysis revealed that landscapes featuring greenery, water, auroras and ice caves received high scores contributing to participants' sense of calm, pleasure and fascination.

The regression model provided insights into the impact of specific questions on the healing effect of photos, including factors like a sense of escape, open and spacious environments, attention-capturing visual elements, personal preferences and a sense of security.

This study substantiates the psychological therapeutic effect of natural landscape images through experimentation. The results demonstrate the potential of specific types of elements in natural landscapes, such as water scenes, trees, expansive forests, glaciers, ice caves and blue hot springs, to enhance individual mental well-being and uplift mood. This aligns with E.O. Wilson's biophilia theory (1984), where water and green symbolize life and serve as clues to the nature of the landscape. Vast open natural spaces, particularly sparse grasslands, allow observation of predators' activities while providing concealed spaces, following the Prospect-Refuge theory. Additionally, ice caves offer warmth and protection. People's fondness for landscapes also stems from their need for survival. Natural elements like the aurora, glaciers, straits and cliffs evoke a strong sense of departure, signifying an escape from everyday life.

We employed a combination of research methodologies, including Kaplan's (1989) environmental psychology research, O. Medvedev's comparative research and Hyun-Ju's survey questionnaire analysis. Through quantitative analysis, we established that two-dimensional visual perception positively influences individual health, confirming the therapeutic effect of natural landscapes on psychological health. Additionally, we developed a mathematical model to evaluate and predict the impact of specific photos on healing effects, demonstrating its efficacy.

In a separate experiment, Hyun-jun investigated the physiological and psychological states of participants using simulated pine forest scents, confirming the therapeutic effect of pine forest aroma (Jo, 2010). This underscores the healing potential of mimicking natural scents through olfaction. In contrast, our study visually demonstrated the healing impact of natural landscapes. Seigo et al. (2021) utilized Virtual Reality technology to replicate real natural settings, affirming their therapeutic influence in a three-dimensional virtual context. Our research contributes to the

understanding that even two-dimensional images of natural landscapes possess inherent healing properties.

In Sun's (2022) investigation into the therapeutic effects of visual, olfactory and auditory stimuli in green landscapes, she posited that optimal psychological recovery occurs when all three dimensions are engaged. This suggests that human psychology tends to benefit from comprehensive sensory experiences. Based on Sun's (2022) findings, we can further evaluate therapeutic effects by combining natural landscape imagery, soothing background music and plant-derived aromatic oils. Nonetheless, considering the outcomes of experiments by Patrick (2007), Sun (2022) and Peter (2005), it is plausible that an environment integrating visual, olfactory and auditory stimuli would yield therapeutic outcomes.

Therefore, in addition to a curated collection of therapeutic landscape images, incorporating ambient sounds from diverse natural settings (accessible via QR code) such as flowing water, bird calls and rustling leaves, along with naturally fragrant perfume, can form a comprehensive multi-sensory therapeutic landscape product. This amalgamation provides visual, olfactory and auditory stimuli for a more immersive healing experience.

Conclusion

This study conducted a controlled experiment to investigate the psychological therapeutic effects of images depicting natural landscapes. The experimental design encompassed distinct variables, including the presentation of natural landscape with some specific elements and their influence on individuals' mental well-being and mood.

In line with our initial hypotheses, the results affirmed that particular categories of natural landscape images, such as water landscapes, trees, expansive forests, ice caves, and blue hot springs, positively impact individuals' mental states. This finding provides empirical support for the therapeutic effect of landscape images on human psychological health.

Furthermore, this study offers valuable insights for practical applications in therapeutic and health interventions. Understanding how natural landscape with some specific elements influence therapeutic outcomes enables the creation of targeted and effective treatment plans, particularly in high-pressure work environments. Incorporating elements like water features, green plants, open green spaces and imaginative features such as ice caves and auroras can be beneficial in alleviating anxiety and promoting relaxation.

Additionally, the research findings illuminate pathways for developing tools and interventions that incorporate Icelandic landscapes into therapeutic landscape.

Leveraging Iceland's natural landscapes for healing photography, soothing music, visual meditation and virtual reality experiences can effectively contribute to emotional management, anxiety reduction, stress relief and psychological recovery.

Moreover, the model established in this study forms the foundation for generating AI-generated therapeutic landscape images. This advancement holds promise for providing characteristic attributes of therapeutic landscapes, paving the way for an AI-powered collection of therapeutic landscape visuals. AI-generated therapeutic landscape pictures require around 5000-6000 pictures and GANs[71] algorithm and train many times. Then the model could possibly create therapeutic landscape pictures.

Lastly, these findings carry substantial practical implications for Iceland's nature conservation efforts. The positive impact of Iceland's landscapes on individual mental health may attract a greater number of tourists, ultimately fostering the growth of the tourism sector. Consequently, safeguarding and ensuring the sustainability of Iceland's natural landscapes becomes paramount for their enduring use in healing and intervention endeavours.

In conclusion, this study underscores the influential role of diverse landscape elements in Iceland in eliciting therapeutic effects through images, offering insights for therapeutic interventions and serving as crucial references for enhancing individual psychological well-being. These findings emphasize the significance of nature conservation and sustainability in the process.

5.2 Research on how narrative influence psychological well-being in Therapeutic Landscape in Roman Temple Garden

We tested how narrative would influence the psychological well-being in Roman temple garden, for curiosity to test the HTLD-indicators on psychological and spiritual aspects. The research results was published in the Livro de atas do V Seminário Internacional de História de Arquitetura Hospitalar: Património Hospitalar e Paisagens de Cura International Seminar on the History of Hospital Architecture (V SIHAH) Património Hospitalar e Paisagens de Cura) https://hdl.handle.net/10316/108822

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[71] GANs (Generative Adversarial Networks) are a type of artificial intelligence algorithm used in machine learning. They consist of two neural networks, the generator and the discriminator, which are trained simultaneously through a competitive process. The generator network generates synthetic data samples, while the discriminator network distinguishes between real and fake samples. GANs have been widely applied in various fields, including image generation, video synthesis, and text generation, among others, showing remarkable success in producing realistic and diverse outputs.

This paper explores therapeutic landscapes in Portugal. The paper presents the outcomes of an experiment conducted in Evora, Portugal.

The study involved collecting data from 1,000 visitors during the Evora experiment, employing semi-structured interviews and Likert scales. Semantic and statistical analyses were conducted, revealing that healing stories exerted a significant impact on visitors' perceived levels of health and well-being, and it may cause placebo effect.

Introduction

Crafting a narrative serves as a potent means to add therapeutic attribute to therapeutic landscape. Creating a persuasive healing story in therapeutic landscape and share with the users. This method also corresponds to placebo effect. That is when the users believe the therapeutic landscape has therapeutic effect on their well-being. Then it really happens. Placebo effect (Linde, 2011; Vambheim, 2021) could be one of the explanation.

This, in turn, significantly amplifies the therapeutic influence embedded within the landscape. Stories have been used for centuries to convey traditions and cultural values, but they also have the power to evoke emotions, make connections and provide perspective on human experience (Greenawalt, 2014). In the context of therapeutic landscapes, storytelling can be used to create deeper connections between visitors and the environment. By telling healing stories, legends about healing myths and utilizing religious and faith-based spaces, visitors can be given a sense of peace and connection beyond themselves. This connection may lead to a more therapeutic experience and promote better mental health outcomes. Research has shown that storytelling can have a positive impact on mental health. For example, a study by Greenawalt (2014) concluded that storytelling improved mood and reduced participants' anxiety levels. Similarly, a study by Liu et al. (2016) concluded that healing storytelling interventions were effective in reducing depression and anxiety symptoms in college students. In conclusion, healing story are a valuable resource for promoting human health and well-being and by creating a healing story, we can provide visitors with an experience of peace and connection to something beyond themselves.

According to Gesler and numerous researchers in the field of wellbeing geography, a physical environment serves as a therapeutic landscape, providing healing through tangible features such as trees and flowers. However, the intangible aspects of a place, including its historical background, personal experiences and religious beliefs, also contribute to the healing process, even if they cannot be scientifically proven. An example of this phenomenon can be seen in his study in Londer (1998), where the healing power of water and space was experienced by pilgrims, despite the lack of scientific validation.

The concept of a therapeutic landscape extends beyond the physical environment and is observed globally. For instance, in Tibetan and Central Asian temple, individuals have reported transformative experiences. In some cases, Buddhists have sold their possessions to embark on a pilgrimage, worshiping the Buddha and witnessing the recovery from cancer by the journey's end.

The influence of storytelling in therapeutic landscapes extends beyond the physical realm, encompassing symbolic and spiritual dimensions. Empirical evidence supporting this notion comes from a positive psychology experiment conducted in the 1990s. In this study, participants around 80 years old were invited to a remote villa for six months, resulting in a reversal of their physical aging and enhanced brain function. The transformative power of storytelling was highlighted when the participants, under the illusion as it was 1976, experienced a setting with furniture, movies and newspapers from that year. Despite being a fabrication, the impact of the *constructed narrative or made-up story* significantly improved participants' overall health. This experiment underscores the role of storytelling as a potential element influencing both physical and psychological well-being (Russo-Netzer & Ben-Shahar, 2011).

Gesler's (1996) investigation of therapeutic landscapes in Lourdes offers additional illustrations of the efficacy of healing narratives in such environments. In Lourdes, a priest discovered a water spring and told people the water has healing power to all diseases as Maria gave her this message. Believers embarked on journeys to drink the water and reported experiencing healing. Subsequent analysis, however, revealed the water to be ordinary.

The connection between storytelling and the placebo effect is evident, where individuals, believing in the healing power of a place, witness tangible improvements. Therefore, as designers of healing spaces, crafting compelling narratives in therapeutic landscapes may indeed exert a therapeutic influence on well-being of users. To explore the potential therapeutic impact of storytelling in therapeutic landscapes, our experiment is conducted.

An experiment was carried in Roman Temple and Garden of Diana in Evora. The study was divided into three parts: creation of the healing story, promotion of the story and data collection. Evora is a historic city in the Alentejo region of Portugal, home to the famous Roman Temple (Figures 49 and 50). This place offers panorama for the city of Evora.

Figure 50: Roman temple from perspective from Diana Garden

By Bao Guotai (2023).

Figure 51: landscape view of Diana Garden

By Bao Guotai (2023).

Figure 52: map of Roman temple and Diana Garden

By Bao Guotai (2023).

Methods

In crafting a healing narrative for Diana Garden and Roman temple, a fictional legend unfolds, recounting a miraculous healing initiated by the goddess Diana in response to a devoted mother's prayer. This fabricated tale serves as a symbolic representation, conveying the overarching message that placing faith in both the goddess and the sacred locale can yield a transformative and almost magical healing experience for visitors.

The dissemination of this healing narrative took place in the second phase through various social media platforms, including TikTok, WeChat, and Instagram. The storytelling transcended linguistic boundaries, utilizing Chinese, English and Portuguese to reach a diverse audience. The fabricated narrative portrays the temple and garden as a sanctified space for both physical and mental healing and restoration. It weaves together accounts of miraculous healings documented throughout the

monastery's storied history, creating a compelling and engaging portrayal of Diana Garden as a site imbued with transformative and restorative powers.

In the third and final phase of the study, data on visitors to the Diana Garden were collected. During 10 consecutive days, 100 visitors were randomly selected each day and 10 visitors per day were invited to participate in semi-structured interviews and Likert scale surveys. In order to avoid minor duplications or anomalous data during data collection and analysis, questionnaires from five individuals were added to each group each day as safety data. Visitors were asked questions about their experience of visiting the temple, whether they were familiar with the story of Roman temple and Diana Garden.

The data collected was semantically and statistically analyzed. The semantic analysis categorized the visitors' responses into themes related to the story of Diana's temple garden and their level of health and well-being. Meanwhile, statistical analysis determined whether there were significant differences in health and well-being perceptions between visitors who knew the story and those who did not.

Results and analysis

A mixed-methods research study was conducted to explore the impact of a healing story on visitors' health and well-being in the gardens of Diana in Evora. The study consisted of three parts: creation of the healing story, sharing the story with visitors and data collection. A sample of 1,000 visitors, including 469 males and 531 females, were sampled over a 10-day period, of which 721 visitors had heard the story and 279 had not.

Data collected through semantic and statistical analyses showed that the healing story had a significant effect on visitors' perceived health and well-being ($F_{(2,997)} = 690.77$, $p < 0.001$). The results of the chi-square test ($p < 0,001$) indicated that visitors who had heard the story reported significantly higher health and well-being than those who had not heard the story.

The results showed that of those 721 visitors who had heard the story, 700 reported feeling healed, 11 reported feeling a moderate effect and 10 reported not feeling healed. However, of the 279 visitors who had not heard the story, none reported feeling healed, 5 reported feeling a moderate effect and 274 reported not feeling healed.

To determine whether there was a significant difference in perceived health and well-being between visitors who knew the story and those who did not, we conducted a one-way ANOVA. Our analysis revealed that healing stories had a significant effect on visitors' health and well-being perceptions ($F_{(2,997)} = 690.77$, $p < 0.001$). A chi-square

test showed that visitors who had heard the story reported significantly higher perceptions of health and well-being than those who had not (p < 0.001).

The results suggest that creating healing stories in a landscape may be contribute for enhancing visitors' well-being. The results of this study may inspire a deeper exploration of healing stories in transform a therapeutic landscape with some more healing attributes to improve people's health in terms of placebo effect.

Overall, the null hypothesis was rejected, and the alternative hypothesis was accepted indicating that there is a significant difference in the level of well-being perception between visitors who have listened to the healing story and those who have not. Therefore, listening to stories in the garden of Diana does have a significant effect on visitors' perceived health and well-being.

Table 19: Descriptive Summary Based on Visitors' Perceptions of Health and Wellbeing

Variável independente	Variável dependente	Categoria	Frequência	Percentagem
A (história ouvida)	X (curado)	700	70	72.1%
	Y (mod. efectivo)	11	1.1	
	Z (não curado)	10	1	
	Total	721	72.1	
B (não ouvi a história)	X (curado)	0	0	27.9%
	Y (mod. efectivo)	0	0	
	Z (não curado)	279	27.9	
	Total	279	27.9	
Em geral	X (curado)	700	70	70%
	Y (mod. efectivo)	11	1.1	
	Z (não curado)	289	28.9	
	Total	1000	100	

Variable independent	Variable dependent Category	Frequency	Percentage	
A (history heard)	X (cured)	700	70	72.1%
	Y (mod. effective)	11	1.1	
	Z (no cured)	10	1	
	Total	721	72.1	
B (I didn't hear the story)	X (cured)	0	0	27.9%
	Y (mod. effective)	0	0	
	Z (no cured)	279	27.9	
	Total	279	27.9	
In general	X (cured)	700	70	70%
	Y (mod. effective)	11	1.1	
	Z (no cured)	289	28.9	
	Total	1000	100	

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Table 20: Summary of Percentage of Visitors' Perceived Health and Well-Being

	Grupo A (história ouvida)	Grupo B (não ouviu a história)
Curado (X)	0.971	0.004
Mod. Efectivo (Y)	0.155	0.007
Não curado (Z)	0.143	0.989
Média global	1.028	3.0
Desvio padrão	1.152	-

	Group A (history heard)	Group B (didn't hear the story)
Cured (X)	0.971	0.004
Effective Mod. (Y)	0.155	0.007
Uncured (Z)	0.143	0.989
Global average	1,028	3.0
Standard deviation	1.152	-

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Table 19 summarizes the percentage of visitors in each group who perceived their health and well-being as improved, moderately effective and not cured. The mean and standard deviation for each group are also shown. We can tell from the research results that visitors who heard the story tended to perceive their health and well-being as better, as reflected in the higher proportion of visitors in Group A who reported feeling cured or moderately effective and the smaller standard deviation for this group.

Table 21: One-way ANOVA on visitors' perception of health and well-being

Fonte	SS	df	EM	F	valor de p
Entre	23.091	2	23.091	25.042	<0.001
Dentro de	250.396	997	0.251		
Total	273.487	999			

Source	SS	df EM		F	p-value
In between	23,091	N₂	23,091	25.042 <0.001	
Inside of	250,396	997 0.251			
Total	273,487	999			

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Table 19 shows a one-way ANOVA of the results of the statistical analysis measuring the level of visitors' perception of health and well-being. The results of the analysis show that the between-group variance is significantly greater than the within-group variance as indicated by the F-statistic of 25.042 with a significance value of less than 0. 001.This suggests that visitors who have heard the stories have a better perception of their health and well-being.

Conclusion

This experiment provides compelling evidence that the creation of healing stories contributes significantly to improving health, potentially leveraging the placebo effect (Linde, 2011). Visitors who hold strong beliefs in the transformative power of these stories may experience a therapeutic effect on their well-being (Vambheim, 2021). This transcendent therapeutic journey extends beyond a mere half-hour trip; it becomes a recurring source of positive influence every time individuals reflect on it.

Drawing insights from Harvard's renowned well-being psychologist, Gilbert (2006), suggests that a simple practice of closing one's eyes and recalling a cherished place can contribute to daily happiness. By strategically promoting the historical narratives of healing sites, visitors can embark on a transformative journey that goes beyond the physical environment, resonating psychologically and spiritually, ultimately positively impacting physical well-being.

It is crucial to emphasize that a visit to a therapeutic landscape engages all the senses, emotions and the spirit, offering a holistic experience that facilitates a profound connection with nature. This holistic approach plays a pivotal role in self-healing and rejuvenation, fostering both mental and physical well-being. Consequently, it becomes imperative to consider not only the physical aspects of the landscape but also the experiential, emotional and spiritual dimensions for a comprehensive understanding of its therapeutic potential.

CHAPTER III – Case-Study:

Holistic Therapeutic Landscape Design for

elderly in Yunyan District - Guiyang City

CHAPTER III – Case-Study: Holistic Therapeutic Landscape Design for elderly in Yunyan District - Guiyang City

Chapter 3 aims to establish a Holistic Therapeutic Landscape Design Indicators for Elderly (HTLD-indicators(E)) in Yunyan District, Guiyang City, based on the Therapeutic Landscape Design Index (HTLD-indicators). Surveys were conducted among 100 elderly individuals (aged 65 and above) in Yunyan District. Their responses to 35 indicators in the questionnaire (Appendix 3) were analyzed using GST grayscale statistics to derive the HTLD Indicators (E), tailored to assess therapeutic landscapes for the elderly. The purpose is to improve existing outdoor space of elderly care facilities. Provide guidance for designing therapeutic landscapes for the elderly.

Table 22: Holistic Therapeutic landscape indicators (HTLD indicators)

Physical & psychological (14)	psychological (6)	Psychological spiritual (5)	Spiritual(6)	Physical psychological &spiritual(2)
a sense of control	Coherence	historical events	self-identity	Balance
social support	legibility	cultural beliefs	fearlessness toward death	Holism
physical movement and exercise	complexity	social relationships	clarity	
positive natural distractions	mystery	personal experiences	a sense of belonging	
a sense of security	a sense of safety (refugee)	Perception	sacredness	
physiological comfort	good visual experiences(prospect)	Uniqueness	vitality	
opportunities for choice		User involvement in design		
interaction with nature				
familiarity				
clearly positive design features.				
natural resources				
well-designed				
well maintained.				
appealing				

By Bao Guotai(2024).

1. Yunyan District, Guiyang City

Yunyan District is situated in Guiyang City, the capital of Guizhou Province, China. Positioned at the heart of the city, Yunyan is often referred to as the "crossroads". Geographically, it spans from longitude 106°29' to 47' and latitude 26°33' to 41', covering a total land area of 93.57 square kilometres.

At the end of 2022, the resident population of the district was 1,097,800, with a total household population of 722,467, which is the smallest and most densely populated administrative district in the province, with prosperous commerce and trade, convenient transportation and rich landscapes. Yunyan District is the main part of the former Guiyang Old Town, and has been an important political, economic and cultural centre of the province since the establishment of Guizhou Province in the Ming Dynasty. It is 10 kilometres away from Longdongbao Airport, 6 kilometres away from High-Speed Railway North Station and 13 kilometres away from High-Speed Railway East Station. There are 20 stations of Railway Lines 1, 2 and 3 set up in the territory of Yunyan (Yunyan District People's Government of Guiyang City, 2023) (Cheng et al., 2013), (figure 38).

Figure 53: Location of Guizhou Province, China.
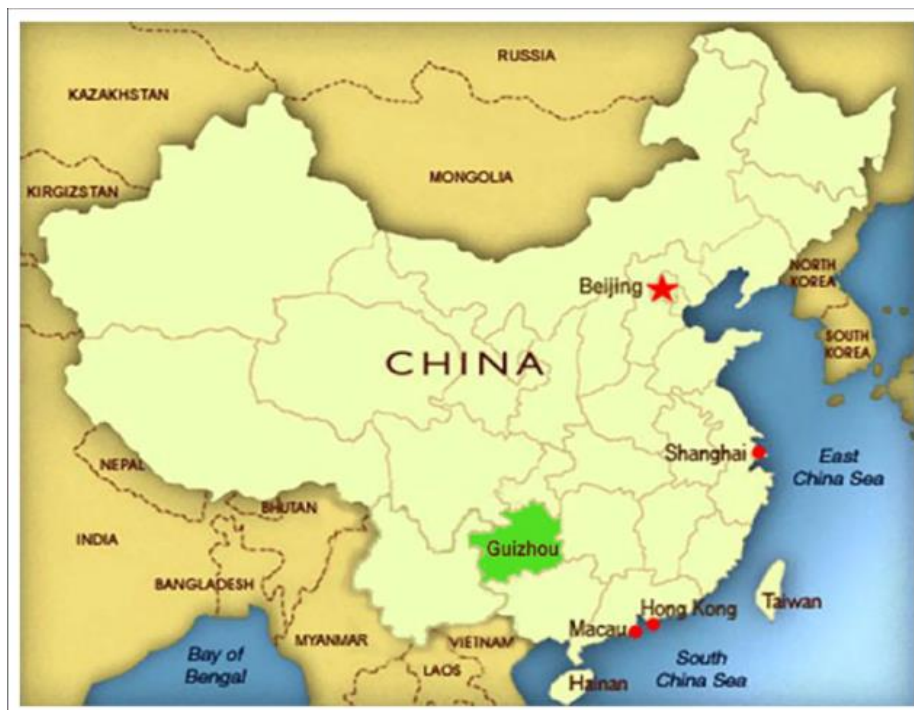
By unknown author,

http://homestaychina.org/44_things_to_do_in_guiyang_guizhou_china.ht).

Figure 54: The study area and adjacent districts in the city of Guiyang, Guizhou Province.

1.1 Geographic Localization

Yunyan District's terrain belongs to the central and southern hilly basin of Guizhou, forming part of the Guiyang Basin. The highest point is Tangjiashan in the northeast town of Qianling, reaching an elevation of 1438 meters. The lowest point lies at the exit of Nanming River, where it meets the Anjing River Valley in the east of Qianling Town, bordering Wudang District, at an elevation of 1023 meters. The area is surrounded by mountains to the north, west and east. The average elevation across the district is 1184 meters, with plains covering 18.20% of the total area, hills occupying 52.79%, and mountains encompassing 29.01%.

Figure 55: Yunyan District and Future Ark Street

By Yunyan District People's Government
(2021).https://www.yunyan.gov.cn/wcyy/cyyy/tsyy/202106/t20210602_82704723.html.

1.2 Climate

With an average elevation of 1184 meters, the district enjoys a subtropical humid monsoon climate. Due to its lower latitude, proximity to the ocean and higher elevation, there are no severe winters or scorching summers. The four seasons are distinct, with an average annual temperature of 15.3°C and a frost-free period lasting 271 days. The average annual precipitation is 1196.7 millimetres, with a relative humidity of 77% and an average sunshine duration of 1354 hours per year. The green coverage in urban areas reaches 52.1%, and the days with excellent air quality amount to 98.7%. Summers are gentle with refreshing breezes and abundant sunshine, making it an ideal district to relax.

Figure 56: Yunyan district and Panorama view from Qianlin Mountain

By Yunyan District People's Government. (2021),
https://www.yunyan.gov.cn/wcyy/cyyy/tsyy/202106/t20210602_82704724.html.

1.3 Natural Resources and Cultural Values

The area boasts abundant water resources, primarily the Nanming River and its tributaries such as the Shixi River and Guancheng River, with a total river length of 25 kilometres. Additionally, there are Xiaoguan Lake, Qianling Lake and Aha Reservoir, covering an area of 223,000 square meters and holding a capacity of 3.46 million cubic meters. Geothermal water resources are abundant, with mineral springs originating from ancient rock strata over 15,000 years old, more than 2000 meters underground. These springs maintain a temperature between 65°C to 67°C throughout the year, boasting clear and transparent water rich in trace elements. The area hosts 34 cultural heritage units within the district, accounting for 40% of the total in the city. Notable historical and cultural landmarks include Qianling Mountain Park, Yangming Shrine and WenchangPavilion.

Figure 57: Qianlin Park

By Yunyan District People's Government (2021).
https://www.yunyan.gov.cn/wcyy/cyyy/tsyy/202106/t20210602_82704724.html.

1.4 Spatial Pattern

In the south and centre area: focusing on the development of the headquarters economy, high-end consumption, investment in finance, science and technology R&D and cultural creativity and other modern services, to create a comprehensive embodiment of the new development concept of the "central business district".

In west area: focusing on the development of big data applications, industrial R&D design, electronic information manufacturing, high-end business and other industries, to create a Guiyang Guian integration of the development of the "Grand Cross".

In the east area: with the Future Ark as the main body, 7 km of the Nanming River as the main axis, relying on the Guiyang World Trade Centre complex, the construction of leisure, culture, vacation as one of the riverfront culture and leisure experience area, to create a "demonstration belt" of the integration of culture, business and tourism development.

In the north area: relying on the good ecological environment and the advantages of neighbouring the comprehensive protection zone and Guiyang North Railway Station, Guiyang East Railway Station, focusing on building a high-end business services and education industry .

1.5 Population

Yunyan District in Guiyang City is characterized by its multi-ethnic composition. The Han Chinese form the majority, followed by the Buyi and the Miao in the third position. Moreover, the district is home to diverse ethnic communities, including Dong, Yi, Bai, Dai, Zhuang, Hui, Tibetan, Brown, Tujia, Achang, Hani, Mongolian, Shui, Manchu, Dulong and others. It's worth noting that the presence of foreigners is relatively minimal, accounting for less than 5000 people.

2. Elderly

2.1 Population Ageing in China

China, with about one fifth of the world's total population, is experiencing increasing population aging owing to rapidly declining fertility and mortality rates. Under moderate or low mortality scenarios, China's total elderly population aged 65 years or older is projected to increase dramatically from 111 million (8.2 percent of the total population) in 2010 to between 337 million and 400 million (23.9 percent to 26.9 percent of the total population) in 2050; the number of elderly people aged 80 years or older, who are the most likely to need assistance with daily living, was about 193 million in 2010. From 2000 to 2050, the average annual growth rate of the elderly in China will be about 4.4 to 5.1 percent, more than twice the growth rate of industrialized countries. (Tsang, Yuk-ho & George 2010; Tsang, Yuk-ho, Chen, Enjian & Wang, Hongmei 2012)

As China pursues the liberalisation of its three-child policy to meet the challenges of an aging population, the reality is that factors such as education, real estate pressures,

living standards and a weak economy have led modern young people to generally choose not to have children or to have only one child. This has led to a continuing deterioration of China's aging problem and a grim situation. This situation signals that more and more elderly people will face the problem of not having children to take care of them. Elderly care institutions such as nursing homes, retirement communities and hospice care centres have become an inevitable result of aging and childlessness in China. In response to this serious social phenomenon, it has become crucial to study the rehabilitation landscape and enhance its quality. This will not only provide the necessary support for aging, but also enhance the quality of life and physical and mental health of the elderly. The HTLD-indicators(E) is an important indicator for assessing the quality of therapeutic landscape for the elderly.

2.2 Physical Characteristics and Environmental Needs

The physical characteristics of elderly patients is characterized by a general decline in the functioning of organs, the nervous system, bones and muscle tissue as they age. Therefore, from a physical point of view, the needs of the environment are based on their physical situation and can support and optimize their daily activities in all aspects.

Figure 58: Changing of Physical Condition by Aging

Figure 6-1 Schematic diagram of changes in age and body functions
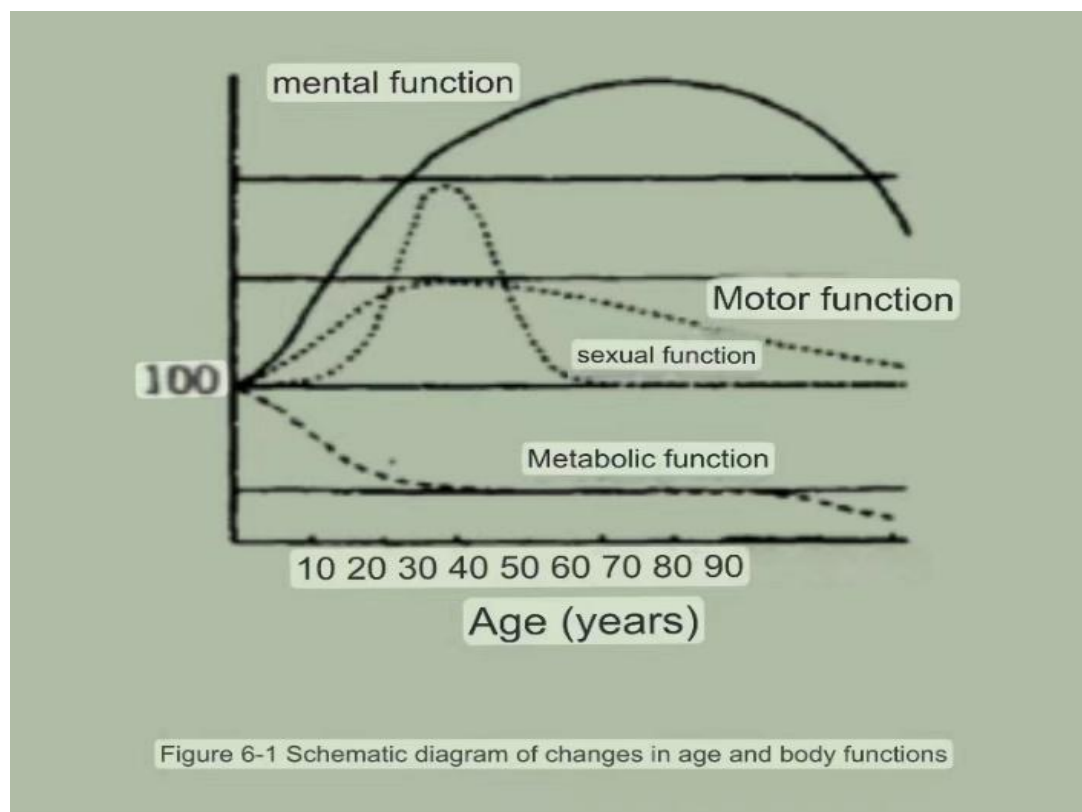
By Xiao Jian (2009).

(1) Decline of the perceptual system

The senses of sight, hearing, smell and touch are all declining in elderly patients. In terms of vision, the ability of the elderly to regulate their vision decreases sharply from the age of 65 onwards; their ability to recognize forms and colours (especially cold colours such as purple, blue, green, etc.) decreases and their ability to perceive the intensity of light decreases, so it is necessary to provide them with adequate lighting; in terms of hearing, the elderly's ability to recognize speech and sound decreases significantly, which directly affects their communication and creates inconvenience and safety hazards for their outdoor activities; in the sense of touch, the number of tactile points in the skin of the elderly over 60 years of age is significantly reduced, so the elderly's sensation of temperature and pain is also significantly weaker. The ability of understanding , memorial skill are reduced (Yang Xi, 2005).

(2) Decline of motor organs and functions
Bone and muscle deterioration in the elderly, atrophy of the body scale, the appearance of hooked waist and hunchback, the increase of bone brittleness, the weakening of muscle elasticity and muscle strength, coordination, durability, strength decline, coupled with the decline of sensitivity and sense of balance caused by the decline of the elderly athletic ability.

(3) Decline of the central nervous system and cardiorespiratory function
The reduction of nerve cells in the brain, the reduction of brain weight by about 20% compared to youth and middle age, the reduction of blood flow and oxygen to all parts of the body and the reduction in the efficiency of the circulatory system, respiratory system and digestive system. Aging of the brain leads to a decline in response functions. Cardiomyocytes decrease, muscle fibre atrophy, contractility decreases, leading to an increase in cardiovascular disease, so the elderly are not suitable for high-intensity exercise, due to the harmful gases in the air and dust resistance becomes weaker, so there is a greater need for clean and fresh air. The gastrointestinal and urinary systems of the elderly become weaker, which can easily cause gastrointestinal disorders and incontinence (Zhang Qiuxia, 2013).

2.3 Psychological characteristics and environmental needs

As we have discussed in the concept chapter, emotional and social feature are also included in psychological character.

The main factors affecting the psychological changes of the elderly include two aspects: the first is the change of social roles and the gradual fading of the elderly group from the main productive forces of the society; the second is the various diseases due to the aging of physiological tissues and organs, as well as negative emotions and psychological disorders due to the decline of physical functions and mobility. Negative emotional experiences can cause a decline in immune function, which is similar to the role of chronic stress (Yang Hongyu et al., 2006).

Normal emotional and mental activities that can avoid the occurrence of disease are also an important part of health and longevity ; ancient Chinese medical doctors emphasized that a good psychological environment is an important condition for prolonging life (Xu Jinghua, 1986).

(1）Feeling of Loneliness

Elderly individuals at home experience a gradual reduction in the frequency and scope of social interactions. Coupled with the fact that their children are often busy with work, leading to insufficient time for companionship and communication, loneliness among retired individuals deepens. Sociable and active participants in social activities tend to experience milder loneliness compared to those who stay idle at home. Loneliness mirrors the social needs of older adults and research suggests that they prefer collective activities with like-minded individuals. In China, collective activities such as chess, drama, dance, bird-walking, photography, painting, calligraphy, gardening, etc., attract the participation of older people.

(2）Feelings of Depression and Anxiety

Due to the decline in physiological functions and greater limitations in behaviour compared to their younger years, elderly individuals may experience feelings of depression. Those with illnesses are more prone to negative impacts such as insomnia, despondency, loss of appetite, anxiety, and low mood due to the pain and concerns about the future. Elderly individuals need positive guidance, communication and appropriate attention diversion, especially those dealing with health challenges (Robert Feldman, 2007). Suspicion and stubborn dissatisfaction with rich life experiences and diminishing reflexes and adaptability in older age, individuals develop nostalgic sentiments and may harbour suspicions and dissatisfaction towards new environments and life states. Nostalgia for the past can transform into resistance to new things, making them appear rigid, adhering to old norms, and holding onto their opinions. Acceptance of new environments and rules is challenging for older individuals, and familiarity with their surroundings and familiar elements can alleviate their stubborn and suspicious emotions. Older adults tend to engage in activities within familiar environments, places, people and memories, making these aspects crucial. In designing rehabilitation landscapes for older adults, preserving the original cultural features and objects of a place is important. In entirely new environments, considerations should align with the cultural background of the elderly group, enhancing the environment's sense of security, familiarity and recognizability through spatial design and material choices.

2.4 Spiritual characteristics and environmental needs

The spiritual aspect of a being is the inner essence, the soul and the part of the being that exists beyond time and space. It connects human beings with the universal source

and the oneness of all life[72]. Developing the awareness of the spiritual level gives people an experience of a feeling of "belonging" in the universe. The lack of connection to the spirit is the root of many of social and cultural ills as well as personal problems. The contact with the spiritual dimension gives the elderly an expanded perspective on their lives as individuals in the society by developing spiritual awareness. One is able to find the inspiration, understanding and strength that is needed to confront the difficulties and challenges of healing on other levels [73] (Gawain, 1997).

As the elderly have limited physical activities due to the decline of their physiological functions, they need to make up for it on a spiritual level. Cultural activity, sports and the discussion and socialization enhance their spiritual health. Poetry and song, painting, watching movies and plays are certainly ideal cultural activities, but they require a certain level of cultural literacy and skill on the part of the participants, whereas there is no restriction or pressure on the appreciation of natural beauty. When people get older, they have to confront death one day. The opportunity to observe the change of seasons in nature represents the cycle of the new and the old, life and death, which is significant time to be time-in for the elderly. They learn the philosophy of life from nature, the science of nature, the all knowledge beyond words in nature.

（1）loss of sense of belonging

After retiring, elderly individuals transition from being a vital part of society's workforce to finding themselves idle at home. This shift results in significant changes in the pace and content of their lives. Those who once contributed unique skills to society and received social recognition may now feel a loss of societal value and this also leads to feel lose the connection with universe and spirit. This, in turn, affects their self-worth assessment and acknowledgment. The sense of loss is a prevalent spiritual experience among retirees, reflecting their need for self-value realization. It becomes crucial to help them find additional avenues for fulfilling their sense of self-worth.

（2）Fear of confronting death

Older individuals face evident physical weakening and are susceptible to various diseases, leading to death. Contemplation of the deaths and self-induced thoughts about their own mortality evoke strong feelings of fear among the elderly. Death is an inevitable part of every person's journey and attempting to deliberately evade it not only proves futile but also results in negative feeling. Understanding and confronting death should be a topic everyone learns to appreciate. The enhancement of spiritual therapy should also contribute to a better understanding of death. The need for a

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[72] Gharipour, M., & Zimring, C. (2005). Design of gardens in healthcare facilities. Environmental Exposure and Health, 491, WIT Transactions on Ecology and the Environment. Retrieved from https://www.witpress.com ISSN 1743-3541

[73] Gawain, S. (1997). The Four Levels of Healing. Mill Valley, CA, Nataraj Publishing.

sense of security among older individuals is reflected not only in the safety of their daily travels but also in their inner sense of stability and tranquillity. A well-designed therapeutic landscape should provide older individuals with sense of physical, mental and spiritual security .

3. Methodology

To build HTLD-indicator(E) in Yunyan District from the HTLD-indicator, it's crucial to know ratings given by elderly for each indicator. This would help to understand how elderly people in this area think about the importance of each indicators. By this , HTLD-indicator (E) become practical and applicable in Yunyan District. A questionnaire was applied to collect ratings for each indicator.

In Yunyan District of Guiyang City, 100 older people (over 65 years old) were randomly selected to collect their evaluation of the importance of 35 indicators in the HTLD indicators. After the questionnaires were collected, the results were analysed by two methods, the first being the calculation of mean values. The second is the GST grey statistical method (GST method[74]). Mean value calculation will not calculate the correlation between the indicators, while GST grey statistics will calculate the correlation between the indicators. Each question in the questionnaire corresponds to a rating and Likert's ratings 1-7 scores correspond to the assessment results

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[74]Grey System Theory (GST), also known as Grey System Analysis (GSA), is a mathematical framework developed by Professor Deng Ju long in the 1980s. It is a statistical method used to analyse and model systems with limited or incomplete information. Grey System Theory (GST), also known as Grey System Analysis (GSA), is a mathematical framework developed by Prof. Deng Ju long in the 1980s.

Grey System Theory (GST) finds its primary application in systems characterized by uncertain, incomplete or insufficient data. The core objective is to analyse and predict the behaviour of such systems by extracting valuable insights from the available data. Central to GST is the concept of "grey sets," representing partially known or uncertain information.

The fundamental idea behind GST is to transform a grey system into a known system through data whitening. Whitening involves the reduction of uncertainty to obtain more accurate and reliable information. This process includes constructing grey models, developing whitening operators and performing statistical analysis.

In GST, the grey system is portrayed by a set of grey numbers, encompassing both known and unknown components. The known components reflect available information, while the unknown components signify uncertain or incomplete aspects of the system. By analysing the known components and employing whitening operators, GST aims to estimate and predict the unknown components.

Grey system theory has found widespread application in diverse fields such as economics, engineering, social sciences, environmental studies and management. It serves as a robust tool for decision-making, forecasting, optimization and risk analysis in scenarios where traditional mathematical models face limitations due to data constraints.

It's important to note that understanding and applying GST can be intricate, involving mathematical calculations and specialized techniques. Proficiency in the theory necessitates a strong foundation in mathematics and statistics.

evaluation result Extremely unimportant - Extremely important, respectively (table 21).

Table 23: Types and Scores of Importance Evaluation

Type (k value)	Evaluation Score (h value)	Evaluation Result
Not important (1)	1	Extremely unimportant
	2	Very unimportant
	3	Slightly unimportant Moderate
Moderate (2)	4	Moderate level
Important (3)	5	Slightly important
	6	Very important
	7	Extremely important

By Bao Guotai(2024).

In addition, the questionnaire needs to state that its distribution and the utilization of the data is for academic purposes only and that no information about the respondents will be collected, retained or disclosed.

Questionnaire since all the respondents were elderly people (65 years old and above) were distributed in a paper version. The information of the respondents is as follows.

Table 24: Information of Experimental respondents

distinguishing between the sexes	male	women
Number	50	50
frequency	50%	50%
age	65 years and over	65 years and over

By Bao Guotai.

A total of 100 questionnaires were distributed in November 2023 and 100 valid questionnaires were collected. The questionnaires were further organised. Finally, the raw data of the questionnaire were in two results, one is the average value, and the

other is the grey class whitening function, using two methods to make the value more accurate. Then the HTLD(E) is presented. 35 indicators and explanations are provided below.

3.1 Average Score Analysis

Based on 35 questions from 100 questionnaires, the average value was found and then ranked; the order of importance of the HTLD was determined according to the subjective feelings of the elderly in Yunyan District of Guiyang City, thus arriving at a suitable HTLD (E)

Table 25: The 100 Person Average Rating Score

Indicator	Evaluation rating (1-7)
Sense of control	5.35
Coherence	5.41
Balance	5.82
Self-identity	5.84
Social support	5.34
Legibility	5.98
Historical event	4.5
Fearless towards death	5.21
Physical activity and exercise	6.54
Complexity	5.24
Cultural belief	5.38
Uniqueness	4.68
Interaction with nature	6.56
Mystery	5.10
Social relationship	6.54
Good visual experience(prospect)	6.23
A sense of safety(refugee)	5.84
Vitality	5.87
Personal experience	6.55
Sense of security	6.45
Natural resource	5.45
Perception	6..23
User involved in design	4.01
Physiological comfort	6.56
Appealing	5.85
Opportunities for choice	6.01
Interacting with Nature	6.21
Well maintained	6.33
Well designed	5.63
Perceptual	6.16
Clarity	6.54

Indicator	Evaluation rating (1-7)
Sense of belonging	6.35
Sacredness	5.56
Positive design features	5.74
Holism	5.86

By Bao Guotai (2024).

3.2 GST Analysis

Grey System Theory (GST) is a statistical method that applies whitening functions for calculation and statistical analysis. It can effectively process unknown values within a model framework. Whitening functions analyse the whitening statistic of a given value, while whitening value describes the degree of certainty about the research object. When the grey degree is 1, the whitening degree of the set is 0, indicating no knowledge about the research object. Conversely, when the grey degree is 0, the whitening degree is 1, indicating complete certainty about Traditionally, mathematical discussions focus on sets with a grey degree of 0 and a whitening degree of 1, representing known objects. However, grey sets describe situations where some information is known and some is unknown, representing the data that includes both known and unknown quantities.

In GST, the first step is to provide a sample matrix of whitening statistics. Next, grey statistics are applied to classify the selected initial indicators into different types of grey classes. Different grey classes are then segmented, and a multi-level grey whitening segmentation function is constructed based on the grey classes. k represents the number of grey classes, where k = 1, 2, 3, …. k represents the number of grey classes, where k = 1, 2, 3, …

The grey statistical numbers were used as the actual sample value. q represents the number of statistical grey classes. γ_{ik} represents the sample value of the j-th statistical indicator for the K grey class statistics and represents the grey statistical value of the sample value of the i-th statistical indicator and η_i represents the grey statistical value of the sample value of the i-th statistical indicator $\gamma_{ik} = \frac{\eta_{jk}}{\eta_i}$ which means the grey statistical value of the i-th statistical indicator for all statistical objects under the K statistical grey class.

$$\gamma_{ik} = \frac{\eta_{jk}}{\eta_i}$$

$$\eta_{jk}^{\overline{\sum_{i=1}^{P}}} f_k$$

Then, the statistical decision matrix is determined.

$$R = (R_{ik})$$

$$r_j = (r_{j1}, r_{j2} \cdots r_{jk})$$

Finally, according to the principle of maximum statistical credibility, the evaluation conclusion of the grey system is obtained. In other words, when the component of the K-th grey class statistical number in ηi, denoted as γ_{ik}, is the maximum, the i-th statistical indicator belongs to the K-th grey class.

GST as a way of analysing mathematical statistics questionnaires for the correlation of indicators will be analysed. Below are the steps of GST grayscale analysis, with more mathematical analysis and formulas, due to the tediousness, skip over and go directly to the analysis of the results of the grayscale analysis .

The importance of all 35 indicators were divided. The final result proves the consistency between the mean values and the results derived from the grayscale analysis. Holistic Therapeutic landscape (HTLD-indicators (E))indicators were completed based on the questionnaire of the elderly in Yunyan District of Guiyang City and the HTL (index) of the rehabilitation landscape.

The questionnaire used in the GST method is designed to investigate one by one and the options belong to the Likert equidistant questionnaire, which is a seven-level indicator and the importance of each indicator is investigated and understood separately, corresponding to the importance of a with the value of a=1,2,3,4,5,6,7. The questionnaire involves a total of 35 indicators of the corresponding choice, that is to say, the number of the corresponding indicators b with the value of b=1,2,3,37.

In the GST method, these indicators are graded into various levels of importance, categorized as high, medium and low, represented by k=1,2,3. This classification aims to construct a three-level grey class whitening segmentation function. For a specific indicator with an importance level 'a' and labelled as the b-th indicator, the whiteness of the indicator is determined by a three-level grey class whitening segmentation function. The whitening function value is denoted as fk(ab). This segmentation process follows the formula as described below.

For k=1, representing high importance level

$$f_1(ab) = \begin{cases} 1, & h_{ab} \geq 7 \\ \frac{h_{ab}-4}{7-4}, & 4 < h_{ab} < 7 \\ 0, & h_{ab} \leq 4 \end{cases}$$

225

For k=2, representing medium importance level.

$$
f_1(ab) = \begin{cases} 0, & h_{ab} \geq 7 \\ \frac{7-h_{ab}}{7-4}, & 4 < h_{ab} < 7 \\ 1, & h_{ab} = 4 \\ \frac{h_{ab}-1}{4-1}, & 1 < h_{ab} < 4 \\ 0, & h_{ab} \leq 1 \end{cases}
$$

For k=3, representing low importance level.

$$
f_3(ab) = \begin{cases} 0, & h_{ab} \geq 4 \\ \frac{4-h_{ab}}{4-1}, & 1 < h_{ab} < 4 \\ 0, & h_{ab} \leq 1 \end{cases}
$$

In the above formulas, $f_k（ab）$ is quantified based on the segmentation and the number of experts corresponding to indicator a with importance level b is denoted as $L（ab）$. The product of the two is then accumulated to form the grey-class decision coefficient of the overall population.

$$
\eta_k(\ b) = \sum L(ab) \times f_k(ab)
$$

This process allows the organization of the primary data obtained from the survey questionnaire into segmented function-based weighted assignment results, which can be applied in subsequent analyses. This process allows the organization of the primary data obtained from the survey questionnaire into segmented function-based weighted assignment results, which can be applied in subsequent analyses. The statistical results of grayscale analysis are shown in the table below, through the results show that there is a high degree of consistency between the mean method and the grayscale analysis method. Using SPSS data analysis, the Cronbach.α coefficient was calculated as 0.958 coefficient close to 1 through the validity analysis, which proves that the data are highly consistent. The internal consistency has high reliability.

Table 26: Grey scale analysis of statistical results

indicator layer	η High	η Medium	η low	Importance
Sense of control	4.66	10.31	5.03	High
Coherence	13.50	5.20	2.30	High
Balance	15.66	3.04	1.30	High
Self-identity	15.02	3.02	1.96	High
Social support	15.36	3.54	1.10	High
Legibility	16.50	2.50	1.00	High
Historical event	8.50	7.51	3.99	Medium
Fearless towards death	15.50	4.20	0.30	High
Physical activity and exercise	15.00	4.33	0.67	High
Complexity	16.80	2.80	0.40	High
Cultural belief	8.50	7.51	3.99	High
Uniqueness	8.75	3.50	1.85	Medium
Interaction of nature	15.00	4.32	0.68	High
Mystery	16.00	2.68	2.32	High
Social relationship	16.22	2.22	2.46	High
Good visual experience (prospect)	15.65	2.50	3.91	High
Sense of Security (refugee)	14.35	4.00	1.65	High
Personal experience	13.00	3.68	3.32	High
Vitality	14.33	4.65	1.12	High

Sense of security	15.67	2.50	1.83	High
Natural resource	15.00	4.32	0.68	High
Perception	19.00	0.67	0.33	high
User involvement in design	9.67	6.66	3.67	Medium
Physiological comfort	15.32	4.32	0.36	High
Appealing	15.34	4.32	0.34	High
Opportunities for choice	15.68	2.66	1.76	High
Interacting with Nature	16.67	2.33	1.00	High
Well maintained	13.00	5.33	1.67	High
perceptual	15.33	2.99	1.68	High
clarity	15.67	3.33	1.00	High
sense of belonging	15.34	4.32	0.34	High
Sacredness	15.01	3.32	1.34	High
Positive design features	14.33	4.65	1.12	High
Holism	15.12	6.93	3.21	High

By Bao guotai (2024).

4. HTLD indicators (E) for elderly in Guiyang

After calculating both the mean values and GST analysis of indicators of HTLD-indicators, HTLD-indicators(E) and their importance, they were selected for the elderly. This was determined based on the research, survey analysis and assessment.

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Table 27: HTLD-indicators (E)

Indicator	Importance	Indicator	Importance	Indicator	Importance
sense of control	High	Mystery	High	Vitality	High
coherence	High	Social relationship	High	Personal experience	High
Balance	High	Good visual experience	High	Sense of security	High
Self-identity	High	A sense of safety(refugee)	High	Natural resource	High
Social support	High	Vitality	High	Perception	High
Legibility	High	Personal experience	High	Physiological comfort	High
Fearless towards death	High	Sense of security	High	Appealing	High
Physical activity and exercise	High	Natural resource	High	Opportunities for choice	High
Complexity	High	Perception	High	Historical event	Medium
Cultural belief	High	Good visual experience(prospect)	High	Uniqueness	Medium
Interaction with nature	High	A sense of safety(refugee)	High	User involved in design	Medium
Sense of belonging	High	Vitality	High		
Holism	High	Positive design features	High		

By Bao Guotai (2024).

4.1. Testing HTLD Indicators (E)

The HTLD indicators (E) specific to the elderly for therapeutic landscapes has been established to analyse and improve an existing project. Recommendations for design will also be provided based on this analysis using the HTLD index (E).

4.1.1. Golden House

Project Name	Guiyang Golden Home

Project Location	Guiyang City, Guizhou Province, China
Project area	50,000 square meters

Figure 59: Guiyang Yunyan District Golden Home Elderly Care Centre

Master plan

By Bao Guotai(2024).

Guiyang Golden Home is an important public elderly care facility in Guiyang City. It is operated and managed by Guizhou Royal Diamond Geriatric Industry Development Co.

Ltd. with strong support from the Yunyan District Council and Government. As one of the largest publicly funded senior care facilities in the province, the centre is committed to providing comprehensive care, support, education and research for its elderly residents. It is resident-cantered and strives to improve the health, well-being and overall quality of life of its residents. Additionally, they established a nursing home within the facility that provides specialized medical services to ensure residents have easy access to healthcare. Through partnerships with a variety of professional organizations, the centre meets the diverse needs of the senior population and ensures their comfort and safety throughout their stay. As a pioneer in geriatric care, the centre continues to improve its services to provide a fulfilling and comfortable living environment for the elderly.

The outdoor landscaping at Golden House Retreat primarily consists of building-enclosed courtyards, the Mori Trestle Trail, exercise and fitness areas and a number of Private open spaces.

The architectural form of the Golden House echoes that of Qianling Mountain, adopting the form of white walls, imitation blue brick finishes and dark grey sloping roofs, with the main buildings ranging from two to three floors. Buildings 1 to 4, which were constructed in the early days, adopt a corridor-style architectural layout, forming a corridor-style courtyard space between the buildings, with regular rectangular plant scenery in between. Due to the lack of seating, very few users stay in the space, but from the indoors to the outdoors, each room and pleasant plant landscape.

Figure 60: Corridor-style Courtyard Space

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The southern section of the site preserves an extensive expanse of the original dense forest, featuring low shrubs, groundcover and various trees. The vegetation has been thoughtfully arranged and maintained to establish a permeable line of sight, enhancing the visual experience of the space. Along the wooden walkway, intermittent resting benches are provided, each accommodating some individuals, making it a favoured spot for elderly users to take a leisurely stroll and rest. Adding a touch of cultural charm to the southernmost part of the walkway is a Chinese classical pavilion, elevating the overall humanistic ambiance of the site.

Figure 61： Walking path and Chinese Gazebo.

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The exercise and fitness zone, nestled between the sites, is enveloped by a mix of evergreen and broad-leaved trees, creating a semi-private space that feels enclosed yet maintains clear sightlines. The area features various uncomplicated exercise equipment tailored for the elderly. During the research period, the author observed numerous elderly individuals rearranging benches and gathering in the open space of the exercise area, engaging in communal singing sessions. This lively scene added a vibrant atmosphere to the surroundings.

Figure 62：Singing Practice

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The outdoor therapeutic landscape design of the Golden Home prioritizes the respectful and optimal utilization of the natural surroundings. While the therapeutic landscape brings great satisfaction to the users, there is room for improvement in the detailed implementation of barrier-free features in facilities. Further enhancements in these aspects will contribute to an even more holistic and user-friendly design to improve the holistic well-being of users.

A questionnaire was distributed to users in Yunyan District, Guiyang City, to further understand their perceptions of the Golden Home.

The questionnaire consisted of two parts, Questionnaire A was based on the user's personal preferences, for various designed landscape types, or for exercise in general and specific questions about satisfaction with the facility.

Questionnaire B is the HTLD-index (E), which scores the indicators for the Golden Home based on each individual's perceptions.

The questionnaires were randomly distributed and included three user groups: patients/recovering patients, family/friends/visitors and staff members.

5.Survey

5.1 Questionnaire A Findings

According to the findings of questionnaire A (Appendix A)

(1) Gender and Age Distribution of Participants

The residents of the Golden Home are all over 65 years of age, and the staff are mainly health care workers, visitors, administrative staff and caregivers for the residents. The nurses are all young women between the ages of 18-35 years old, while the administrative staff, caregivers and visitors are mainly in the age range of 18-45 years old (figure 63).

Figure 63： The distribution of genders and age groups
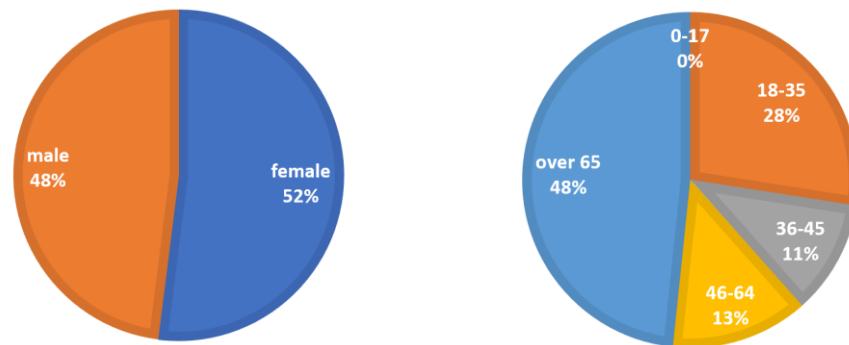
By Bao Guotai(2024).

(2) Average Daily Outdoor Time in Golden Home Therapeutic Landscape

The results show that when the weather and the temperature is pleasant, most participants carry outdoor activities average time is less than 2 hours and people who don't go out and those who have more than 6 hours of outdoor activity are equal. The survey respondents who do not go out are staffs . One elder person (over 65 years old) commenting that healthy life bases on a moderate amount of exercise.

Figure 64: Average Daily Outdoor Time in Golden Home Therapeutic Landscape
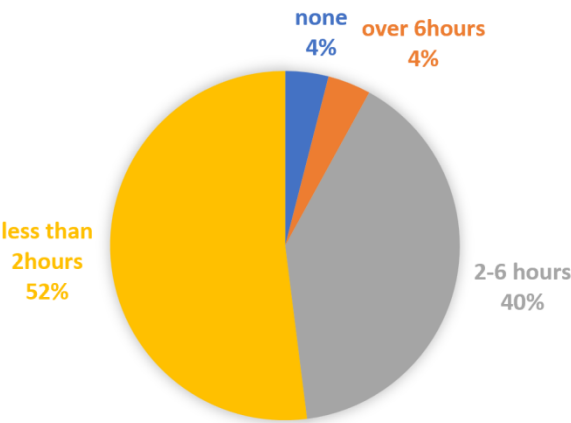
By Bao Guotai(2024).

(3) Landscape elements for psychological therapeutic impact on users

Questionnaire A listed a number of outdoor landscape elements for respondents to choose from and respondents were also able to add outdoor landscape elements that they felt promoted physical and psychological health. The results of the survey show that the highest rating of the landscape for therapeutic effect on elderly: 1) green plants and calm water, 2) brightly coloured flowers, which is basically consistent with many scholars Marcus, Ulrich, Roger, Kaplan and other scholars have done the survey experiments. Some of the respondents filled in the supplementary columns with key words such as forest, trees, etc., which again proves the importance of natural elements for therapeutic effect.

Figure 65： Different landscape elements for psychological therapeutic impact on users
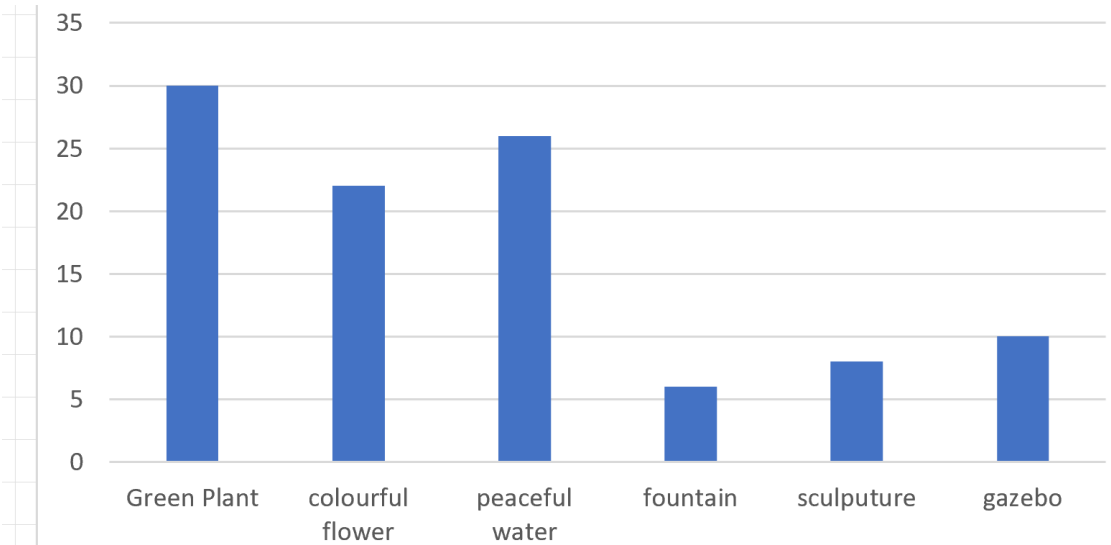
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(4) Ideal elements of therapeutic landscape in Guiyang

Survey A listed common landscape features and respondents were also free to supplement their ideal therapeutic landscape form. The survey results indicate a preference among respondents for open landscapes without visual barriers. Simultaneously, those favouring open landscapes also like enclosed landscape, indicating a coexistence of the two—open and close space in therapeutic landscape. This aligns with Jay Appleton's (1983) prospect and refuge theory and open and private space theory (Gehl, 2011). Most respondents also expressed a desire for immersive interaction with the landscape. Chinese classical and modern minimalist styles were the preferred landscape styles among respondents, who also favoured a tranquil atmosphere. This preference might stem from a sense of familiarity and belonging. Therefore, there's a greater inclination towards Chinese-style gardens. Mentioning Buddhist landscape elements in the open landscape was also well-received. Given that in Guiyang, one of the prevalent cultural influences is Buddhism, incorporating these elements into therapeutic landscape design can be beneficial. The preferred landscape style is Chinese classical style.

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Figure 66： Ideal elements of therapeutic landscape in Guiyang
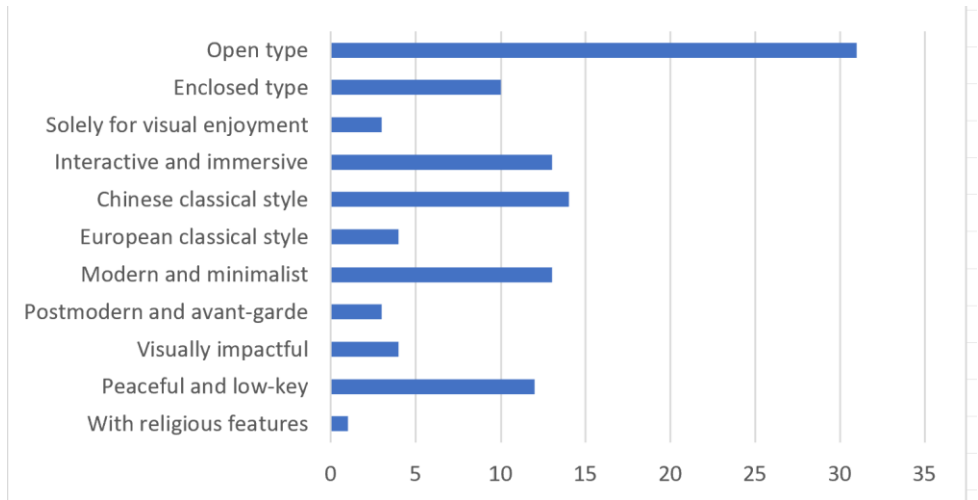
By Bao Guotai(2024).

(5) Satisfaction with therapeutic landscape of the Golden Home
The results of the survey indicate that respondents are highly satisfied with the therapeutic landscape of the Golden Home.

Figure 67： Satisfaction with therapeutic landscape of the Golden Home
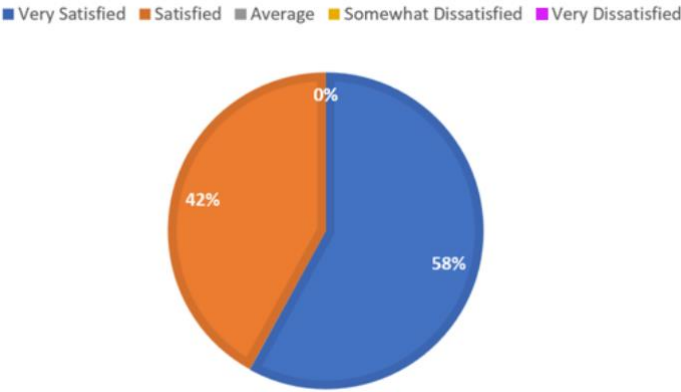
By Bao Guotai(2024).

(7) Functions of therapeutic landscape
The results indicate that all respondents agreed that therapeutic landscapes need to serve the recreation and appreciation of nature. The third most desired function was to provide opportunities to interact with natural elements. Additionally, spaces for outdoor exercise, meditation and socialization were selected by more than half of the respondents. Three additional respondents offered more functions that therapeutic landscape shall have art galleries, medical treatment space, closed private spaces .

Figure 68: Functions of therapeutic landscape
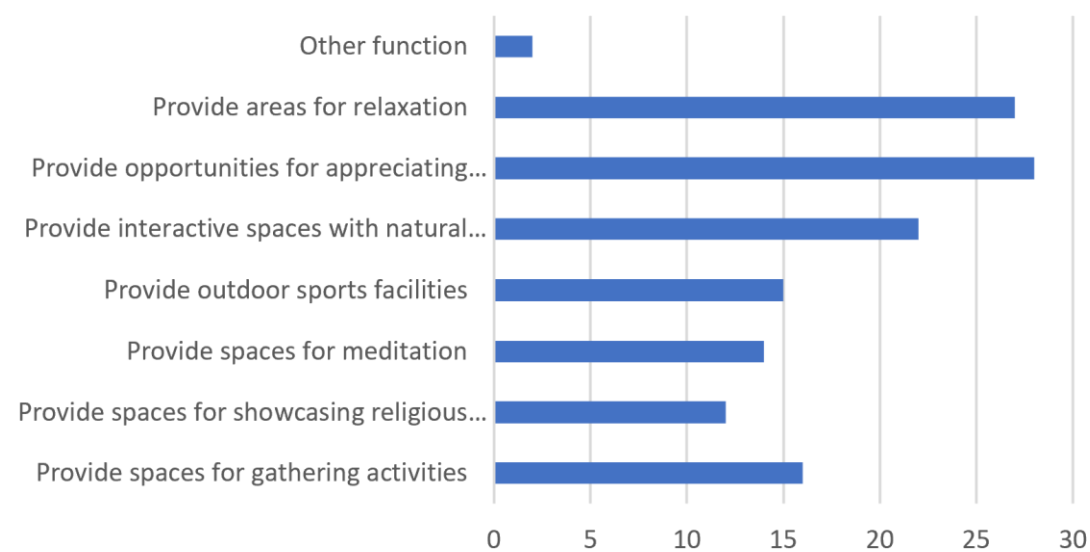
By Bao Guotai(2024).

5.2 Questionnaire B Findings

Questionnaire B was distributed "contemporary therapeutic landscape HTLD-indicators (E)", with the option of a five-level: very good, good, fair, poor and very poor, asking respondents to evaluate indicator-by-indicator based on their knowledge and understanding of therapeutic landscape.

In addition, the demographic information was supplemented by collecting information on gender, age, job position and ages and the information are confidential. It is paper-based questionnaire. The Golden Home has a large number of employee, and the overall size of the staff is large and mobile, with a wide range of specific jobs and years of experience.

Therefore, in order to fully take into account, the variability of profession and years of experience of the respondents' background, stratified sampling combined with random sampling was used to select the survey respondents. 50 were the elder people (over 65 years) and 50 people were from other categories (staff, family member and friends).

As paper-based questionnaire, it was necessary to provide the questionnaires to the respondents through the offline channel and the investigator collected the questionnaires after confirming that the respondents had completed the questionnaires. Based on this, all 100 questionnaires distributed were collected and all of them were valid questionnaires. The collected questionnaires which are blank, unfinished questionnaires and questionnaires with defacement were excluded and the information of the sorted questionnaires was processed in computer for further

analysis.

As mentioned above, after the data processing, results of the evaluation of each indicator are obtained, as shown in the table below, which includes the cumulative number of indicators and the number of people who are satisfied with the Golden Home and the importance of each indicator and the weight of the indicator.

Figure 69：Results of the Analysis of Questionnaire

Golden Home						
Rating	Very good	good	fair	poor	Very poor	significance	Weight of indicators
Sense of control	45	50	5	0	0	High	0.9
Coherence	35	60	5	0	0	High	0.9
Balance	66	31	3	0	0	High	0.9
Self-identity	10	40	50	0	0	High	0.9
Social support	4	85	11	0	0	High	0.9
Legibility	10	75	15	0	0	High	0.9
Fearless towards death	15	45	40	0	0	High	0.9
Physical activity and exercise	90	10	0	0	0	High	0.9
Complexity	5	91	4	0	0	High	0.9
Cultural belief	10	10	80	0	0	High	0.9
Interaction with nature	5	95	0	0	0	High	0.9
Mystery	15	50	35	0	0	High	0.9

Social relationship	21	56		1	0	High	0.9
Good visual experience(prospect)	19	50	20	10	1	High	0.9
A sense of safety	30	65	5	0	0	High	0.9
Vitality	21	67	12	0	0	High	0.9
Personal experience	10	89	0	1	0	High	0.9
Sense of security	6	94	0	0	0	High	0.9
Natural resource	22	44	22	12	0	High	0.9
Perception	34	54	12	0	0	high	0.9
Physiological comfort	25	45	25	5	0	High	0.9
Appealing	23	56	21	0	0	High	0.9
Opportunities for choice	22	41	35	2	0	High	0.9
Interacting with Nature	25	35	21	19	0	High	0.9
Well maintained	34	43	23	0	0	High	0.9
Well designed	38	45	17	0	0	High	0.9
Perceptual	42	33	25	0	0	High	0.9

Clarity	23	41	11	0	0	High	0.9
Sense of belonging	45	46	9	0	0	High	0.9
Sacredness	35	54	1	0	0	High	0.9
Positive design features	24	65	11	0	0	High	0.9
Holism	6	10	84	0	0	Medium	0.6
Historical events	32	35	33	0	0	Medium	0.6
uniqueness	34	43	23	0	0	Medium	0.6
User involvement in design	1	11	82	5	1	Medium	0.6

By Bao Guotai（2024）.

Golden Home focuses on therapeutic effect on users, with comprehensive and complete outdoor therapeutic facilities, so the overall satisfaction of the users of the Golden home therapeutic landscape are very good , good and fair.

5.3 Survey Results

The corresponding weights of HTLD-indicators (E) are accumulated and for very good, good, fair, poor and very poor options are assigned values of 2, 1, 0, -1, -2, respectively, so as to calculate the cumulative scores. The proportion of indicators with high importance is 0.9, the proportion of indicators with medium importance is 0.6 and the proportion of indicators with low importance is 0.3. As a result, the weighted evaluation results are formed. The evaluation results of the "HTLD-indicators (E)" for the therapeutic landscape of Golden Home.
The higher score represents the significant therapeutic effect of this index in this therapeutic landscape. The highest score for a single item is 180 points and the lowest score is -180 points.

An example of how the sense of control score is calculated:

Rating	Very good	good	fair	poor	Very poor	significance	Weight of indicators	Rating
sense of control	45	50	5	0	0	High	0.9	126

Final score = (45*2+50*1+0) *0.9=126

Table 28: Result of Rating of Each Indicators

Golden Home								
Rating	Very good	good	fair	poor	Very poor	significance	Weight of indicators	Rating
Sense of control	45	50	5	0	0	High	0.9	126
Coherence	35	60	5	0	0	High	0.9	117
Balance	66	31	3	0	0	High	0.9	146.7
Self-identity	10	40	50	0	0	High	0.9	54
Social support	4	85	11	0	0	High	0.9	83.7
Legibility	10	75	15	0	0	High	0.9	85.5
Fearless towards death	15	45	40	0	0	High	0.9	67.5
Physical activity and exercise	90	10	0	0	0	High	0.9	171
Complexity	5	91	4	0	0	High	0.9	90.9
Uniqueness	10	10	80	0	0	High	0.9	27
Interaction with nature	5	95	0	0	0	High	0.9	94.5

Mystery	15	50	35	0	0	High	0.9	72
Social relationship	21	56		1	0	High	0.9	87.3
Good visual experience(prospect)	30	65	5	0	0	High	0.9	112.5
Personal experience	21	67	12	0	0	High	0.9	98.1
A sense of safety(refugee)	10	89	0	1	0	High	0.9	97.2
Sense of security	6	94	0	0	0	High	0.9	95.4
Vitality	22	44	22	12	0	High	0.9	68.4
perception	34	54	12	0	0	high	0.9	109.8
Physiological comfort	25	45	25	5	0	High	0.9	81
Appealing	23	56	21	0	0	High	0.9	91.8
Opportunities for choice	22	41	35	2	0	High	0.9	74.7
Interacting with Nature	34	43	23	0	0	High	0.9	99.9
Well maintained	38	45	17	0	0	High	0.9	108.9
Well designed	42	33	25	0	0	High	0.9	105.3
Clarity	23	41	11	0	0	High	0.9	78.3

Sense of belonging	45	46	9	0	0	High	0.9	122.4
Positive design features	35	54	1	0	0	High	0.9	111.6
Holism	24	65	11	0	0	High	0.9	101.7
Sacredness	6	10	84	0	0	Medium	0.6	13.2
User participation in design	1	11	82	5	1	Medium	0.6	3.6
Cultural belief	34	43	23	0	0	Medium	0.6	66.6
Historical event	2	64	29	5	0	Medium	0.6	37.8

By Bao Guotai(2024).

Based on the findings, the analysis of the therapeutic landscape design at Golden Home in Guiyang reveals that users' express dissatisfaction with aspects such as user involvement in the design, sacredness and historical event, cultural belief. On the positive side, high scores are evident in categories like holism, sense of belonging, positive design features, level of maintenance, perception and interaction with nature. Moderate scores were assigned to the remaining indicators. The HTLD(E) enables a clear identification of user satisfaction with specific aspects and areas that require improvement. This insight is crucial for optimizing the design of therapeutic landscape. Consequently, the HTLD(E) holds valuable practical significance and application potential. However，we cannot deny that users have a 100% satisfaction level with the therapeutic landscape of Golden Home. However, we should not stop seeking ways to further optimize the space just because users are satisfied. Stagnation is definitely not the responsibility of designers and researchers. We can also convert the 46% of "satisfied" users into "very satisfied" after improving the design. Additionally, the enhancement of indicators can increase the physiological, psychological, and mental rehabilitation effects for users. It is not merely a simple matter of liking or disliking, but about achieving physical, psychological, and mental rehabilitation from the perspective of therapeutic landscapes.

5.4 Conclusion

The study on the therapeutic landscape of Golden Home in Guiyang, based on the HTLD (E) indicators, holds significant guiding implications. Grounded in theory and complemented by user surveys, the subjective perceptions of the environment vary based on users' moods, personal experiences, religious beliefs, values, preferences for nature and individual physical, psychological and mental states when carrying the research. Consequently, the HTLD (E) provides objective quantifiable indicators for the therapeutic landscape of older, while simultaneously acknowledging the inherent subjectivity associated with different sites and user groups. This means that measuring the same location with different people may introduce some data bias due to diverse subjective factors as mentioned on individual differences. And we must acknowledge that the subjectivity inherent in design is unavoidable. Even if all indicators are analysed objectively, it is still impossible to achieve complete objectivity.

However, with a considerable sample size and respondents' answers to questionnaire items, we were able to evaluate the 35 indicators of the therapeutic landscape. Analysing certain low-scoring indicators in the therapeutic landscape and proposing design guidance strategies enables a more comprehensive approach to therapeutic effect for users. In practical terms, the recognition of environmental factors carries inherent subjectivity, and such biases are inevitable in real-world scenarios. The study contributes valuable insights and practical strategies for enhancing the holistic therapeutic experience for users in therapeutic landscapes.

6. Holistic therapeutic landscape design strategy for HTLD-indicators (E)

Based on the theory of therapeutic landscape in the previous section and based on the HTLD indicators (E), we will give some examples of the design strategy of therapeutic landscape suitable for the elderly and share some excellent case studies for therapeutic landscape design for the elderly.

6.1 Strategies

Readers should be aware that a diverse array of design strategies exists, and it is impractical to encompass all of them in this discussion. Designers and researchers are encouraged to tailor their choices based on site-specific conditions, client programs and the theories and indicators outlined in previous chapters. These strategies are derived from various theories and indicators, and it is important to note that a single design strategy might enhance multiple design indicators. Consequently, the same design strategy may be reiterated to address different indicators in the subsequent text.

The following section outlines "Therapeutic Landscape Design Strategies" specifically tailored for elderly, HTL-indicators(E). For a more in-depth exploration of General Therapeutic Landscape Design Strategies related to HTLD-indicators, readers are directed to Chapter 2, where they are elaborated upon comprehensively.

Table 29： Therapeutic landscape HTLD-indicators (E)

Indicator	Importance	Indicator	Importance	Indicator	Importance
sense of control	High	Mystery	High	Vitality	High
coherence	High	Social relationship	High	Personal experience	High
Balance	High	Good visual experience	High	Sense of security	High
Self-identity	High	A sense of safety(refugee)	High	Natural resource	High
Social support	High	Vitality	High	Perception	High
Legibility	High	Personal experience	High	Physiological comfort	High
Fearless towards death	High	Sense of security	High	Appealing	High
Physical activity and exercise	High	Natural resource	High	Opportunities for choice	High
Complexity	High	Perception	High	Historical event	Medium
Cultural belief	High	Good visual experience	High	Uniqueness	Medium
Interaction with nature	High	A sense of safety(refugee)	High	User involved in design	Medium
Sense of belonging	High	Vitality	High		
Holism	High	Positive design features	High		

By Bao Guotai(2024).

Design Strategies to improve the Sense of Control :

Figure 70 The small lawn in the Olson Family Garden at St. Louis Children 's Hospital

The small lawn in the Olson Family Garden at St. Louis Children 's Hospital in St. Louis, Missouri, is used for many different activities—free play, picnics, and programmed events throughout the year. Designer: EDAW (Marcus & Sachs, 2014).
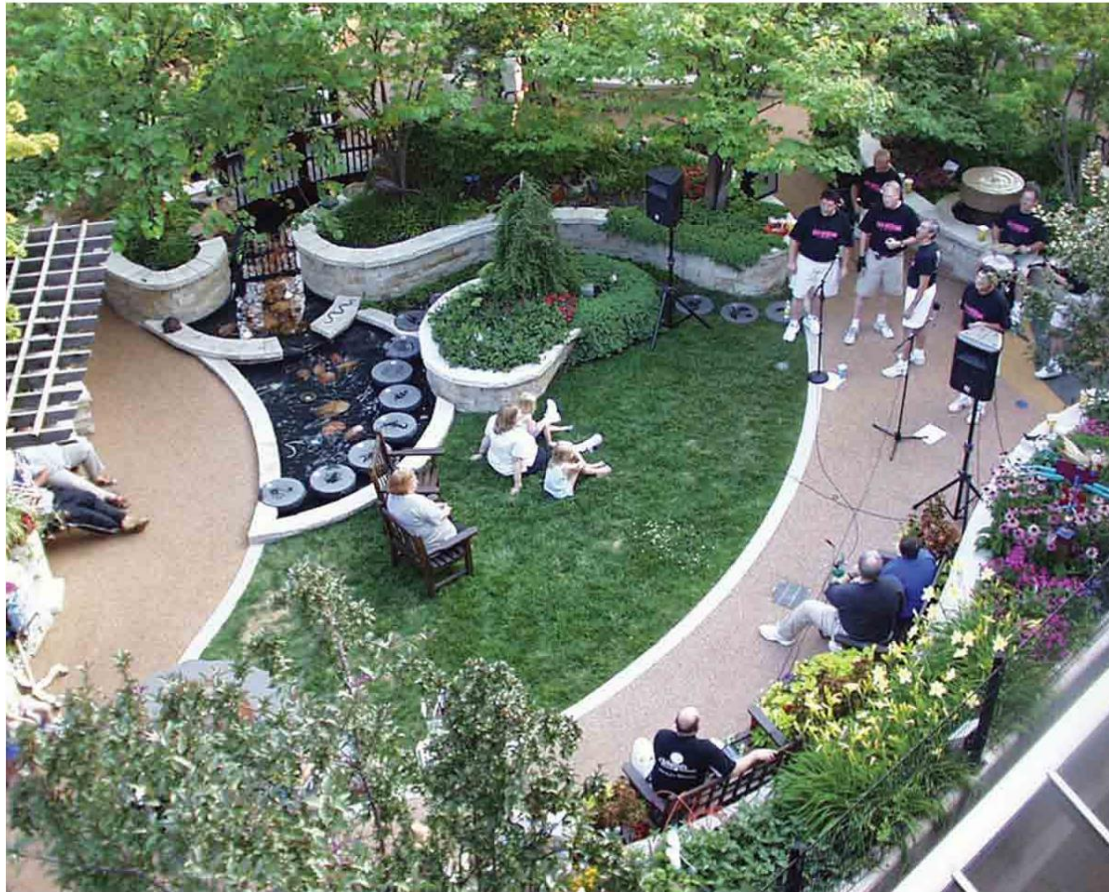
By Gary Wanger(2012)

A) Offer multiple choices and spaces in the therapeutic landscape

Affordance [75]is widely used by environmental psychologists , Kaplans . A space offers multiple choices would improve the sense of control of the users. For example, the

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[75] The concept of "affordance," introduced by James J. Gibson in 1979, is a key idea in understanding how people interact with their environments. Affordance refers to the possibilities for action that an environment offers to individuals. Think of it as the hidden potential of a space, revealing what people can do within it.

Key Points of Affordance:

Action Possibilities: Affordances highlight what actions are possible in an environment. For instance, a bench invites sitting, a path suggests walking, and a garden might encourage relaxation or contemplation.

small lawn in the Olson Family Garden at St. Louis Children 's Hospital in St. Louis, Missouri, is used for many different activities—free play, picnics, and programmed events throughout the year (Marcus & Sachs, 2014). When the spaces are divided into private or public ,they also offer more different choices.

The spaces are arranged and combined in an orderly manner, utilizing the form of sketches to express this intention(figure 71). At the same time, trees and shrubs can create various types of spaces, ranging from private to public(figure 72).

Figure 71 A bubble diagram, representing scale and sequence in a proposed garden. The relationship between the activities, their location in space, and their size become the ƒoundations for the design(Winterbottom & Wagenfeld, 2015).
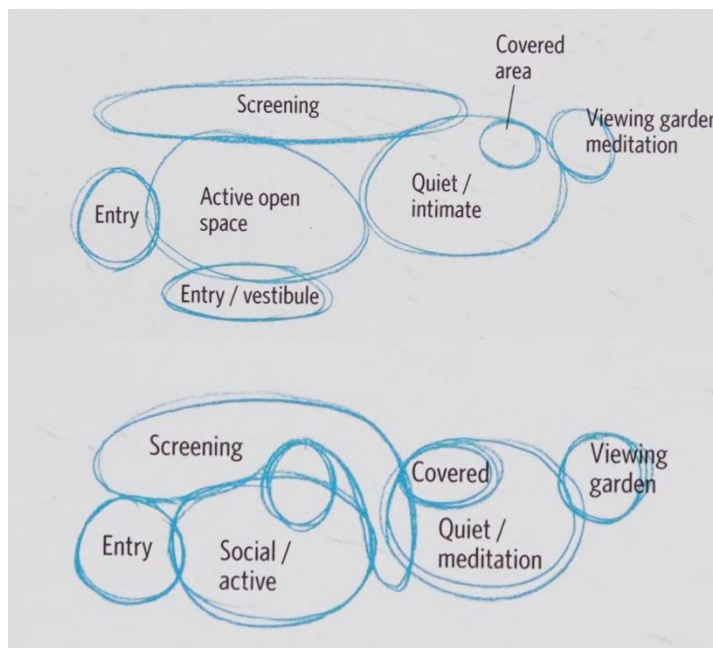
By Daniel Winterbottom (2015)

Perception and Action: Affordances connect what we see with what we can do. They suggest that people perceive environments in terms of the actions they can take. For example, a tree with low branches may be seen as something to climb, while a shaded area might invite someone to rest.

User-Specific: Affordances are relative to the individual. Different people may see different possibilities in the same space based on their abilities, experiences, and needs. A child might see a rock as something to climb, while an adult might see it as a place to sit and relax.

Environment and User Interaction: Affordances exist in the interaction between the environment and the user. They are not just features of the environment or the person but arise from how the two connect.

Figure 72 Smaller rooms can be organised around a central primary space, used for gathering and large activities, that feeds into them(Winterbottom & Wagenfeld, 2015).
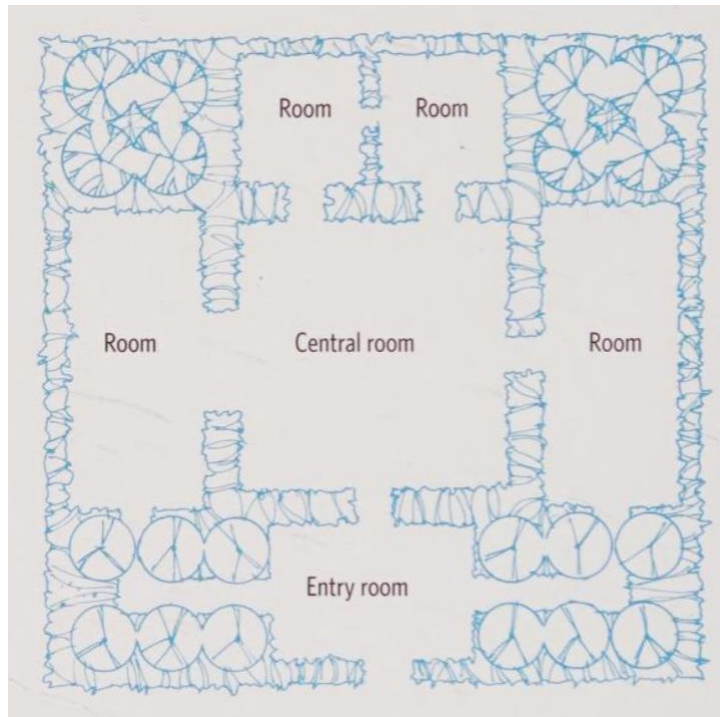
By Daniel Winterbottom (2015)

Figure 73 Rooms can also be organized along a corridor , a strategy often used in tight lineal spaces.
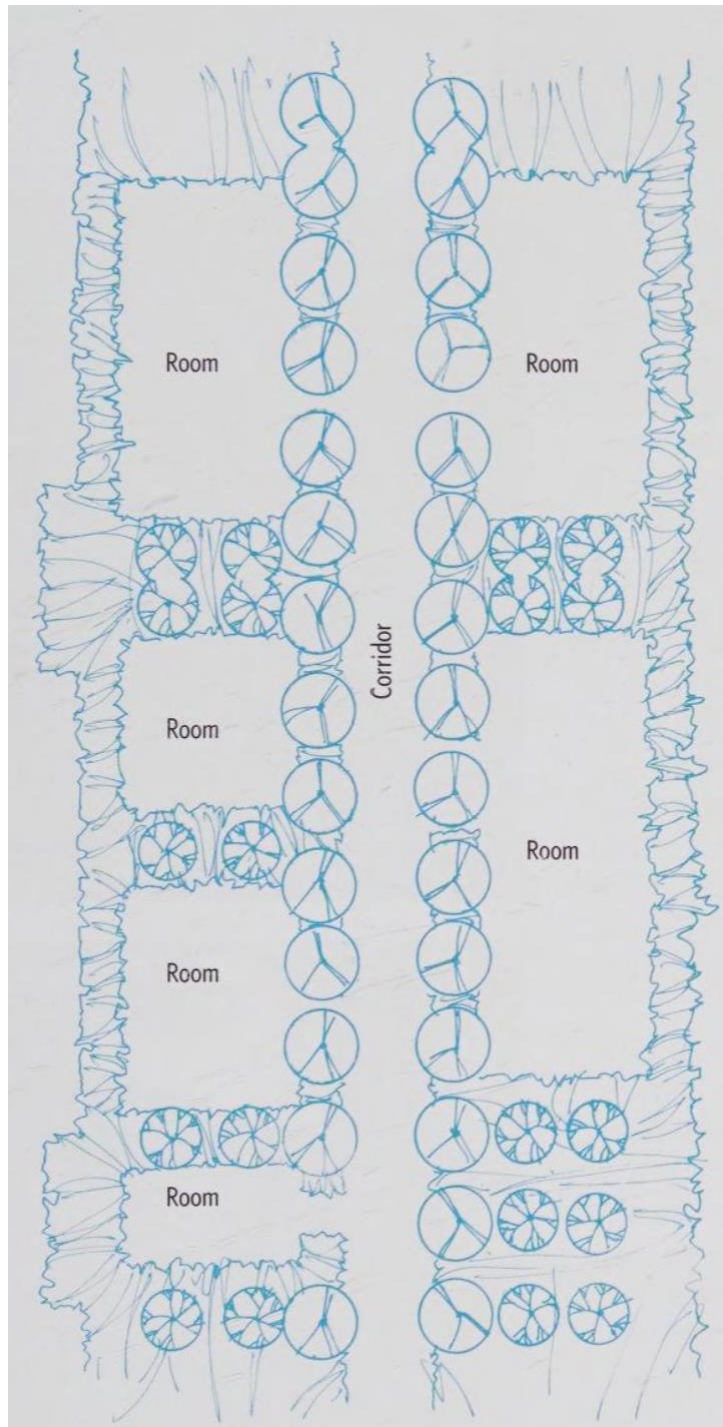
By Daniel Winterbottom (2015)

B) Ensure Accessibility and Visibility:

Design therapeutic landscapes with easy access and visibility, therapeutic landscape are designed to access easily and see from the indoor place(figure 75). Based on Rodiek's (2009) findings, residents in assisted living facilities generally prefer space which is easy to see more people and engage social activities(figure 74). Meanwhile ,create an outdoor place for those seeking quieter and more private, providing individuals with the choice of a lively or a tranquil environment if the space is available for these division.

Figure 74 This courtyard garden provides easy access from inside the building, a variety of seating, places to sit in the sun or shade, and hard surfaces that are easily negotiable by residents who use walkers or wheelchairs. Courtesy of the Plaza at Twin Rivers, Arkadelphia, Arkansas(Marcus & Sachs, 2014).

By Wesley Kluck(2014)

Figure 75 At this London residence for retired Anglican sisters, residents have a good view to the garden while seated in the main lounge(Marcus & Sachs, 2014)

By Clare Cooper Marcus(2014)

C) Design Closed Spaces for Private Conversations and Solitude:

Include designated sitting areas in enclosed spaces to cater to patients who may desire private conversations with visitors or seek solitude in nature(figure 76). This design accommodates those wishing to avoid potential stresses associated with communal living or sharing rooms with others.

Figure 76 A shady garden with walking paths and private seating in Norma 's Garden at the Gathering Place, a cancer resource centre in Cleveland, Ohio. Designer: Virginia Burt, Visionscapes(Winterbottom & Wagenfeld, 2015).

By Chris Garcia(2014)

D) Avoid Seating Arrangements that Compromise Privacy:

Never design seating areas that make individuals feel exposed, especially as seniors may prioritize privacy over excessive social arrangements. Avoid placing seating in locations where individuals may feel exposed and refrain from situating it on grass, an unstable surface for pedestrians and those using wheeled mobility devices (Marcus, 2014). This ensures that the design prioritizes privacy and addresses the diverse needs of the residents.

Figure 77 Indoor therapeutic garden The Thea and James Stoneman Healing Garden, an indoor garden at the Dana-Farber Cancer Institute, Yawkey Centre for Cancer Care, Boston, Massachusetts Designers: Carol R. Johnson Associates, Landscape architects; Zimmer Gunsul Frasca, Architects(Marcus & Sachs, 2014).

By Carol R. Johnson Associates, Inc(2014).

A) At designing stage, planning the indoor care home and outdoor therapeutic landscape together. The therapeutic landscape serves as the extension of the indoor environment, or vice versa. Harmony of the indoor and outdoor landscape is very welcomed (figure 79). For example , Indoor plants, gardens, and atria allow people to connect with nature at all times of the year regardless of weather or health status and it also connects the outdoor therapeutic landscape. The Thea and James Stoneman Healing Garden, an indoor garden at the Dana-Farber Cancer Institute, Yawkey Centre for Cancer Care, Boston, Massachusetts(figure 77).

And another example which emphasize the coherence strategy is in St. Anthony 's Medical Centre Heart and Surgical Pavilion, St. Louis, Missouri(Marcus & Sachs, 2014). When people Sit in the surgical intensive care unit waiting room feels almost like being in the garden. Project team: Interiors, Spellman Brady & Company; Architect, Cannon Design; Landscape architect, Austin Tao and Associates(figure 78).

Figure 78:surgical intensive care unit waiting room at St. Anthony 's Medical Centre

By Debbie Franke (2014)

Figure 79 The indoor landscape space and outdoor landscape are designed linked together Therapeutic sensory appeal through a thoughtful balance of colour , height , texture , plants ,and other natural elements such as river rocks and wood(Winterbottom & Wagenfeld, 2015).

By Robinson Wong (2015)

Design Strategies to improve Balance.

Figure 80 Anne 's Garden at Northeast Georgia Medical Centre, Gainesville, Georgia, comprises many components of a successful therapeutic landscape: a rich variety of plants include deciduous and evergreen plants ; a fountain with water features that people could look at themselves for reflection ; a sense of enclosure; and curvilinear pathways of tinted concrete, with benches spaced at comfortable locations along the route. One would certainly experience a sense of "getting away" in this garden by Designer: The Fockele. Garden Company(Marcus & Sachs, 2014).

By Fockele Garden Company (2014)

A) Incorporate a Thoughtful Selection of Trees and Shrubs:

Ensure a year-round presence of foliage in therapeutic landscapes by strategically choosing a mix of evergreen and deciduous trees and shrubs. This prevents the landscape from appearing bare during certain seasons, providing a continuous connection with nature (figure 80).

Integrate seasonal plants that reflect the changing cycles of nature. By selecting plants that bloom or display distinctive characteristics in different seasons, the design not only adds visual interest but also serves as a symbolic reminder of the passing season.

B）　Add design elements to strengthen the visual balance

View from the Highlands Maggie 's Centre building in Inverness, Scotland, to the outdoor space is dominated by two mounds representing cells communicating and in dynamic balance(figure). This artistic design does not provide a setting which most would recognize and use as a garden. Garden designer: Charles Jencks

Figure 81 Highlands Maggie 's Centre with two mounds for visual balance(Winterbottom & Wagenfeld, 2015).

By Charles Jencks (2014)

Design Strategies to improve Self-Identity

Self-identity is that users feel they are accepted in the therapeutic landscape, they accepted therapeutic landscape and have purpose of meaning of life in the therapeutic landscape:

A) Offering abundant individual activities help them such as horticultural activities to take care of plants. As pet therapy, when elderly feel that they are responsible to take care of other lives enhancing their meaning of life. Thus, the therapeutic landscape

requires different levels of flower bed for easy access of older people even wheelchair users.

B) Setting routine group activities as horticultural therapy, Taiji activities (figure 82) and meditation activities, when people have some common topic in a group ,which would help then to build confidence and connection with surrounding. Thus, open space with sitting area and wheelchair placing area are required .

Figure 82 Elder people are engaging Taiji activities

By Gerald Browning (2016), https://slantedflying.com/tai-chi-not-just-old-people-in-the-park/

C) Consider adding an elevated water mirror (Figure 83) or fountains (Figure 81) that allow the elderly to gaze into them, fostering moments of reflection and self-remembrance.

Figure 83 Water mirror for reflection and looking up (Marcus & Sachs, 2014)


By Leonard Lee(2015)

Design Strategies to Improve Social Support

A) Connect therapeutic landscape with larger community by providing physical access (via sidewalks, paths and other connections) and programmatic activities (e.g., farmers' markets, health classes and community gatherings). Now most old care centres locate in residential areas in China.

Design Strategies to Improve Legibility

Figure 84 A sculptural piece that invites touch provides a wayfinding cue in this garden for the frail elderly and those with dementia. Graham Garden, Saanich Peninsula Hospital, Victoria, British Columbia. Designer: LeFrank & Associates(Winterbottom & Wagenfeld, 2015).
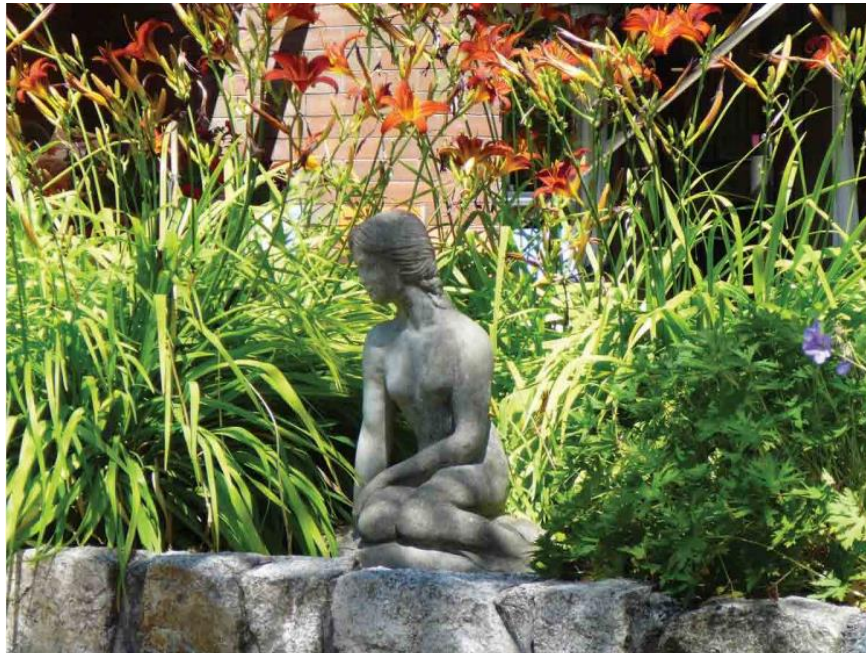
By Clare Cooper Marcus (2014)

A) Provide adequate pathway guidance(figure 84) to the garden as well as within the garden. This is particularly important when the garden is not immediately visible (e.g. in a roof garden) or when healthcare is provided in a building or on a campus. Include information in staff and patient information booklets and provide clear signage in several prominent locations.

Design Strategies to Improve Historical Events

A) In the early design phase of hospitals or elderly care centres, it's advisable to incorporate feng shui principles and choose a location with ideal conditions such as favourable wind patterns, stable temperature changes, appropriate humidity, and ample sunlight. If the site has a historical healing background, like Lourdes or Bath, it would be even more beneficial. Alternatively, you can apply the placebo effect by creating a healing narrative within the therapeutic landscape. If people develop trust in this narrative, the placebo effect can enhance their overall well-being.

B) Preserve and showcase any historical elements or landmarks on the site.

Create pathways or interpretive signage that highlights the historical context of the area, allowing users to connect with the unique heritage of the landscape.

Design Strategies to Improve Fearless Confronting Death.

Figure 85 An echo chamber behind the falling water in this feature at the Bonner Hospice Garden in Sandpoint, Idaho, projects the sounds throughout the garden. Designers: John Siegmund and Tom Runa(Marcus & Sachs, 2014).

By Chris Garcia(2014)

A) By selecting seasonal plants which make them reflect of their own life cycle, the design not only adds visual interest but also serves as a symbolic reminder of the passing seasons, offering a contemplative connection to the elder of life and death.

Figure 86 Dogwood trees provide four-season interest with spring blossoms, green foliage for summer shade, brilliant fall colour, and red berries in winter(Marcus & Sachs, 2014).

By Chris Garcia (2014)

B) Contemplative Spaces:

Design secluded areas within the landscape that offer a peaceful and contemplative atmosphere. Integrate elements like meditation gardens, reflective ponds or quiet corners for individuals to reflect on life and death.

Figure 87 Grief counsellor and family member meet in the tranquil setting of the Teahouse in the Bonner Hospice Garden, Sandpoint, Idaho. Confronting death is not only a challenge for the individual but also for their family and friends.
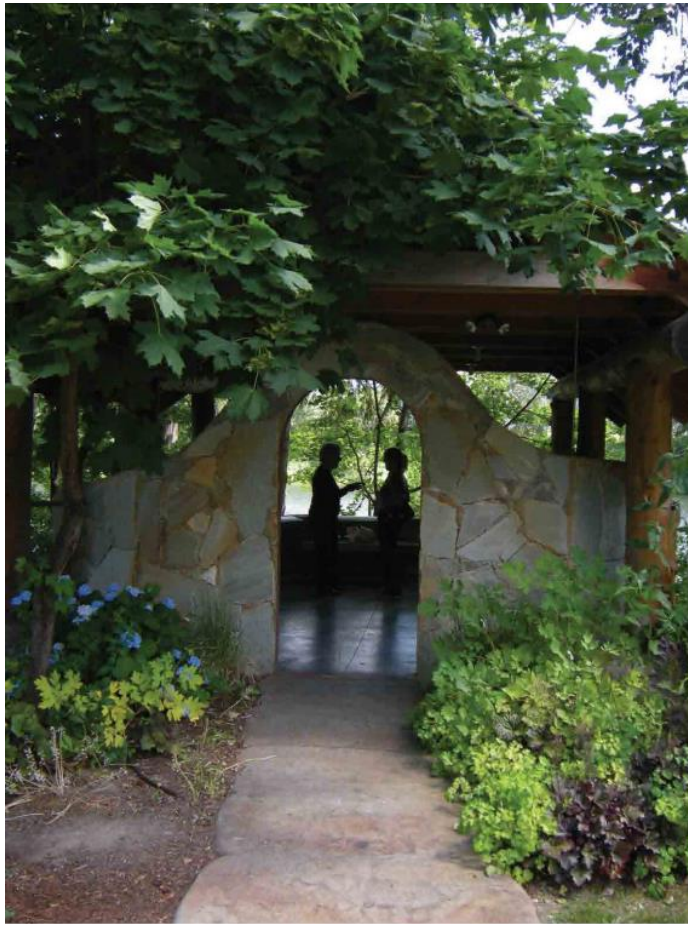
By Chris Garcia(2014)

C)Pathways of Reflection:

Create meandering pathways that encourage reflective walks, allowing individuals to connect with nature and ponder existential questions.

Design pathways that lead to vantage points with scenic views, fostering a sense of perspective on life and death.

Figure 88 The garden provides a variety of ways for patients, visitors, and families to interact with nature. The "serenity bridge" over the pond serves as a focal point (Marcus & Sachs, 2014). It is pitched symbolically "like a mountain, because one must work to get to a better place and reach the higher place to reflect the past."

By Jessy Bergeman (2014)

C) Incorporating Memorable Artifacts

Design areas specifically dedicated to the memory of loved ones, integrating personalized features such as memorial plaques, commemorative benches, or dedicated plantings. Create spaces that encourage communal remembrance and the celebration of life, fostering a sense of connection and shared memory.

Figure 89 The Wall of Tribute, an unobtrusive leaf mosaic, provides a way for family members to memorialize the names of their loved ones and to make a donation to the hospice (Marcus & Sachs, 2014).
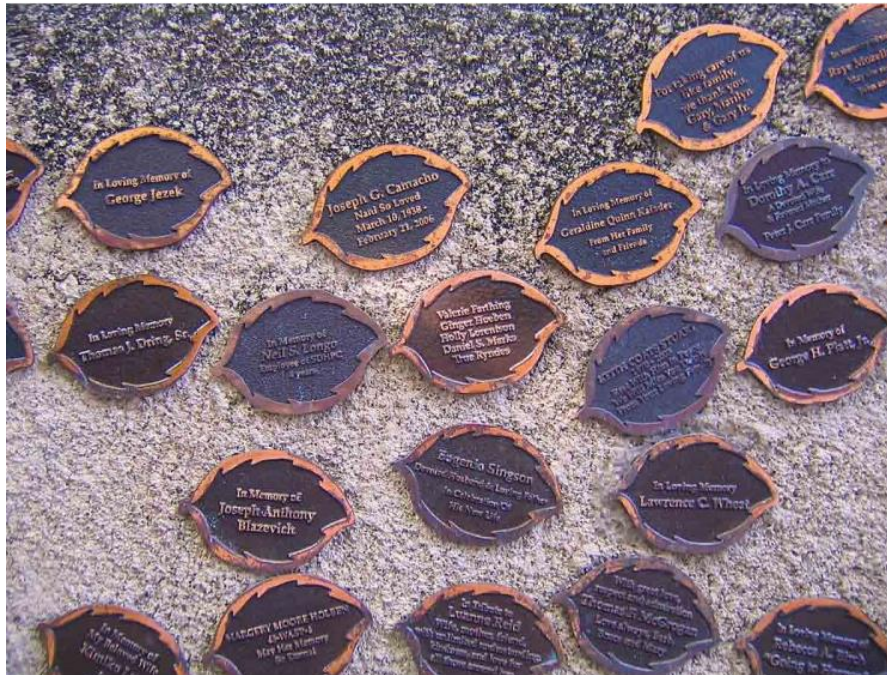
By Naomi Sachs(2014)

Figure 90 Crossing a bridge is a metaphor for passage , to a new place and a fresh beginning . Bridges are the present that connects the past to the future, the life and death , the old and new.

By Naomi Sachs(2014)

D) Educational Programs:

Implement educational components within the landscape to provide information about natural processes related to life and death.

Interpretive signage or workshops can facilitate understanding and acceptance.

Optimizing Physical Movement and Exercise Design Strategies

Figure 91 rock labyrinth in therapeutic landscape to improve the physical movement of users. The path leads to a river rock labyrinth, best experience with bare feet. Lush plantings and local glacial rocks add to the garden's sensory appeal(Winterbottom & Wagenfeld, 2015).

By Draymond Lee （2014）

Figure 92 Residents at a senior facility taking care of the planting beds, an activity that provides them with exercise and a sense of ownership and creates an attractive setting for others to enjoy (Marcus & Sachs, 2014).

By Susan Rodiek （2014）

Figure 93 Many clever and efficient ways to store garden implements also support learning and movement. A tower is used for kids and adult to direct them to follow movement to hang watering cans in specific sequences form high to low(Winterbottom & Wagenfeld, 2015).

By Susan Rodiek （2014）

A) Accessible Outdoor Gym Equipment:

Install outdoor gym equipment specifically designed for the elderly, promoting both cardiovascular and strength training exercises.

Ensure that the equipment is easily accessible, with consideration for mobility aids and varying fitness levels.

B) Therapeutic Walking Trails:

Create therapeutic walking trails with varying terrain and scenic views, promoting a range of walking intensities and enhancing the overall walking experience.

C) Multi-functional Outdoor Spaces:

Design spaces that can serve multiple purposes, such as yoga platforms, tai chi areas or open spaces for group exercise classes.

Provide flexibility for different types of physical activities and exercise classes to accommodate diverse preferences.

Figure 94 tactile experience enhances sensory experience with pebble maze LEFT Polished River rocks integrated into reflexology path add to the tactile experience.

Right Those unable to navigate the reflex-ology path can use their hands or fingers trace a replica of the labyrinth, carved into a nearby flat stone(Winterbottom & Wagenfeld, 2015).
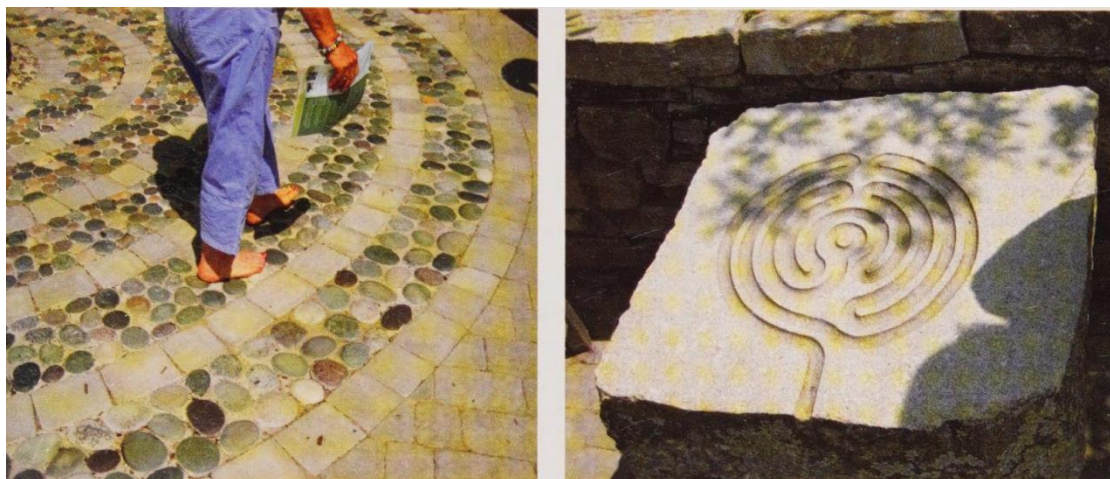
By Susan Rodiek （2014）

Figure 95 The primary path in the garden at Randall Hospital in Portland, Oregon, provides an easy gauge for people to measure walking distance. It encourages people to do more physical exercise (Marcus & Sachs, 2014).

By Clare Cooper Marcus(2012).

Design Strategies to improve Complexity

A) Emphasize complex plantings with a variety of colours and textures at or below eye level, as some older adults walk in a semi-stooped position. Make minor design changes to major paths so that slow-moving people can have a variety of visual experiences (e.g., enclosed/open, sunlight/shadow, varied vegetation (Marcus, 2012).

B)according to the original topography of the site ,design the walking path in cure or more organic shape and arrange groups of vegetation by ground cover, flower, shrub and tree and tall trees, also applying visual trick by choosing different shaped trees with needle leaves and broaden leaves. Also applying the trees as some natural walls to create the complexity of the environment.

Design Strategies to improve cultural beliefs

Figure 96 Budda sculpture in Therapeutic Garden

This statue of Quan Yin, the goddess of compassion, is a place for people to leave offerings in the Chinese Garden, Liu Fang Yuan or Flowing Fragrance, at the Huntington Library in Pasadena, California.

By Naomi Sachs (2014).

A)Cultural Symbolism Integration:

Integrate culturally significant symbols, artifacts, or motifs to create a meaningful and immersive environment, such as the Buddha sculpture for the Buddhist ,emphasize the use of native plants that hold cultural importance, reflecting the natural flora associated with the community's heritage.

B)Seasonal Celebrations Spaces:

Designate areas within the landscape for seasonal celebrations, accommodating cultural festivals and rituals. Create flexible spaces that can be adapted for various cultural events, allowing the therapeutic landscape to serve as a platform for communal gatherings.

C)Storytelling through Design:

Incorporate elements in the design that narrate stories or legends significant to the cultural beliefs of the community. Use pathways, art installations, or landscaping

features to convey narratives that contribute to a sense of cultural continuity and identity.

D)Architectural Influences:

Integrate architectural elements inspired by the traditional structures of the community's cultural heritage. Incorporate design features that echo historical architectural styles, providing a familiar and comforting atmosphere.

Figure 97 At this California retirement facility, where most of the residents are Chinese-American, the garden design emphasizes rounded forms and red flowers, both of which indicate good luck in Chinese culture (Marcus & Sachs, 2014).

By Clare Cooper Marcus（2014）

E) Collaborative Community Input:

Engage the community in the design process to ensure that cultural beliefs are accurately represented. Facilitate workshops or discussions to gather insights from community members, fostering a collaborative approach to cultural landscape design.

Figure 98 Another material to consider when designing rooms in a therapeutic garden is the use of misters. These can serve as an alternative to green or manufactured walls, adding an element of mystery to the space(Winterbottom & Wagenfeld, 2015).

By Susan Rodiek（2014）

Figure 99 Curved paths in therapeutic landscape This universally designed path balances mystery with clarity. The curves add a sense of anticipation, but because the plantings are low enough, users are able to see what lies ahead(Winterbottom & Wagenfeld, 2015).

By Amy Wagenfeld (2015)

A) Curved Pathways:

Incorporate winding or curved pathways that lead to hidden or obscured areas of the landscape, encouraging visitors to explore further to discover what lies beyond.

B) Visual Blocks:

Use dense vegetation or other elements strategically placed to partially obscure certain views, creating a sense of intrigue and prompting individuals to seek out what lies beyond the screen. Or combination of both , natural elements and fence to create the mystery. For example , the yellow blossoms of Hesperaloe play off of the yellow fence screens in Scottsdale Healthcare Healing Garden in Scottsdale, Arizona.

Figure 100 The yellow blossoms of Hesperaloe Healing Garden in Scottsdale, Arizona. Designers: Ten Eyck Landscape Architects, Gensler Architects (Marcus & Sachs, 2014).

By Bill Timmerman （**2014**）

C) Hidden Features:

Integrate concealed elements such as secluded seating areas, tucked-away gardens or meandering trails that are not immediately visible upon entering the space, enticing visitors to uncover these hidden gems. Or even some little cute rocks set in the planting bed are a sweet surprise to someone walking along the adjacent path.

Figure 101 These cheerful, hand-painted rocks set in the planting bed are a sweet surprise to someone walking along the adjacent path (Marcus & Sachs, 2014).

By Naomi Sachs (2014)

D) Interactive Installations:

Include interactive installations or features that require active participation or exploration to fully understand or appreciate, fostering a sense of mystery and engagement.

Figure 102 Plant labels provide information and a deeper engagement with the plants. They also often spark conversation. Chicago Botanic Garden, Glencoe, Illinois (Marcus & Sachs, 2014).
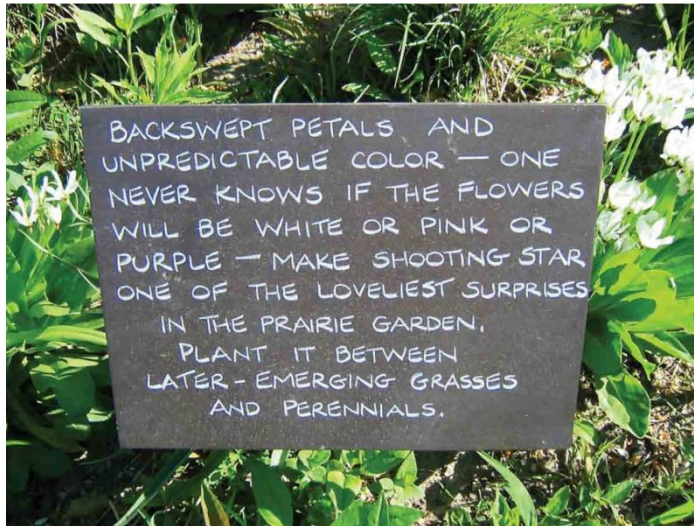
By Naomi Sachs(2014)

E) Soundscapes:

Integrate elements of sound, such as rustling leaves, trickling water or distant bird calls, strategically placed to create an immersive auditory experience that adds an element of mystery and intrigue to the landscape.

Figure 103 The Grateful Overlook is the garden's highest point. The waterfall cascades down twelve levels, symbolizing the twelve steps of a traditional recovery program. The "guardian stone" emerging from the water at the base of the fall's functions, according to traditional belief, as protector of the garden. The water makes distinctly different sounds as it strikes stones in three different locations (Marcus & Sachs, 2014).
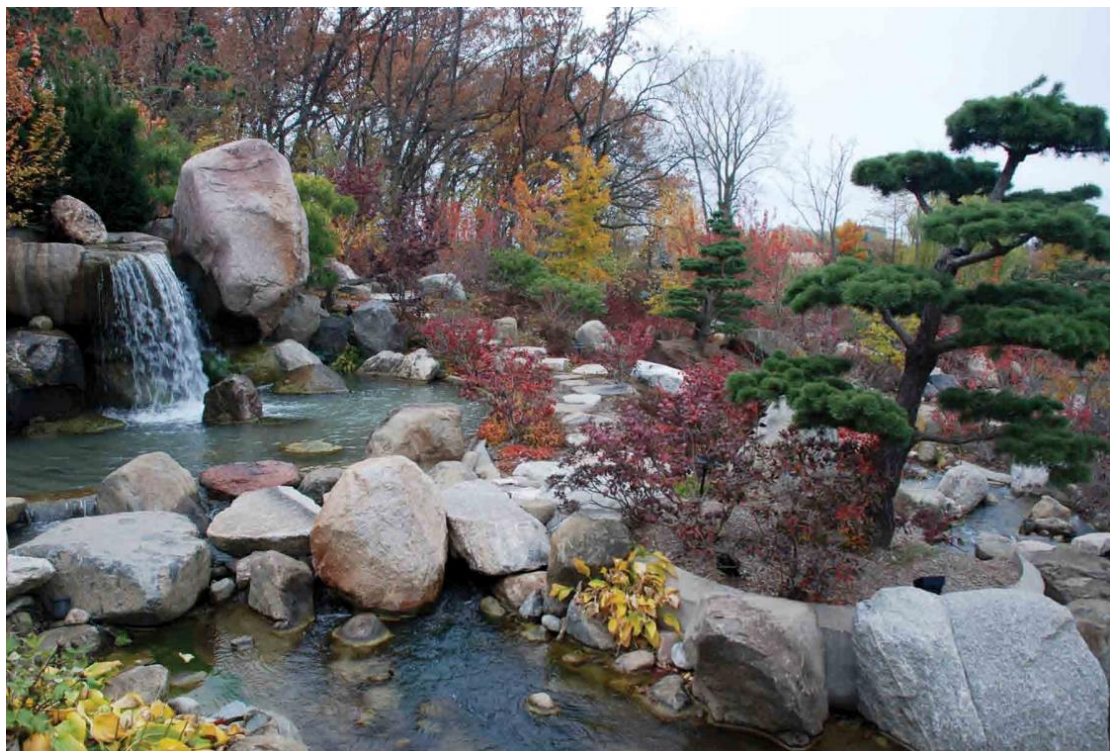
By Jessy Bergeman(2014)

Figure 104 Lunchtime in the healing garden(Winterbottom & Wagenfeld, 2015).

By Clare Cooper Marcus(2014)

Figure 105 Landscape architect Jens Jensen developed the council ring concept , a meeting or gathering point in therapeutic landscape in Chicagoʼs Lincon Park designed by Jensenʼs protégé Alfred Caldwell.

By Clare Cooper Marcus(2014)

A) Provide an appropriate destination point, such as a gazebo, crawlspace, pavilion or summer house, with ample seating and large enough for staff-organized social events or planned activities. Depending on the local climate, this space should ideally be equipped with lighting, heat lamps and/or fans to extend the time the outdoor space can be used during cooler or hotter seasons.

Figure 106: The therapeutic landscape and renewal in Clarkston, Michigan (Marcus & Sachs, 2014).

By Jeffrey T. Smith (2014).

Design Strategies to improve Uniqueness

A) Site-Specific Integration:

Conduct a thorough analysis of the site's natural features, topography and existing vegetation.

Integrate therapeutic landscaping elements that harmonize with the site's unique context, preserving and enhancing its natural beauty.

B) Topographical Features:

Utilize the natural topography of the site to create unique design elements such as hills, valleys or water features.Design pathways that follow the natural contours, providing a visually interesting and immersive experience.

Design Strategies to Improve Visual Experience (Prospect)

Figure 107:surgical intensive care unit waiting room at St. Anthony 's Medical Centre (Marcus & Sachs, 2014).

By Debbie Franke (2014)

A) Design the building so that the garden (or the main garden if there are multiple gardens) is clearly visible and accessible from the main public spaces within the building, such as the lobby, waiting areas, main corridors, or cafeteria (Figure 107), (Marcus 2014)

Design Strategies to Improve Sense of Safety (Refuge)

Figure 108 The therapeutic landscape at the Baltimore Washington Medical Centre offering the sense of safe enclosure (Marcus & Sachs, 2014) .

By Mitro Hood, courtesy of TKF Foundation(2014)

A) Seating for the elderly often overemphasizes social arrangements at the expense of the need for privacy. Never place such seating or any other seating, where people may feel exposed. For example, the therapeutic landscape at the Baltimore Washington Medical Centre in Glen Burnie, Maryland, has many levels for people to enjoy, while at the same time providing a sense of safe enclosure. The garden is also viewable from the infusion therapy wing of the cancer centre. Designer: Mahan Rykiel Associates, Inc.

Figure 109: example of landscape with good sense of safety (refuge)

This photograph was taken from an area of prospect. This pier is fairly hidden by tree branches, a weeping willow trunk at the back, and feels as though the "ceiling" is lower due to the overhead branches. It provides an area that is easily accessible within a larger environment, and with limited visual access.

Notice how this place of refuge offers an opportunity to survey the surrounding landscape with a sense of safety and security, without total removal from the environment. The height of the fence is low, and there is a long focal length. The ability to move around the pier offers a changing view and more visual access.

By Nicole Craanen, (2020). https://www.rootedinnature.org/prospect-refuge#:~:text=The%20prospect%2Drefuge%20theory%20explains,alone%20may%20 20be%20more%20desirable.

Figure 110 Nurses take a much-needed break from work-related stress at Jupiter Medical Centre in Jupiter (Marcus & Sachs, 2014),

By Connie Roy-Fisher (2014)

A) Make every effort to provide at least one separate outdoor space open only to employees. This space should be easily accessible from areas where staff are most likely to take breaks - such as the lunchroom or staff cafeteria. Because staff must "stay on top of things" during long workdays, having a space where they don't have to see or interact with patients, residents or visitors is an essential recovery benefit. A separate garden also allows staff to meet each other or talk on cell phones without disturbing patients or invading privacy. In large facilities, it is best to have several staff gardens in different locations, as many staff have short breaks and do not have the time to walk very far to utilize the outdoor space. When it is not possible to provide separate gardens, it becomes even more important to provide distinct 'rooms' within the garden to allow staff and patients/visitors to occupy different spaces. This would improve the performance of the nurses, and it would improve the quality of service of the users received.

B) Educate staff on the use and benefits of gardens and develop protocols for patient use. Occupational, physical, and horticultural therapists, as well as other allied professionals, should be involved in the design process from start to finish. Experts involved process would overall improve the personal experience of users.

Figure 111 occupational therapist Amy Wagenfeld works with a client in the garden (Marcus & Sachs, 2014)

By Michiko Kurisu(2014)

Figure 112 A visitors' book near the entry to the Olson Family Garden allows people to record their appreciation of this rooftop oasis (Marcus & Sachs, 2014).

Gary i love what you've done with the place. This garden help me so ~~much~~ much. It make me feel safe and at home. When i'm in the garden i don't feel like i'm in a hospital at all, and i thank you for that feeling.

Thank
Dominique
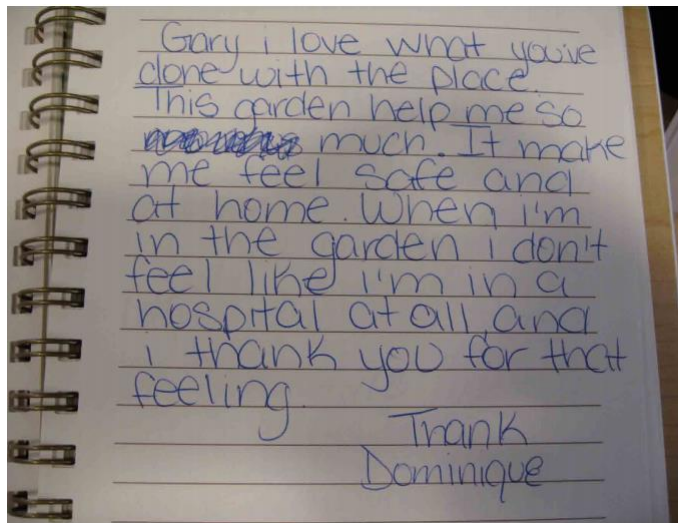
By Clare Cooper Marcus (2014)

Figure 113 Classes in creative expression for cancer patients are held in the Earth and Sky Garden (Marcus & Sachs, 2014).

By Clare Cooper Marcus (2014)

Figure 114 Tile-making workshop with Dr. Laura Esserman (left) and Ann Chamberlain (right) (Winterbottom & Wagenfeld, 2015).

#

By Clare Cooper Marcus (2014)

Design Strategies to Improve Sense of Security :

Figure 115 A rubberized walking surface facilitates use of the garden by those using wheelchairs or pulling an IV pole (Marcus & Sachs, 2014).

By Clare Cooper Marcus (2014)

A) **Paths** that are glare-free, with good grip are particularly important for frail older people, such as rubberized track(figure 115), a high proportion of whom suffer from osteoporosis and arthritis, and where falls are often caused by glare reflecting off light-coloured pavements and irregularities in the surface of the path. For people who are afraid of falling, this fear can greatly limit exercise, so path systems must not only

be completely safe for people with mobility issues or those prone to dragging their feet, but they must also be perceived as safe. For example, avoid shiny surfaces, which may be perceived as slippery.

B) Handrails are provided along the entire or part of the pathway system to assist those with balance problems. In many cases, residents will utilize handrails in interior hallways. The continuation of this element may encourage residents to utilize outdoor spaces. If there are any steps on site, handrails must be provided on both sides to accommodate those who can only use one hand.

Figure 116: Ends of handrails design
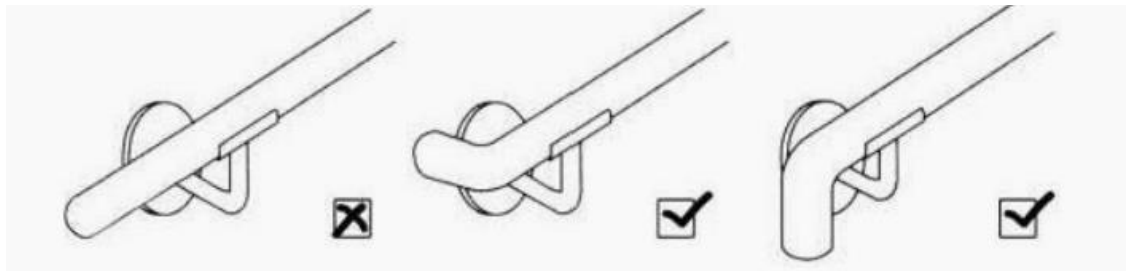
By Li Yunpeng （2002）

Figure 117 Frail residents with balance problems at Ferryfi eld House in Edinburgh, Scotland, can hold onto a handrail to reach a bench in the garden. Designer: Annie Pollock.

By Annie Pollock (2014)

C) Ensure that pathway colours are consistent, as older adults often respond to contrasting ground plane colours as if there were a change in depth. The phenomenon

known as the "visual cliff effect" is an example of agnosia, the inability to understand and utilize sensory information.

D) When providing shade, avoid any garden structures (e.g., arbours, climbers, or decks) that may cast dark stripes of shadow on paths or patios. These may be misinterpreted as "troughs" or variations in depth.

E) Where gardens are not completely surrounded by buildings, they should be appropriately enclosed by fences or hedges, etc. This is particularly important where the garden adjoins a road or parking lot.

Design Strategies to Improve Perceptual Experience
Figure 118 waterfall offering the natural sound and soothe the heart (Marcus & Sachs, 2014).

By Clare Cooper Marcus (2014).

A) Emphasize plants with flowers or foliage in saturated shades of red, yellow, or orange, as colours in the blue/lilac family are often perceived as grey when older adults develop cataracts.

B) Includes a range of scented plants that can be enjoyed all year round. The sense of smell is one of the last senses to disappear and smelling certain plants or picking their leaves can evoke strong memories. Pleasant odour experiences indoors suggest that plants with nighttime aromas should be planted near entrances or windows

Figure 119 At the Östra Psychiatric Hospital in Gothenburg, Sweden, patient units were designed as "neighbourhoods," with one garden for every fourteen patients. Each garden is a separate courtyard surrounded by walls/wings of Östra, providing security. Though each garden is different, all offer a variety of seating choices, access to shade, and prominent vegetation—including flower colour during spring through early fall (Marcus & Sachs, 2014).
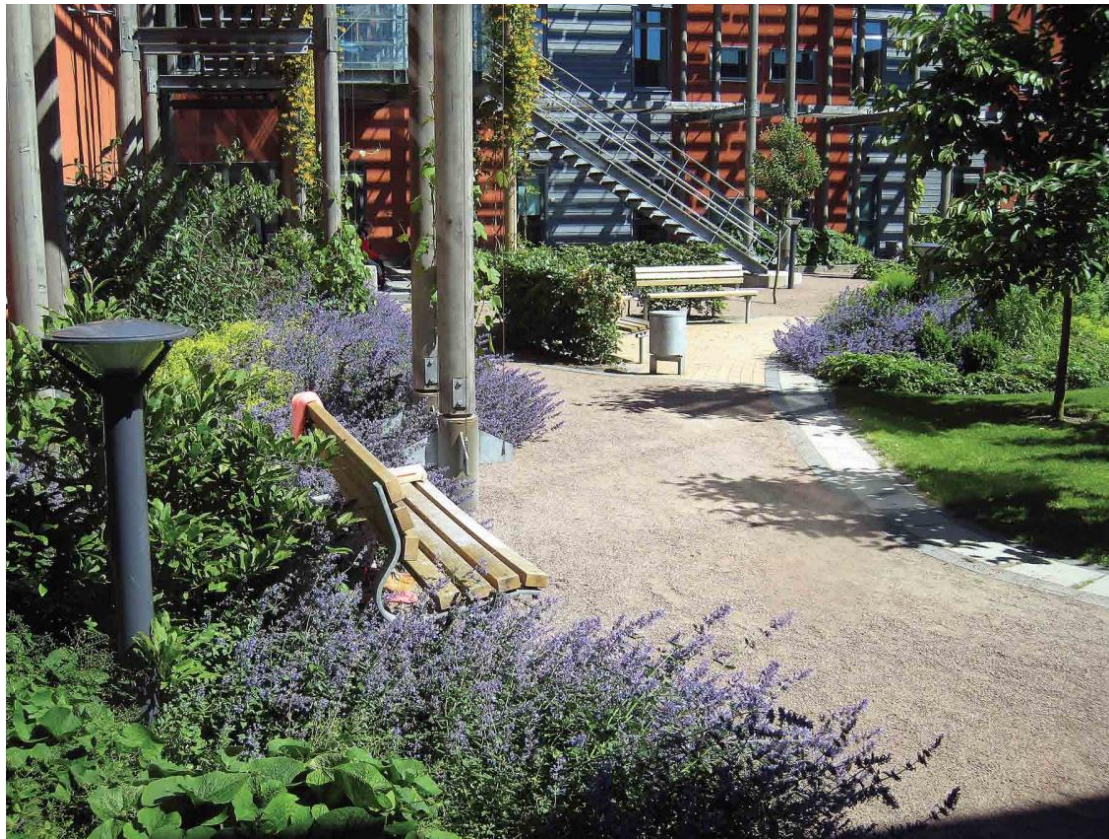
By Roger Ulrich (2014)

C) Gardens should be located in quiet areas to promote a sense of "getting away from the hustle and bustle". Avoid noise nuisance areas where they will affect users' perception of the natural, restorative environment of the garden, e.g. adjacent to traffic, loading and unloading areas, air conditioning units, etc. If such noise is unavoidable, minimize the perception of noise through design (e.g., locate main seating areas away from noise, or use design elements that block noise, such as sound walls or decorative water features).

Figure 120 A girl runs her hand along the waist-high water feature at the Coastal Maine Botanical Garden's Lerner Garden of the Five Senses, Boothbay, Maine. Designer: EDAW (Marcus & Sachs, 2014).
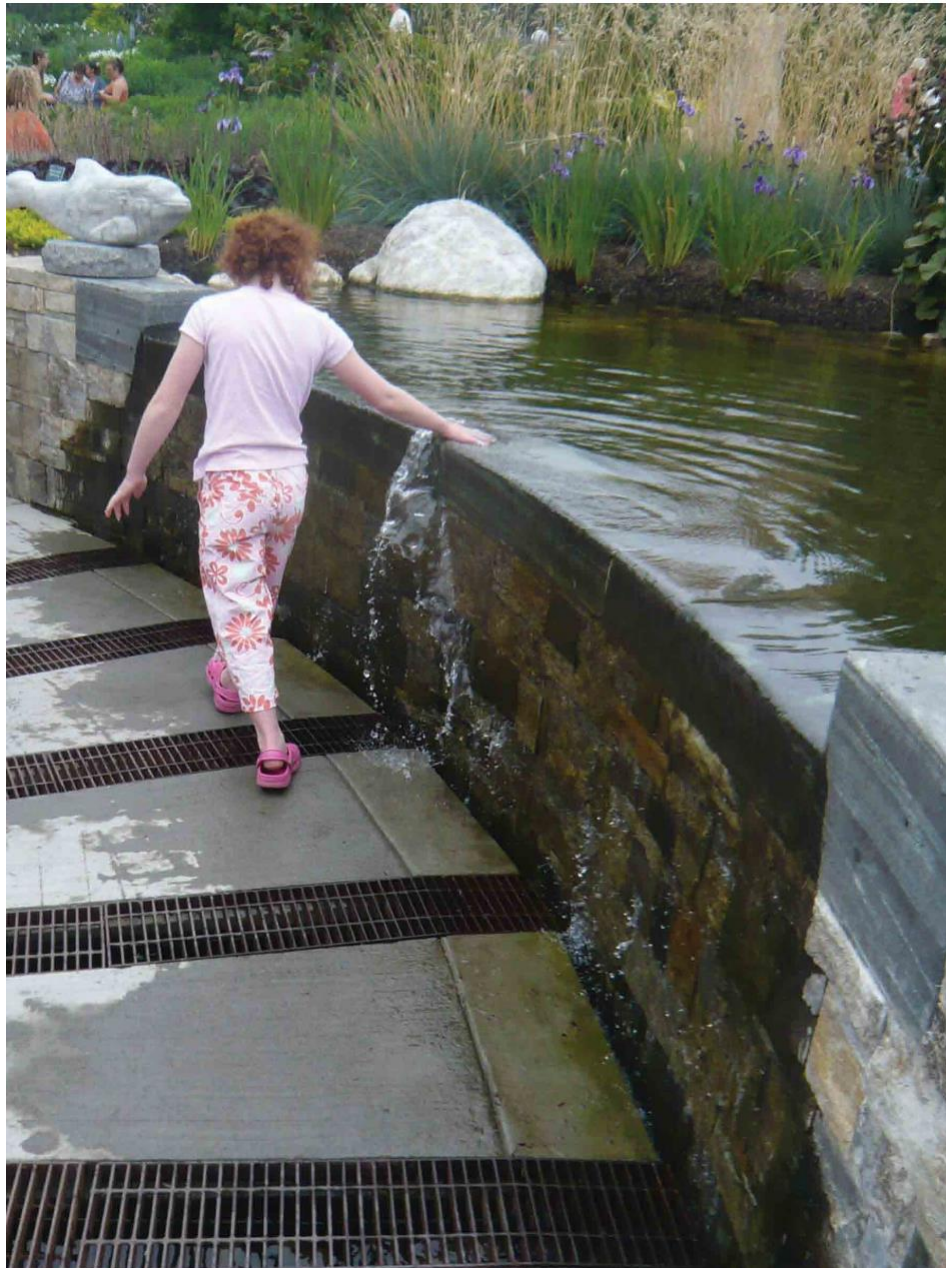
By Dixi Carrillo （2014）

D) Engage for five sense related elements to enhance different sense experiences. For example , Learner Garden for sight impaired users : A tactile relief map welcomes those with visual challenges and the Ulfelder Garden at Massachusetts General Hospital, Boston, Massachusetts, a pot full of small white river rocks stands at the garden entrance with a sign that reads "Touch Stones—Please take one with you." Visitors often take a stone and hold it while they are in the garden, and then

take it with them when they leave. This is one of the most popular features of the garden, and the stones are replenished on a regular basis.

Figure 121 Learner Garden for sight impaired users : A tactile relief map welcomes those with visual challenges (Marcus & Sachs, 2014).

By Coper Marcus (2014)

Figure 122 A pot full of small white river rocks with a sign that reads "Touch Stones—Please take one with you."

By Amy Wagenfeld, PhD, OTR/L, CAPS （2014）

Figure 123 Providing ample opportunities to touch , feel, taste, smell , see , hear and move in therapeutic landscape to improve the sensory experience(Winterbottom & Wagenfeld, 2015).

By Richard Lee (2015)

Design Strategies to Improve User Participation.

Figure 124: Brainstorming the main issues regarding the design of a new garden at Legacy Health, Portland, Oregon (Marcus & Sachs, 2014).

By Clare Cooper Marcus(2014) .

A)Design Workshops and Meetings:

Host pre-design workshops or meetings specifically aimed at involving users in the early stages of the design process.

Organize interactive sessions where users can share their insights, preferences and expectations for the therapeutic landscape. This collaborative approach ensures that user perspectives are considered from the beginning.

B)Surveys and Interviews:

Conduct surveys and interviews to gather individual preferences and experiences.

Use questionnaires or interviews to collect information about users' therapeutic needs, favourite outdoor activities and desired landscape elements. This data can guide the design process.

C)User Advisory Committees:

Form user advisory committees to provide ongoing input. Stablish a committee comprising representatives of the residents in the old care centre or other medical institution as many people join the meeting would be less efficient to propose new ideas, regular meetings can be held to discuss design proposals, receive feedback and ensure that the therapeutic landscape aligns with users' evolving needs.

Figure 125 Moveable wooden benches for safety and comfort in therapeutic garden (Marcus & Sachs, 2014).

Wooden benches with arms are comfortable and allow people who are unsteady to sit down and get up more easily. The design of the Wellspring line by Landscape Forms was based on research about what furniture would be safest and most comfortable for all users(figure 125). Note that the seating is still light enough to move, allowing users control over their environment.

By Clare Cooper Marcus （2014）

A) Extra spacious armrests provide room for drinks or books. Never specify the ubiquitous Adirondack chair, as it is particularly difficult for older people to get up from the low back position it puts the body in, which is also unhealthy for the internal organs.

Older persons are particularly sensitive to cold, some seating should be located where it can receive sunlight and provide adequate shelter and enclosed space. Conversely, because older persons have difficulty coping with the harshness of sunlight on light-coloured surfaces, some seating should provide adequate shade for use during the warmest seasons. Therefore ,movable wooden chairs are the ideal choices.

B) Because older adults tend to lose muscle mass, it is difficult for them to rise from a seated position. Seat height should be higher than usual (18-19 inches), with a maximum seat depth of 20 inches, armrest height of 25-26 inches and armrests extending out from the front of the seat to provide additional support to aid in rising. For a bench that serves more than one person, there should be armrests.

C) Regardless of the location of the garden, the main building entrance should have a covered area with a few comfortable benches or chairs so that people are protected while waiting outside. Where possible, provide an entrance garden (one close to the main building entrance) or garden elements, such as potted plants, so that people feel immediately welcome and connected to nature outside the building.

Figure 126 This pergola announces the entrance to the healing garden at Advocate Hope Hospital in Oak Lawn, Illinois. It also serves as a landmark for those within the garden, helping them find their way back to the entrance. Designer: Hitchcock Design Group (Marcus & Sachs, 2014).

By Clare Cooper Marcus (2015)

D) Provide more than one entrance into the garden. For example, a courtyard garden can be used as an access point for employees and/or visitors who might not otherwise have time to spend outside. Walking loops can be enhanced by connecting to internal access points.

Design Strategies to Improve the Design Qualities.

A) Efficient communication between the landscape architects and the construction team is crucial. By ensuring that ideas developed by the team and the residents of old care institutions are clearly communicated, the construction teams can complete projects efficiently. All design fees and material costs should be listed transparently to

prevent construction teams from pocketing money and using lower-quality materials on site.

Design Strategies to Improve Appealing:

Figure 127 A crane sculpture-Attractive feature in Garden design. Designer: Landscape architect, Michael Kato; Artist/sculptors, Kim Emerson and T.J. Dixon (Marcus & Sachs, 2014).

By Clare Cooper Marcus （2014）

A) Emphasize the attractive views from the main garden entrance. This will entice people to explore the space and will allow those who cannot go deeper into the garden to still enjoy it.

B)Natural Materials:

Use natural materials such as wood and stone in pathways, seating and structures to create a harmonious connection with the environment.

C)Design curving path

Curving paths are natural and would create some visual blocks at endpoint which would attract people to walk further.

Figure 128 It is critical for the physical and mental health of older people in residential facilities that they have access to an attractive outdoor space with a door that is easy to open, smooth walking paths, and a destination point to aim for (Marcus & Sachs, 2014).

By Susan Rodiek(2014)

D）Wildlife Habitats:

Design spaces that attract and support local wildlife by incorporating features such as bird feeders and plants that are friendly to butterflies and bees(figure 129).

Figure 129 At this Chicago retirement facility, family members visiting residents enjoy sitting with them at the entry to the garden and watching birds attracted to feeders and a family of ducks that has taken up residence in a small pond (Marcus & Sachs, 2014).

By Clare Cooper Marcus (2014)

E）Natural Soundscape:

Design with consideration for natural sounds, incorporating elements like wind rustling through leaves or water trickling.

Figure 130 The waterfall provides visual and auditory stimuli. Planting was selected for seasonal interest, including fall foliage (Marcus & Sachs, 2014).

By Jessy Bergeman (2014)

Figure 131 At a Canadian facility for residents with Alzheimer 's disease, a water feature with rocks provides a pleasing visual and aural feature on a roof deck outdoor space. For security, the rocks are all fi xed in place with epoxy. Oak Bay-Kiwanis residential facility, Victoria, British Columbia. Designer: LeFrank & Associates(Winterbottom & Wagenfeld, 2015).

By Deborah LeFrank (2014)

F) Interesting Design Elements

Design elements enhance the appeal and interest of the landscape(figure 127). For instance, the tiled wall in the therapeutic landscape at St. Joseph Memorial Hospital in Santa Rosa, California, offers visual and tactile interest, even when the plants are dormant or not flowering.

Figure 132 Tactile flowering wall (Marcus & Sachs, 2014)

By Clare Cooper Marcus (2014)

Figure 133 A wheelchair-accessible touch switch activates the water feature in the tranquil circular nook, allowing individuals with mobility challenges to easily engage with the space. Additionally, those who are able to walk can gaze into the top of the water jar and see their own reflection, providing a moment for personal contemplation(Winterbottom & Wagenfeld, 2015).

By Simon Ray (2015)

Figure 134 natural dominated space in Kent Hospital's Breast Centre in Warwick (Marcus & Sachs, 2014)
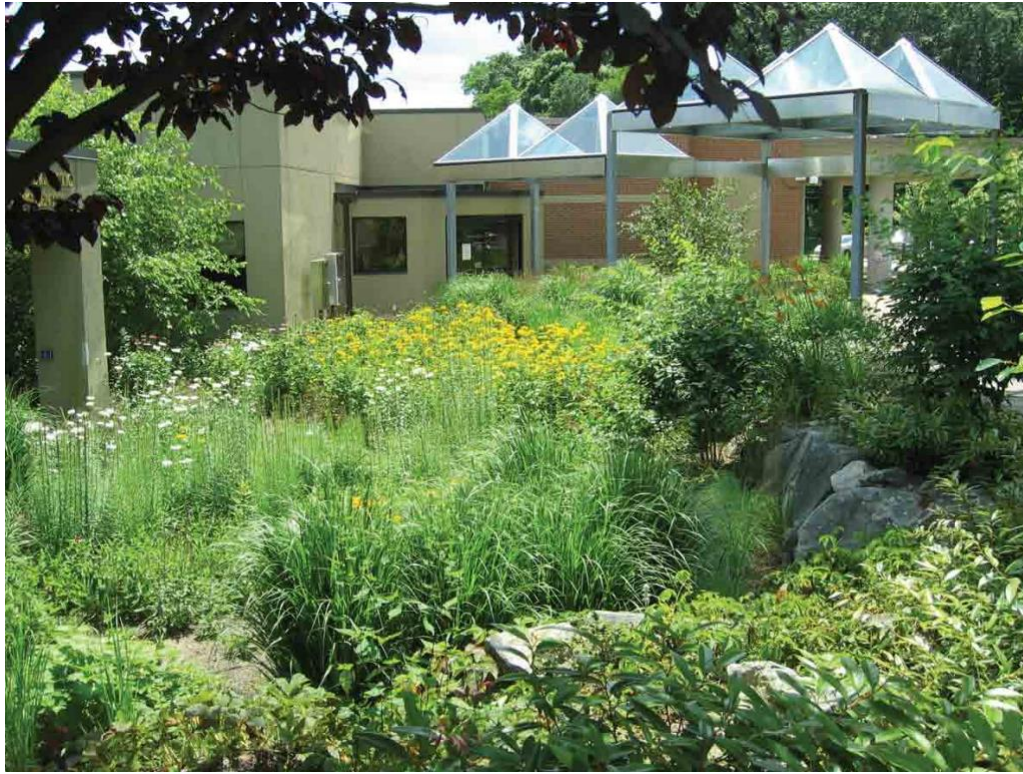
By Thomas Benjamin, Wellnesscapes.com, on behalf of Kent Hospital(2014)

A) Provide specially designed gardening areas (raised plant beds, tool sheds, a variety of large containers, water facilities) that allow older adults to utilize the skills of the past. Ideally, plant stands should be designed with three different heights available: for standing people, for sitting people and for people using wheelchairs. If designed to be open on both sides, left-and right-handed people can enter from different directions (Diaz Moore 2001)

B) Increasing the vegetation mass , which would naturally increase the opportunity for people to interact with nature. Research indicates that people gain emotional and physical benefit from viewing or being in nature-dominated spaces—even for as little as five to ten minutes. The garden at Kent Hospital's Breast Centre is a good example of a plant-dominated landscape. For more information on the rain gardens and other green landscaping measures at Kent Hospital's Breast Centre in Warwick, Rhode Island, Designer: Thomas Benjamin, Wellnesscapes.

Design Strategies to Improve Maintenance.

A) The monthly funding for the maintenance of the therapeutic landscape program will be established during the design phase, ensuring that the source of funding for

ongoing maintenance and upkeep is already secured. Additionally, organizing events with nearby schools and hosting an opening day for community engagement, along with routine updates on social media, will enhance donation opportunities for the elder care center and attract greater attention from the public.

Design Strategies to Improve Uniqueness.

A) Outdoor spaces must have the appearance of a home garden in terms of scale, detail and vegetation. Jack Carman (2006), a senior landscape architect, writes: "These areas should look like home. Residents need to feel that they are experiencing a familiar garden and that they belong there." A study of over one thousand respondents in sixty-eight assisted living facilities found that older adults themselves value nature and that they "feel better outside" (Rodiek 2009).

B) Include herbaceous flowering plants that are particularly popular with older residents and may have nostalgic value that may be reminiscent of the gardens they left behind.

Figure 135 Do not be overzealous in keeping the therapeutic garden Clean. Fallen leaves, acorns, or twigs can be intriguing treasures, collected, used in games, or given to visitors (Marcus & Sachs, 2014) .

By Herb Schall (2014)

Design Strategies to Improve Sense of Belonging.

A) Even if the garden is not completely surrounded by boundaries, it should have a sense of physical enclosure that allows users to feel safe and private from what is

happening outside. A well-defined garden can also allow users to escape from the interior of the building to a separate place

B) Provide some a few brooms, rakes and water bottles for those residents who wish to experience a sense of belonging by helping to maintain the garden.

Figure 136 examples of equipment for maintenance of therapeutic landscape (Marcus & Sachs, 2014)

By Clare Cooper Marcus (2014)

Perception would be enhanced by rich sensory experiences. Enhancing colour, shape, aroma, sound, texture and spatial experiences contributes to fostering a positive perceptual encounter.

A)Multisensory Gardens:

Integrate gardens that engage multiple senses simultaneously.

Design areas where users can experience a combination of visual beauty, fragrant flowers, textured plants and the soothing sound of water features.

Figure 137 The sounds of falling water and quivering bamboo create a soothing atmosphere in the Meditation Garden (Marcus & Sachs, 2014).
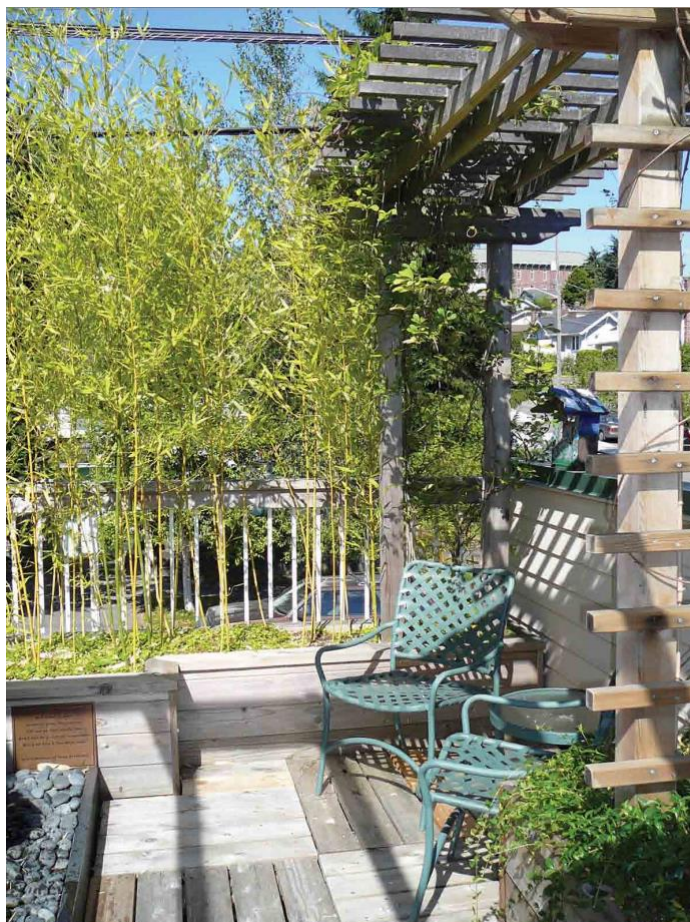
By Clare Cooper Marcus(2014)

B)Tactile Pathways:

Install tactile pathways with varying textures underfoot.

Use materials like pebbles, grass and textured paving to create pathways that provide a tactile experience for users, enhancing their connection to the landscape.

C)Sculptural Installations:

Incorporate tactile and visually appealing sculptures.

Place sculptures strategically within the landscape, encouraging users to interact with the art. Consider materials that invite touch and exploration.

D)Aromatic Planting:

Cultivate aromatic plants throughout the landscape.

Integrate herbs, flowers or shrubs with pleasant scents to create aromatic zones within the therapeutic landscape, promoting olfactory stimulation.

E)Colour Psychology:

Use colour schemes strategically to influence mood and perception. Understand the psychological impact of colours and apply them to different areas of the landscape. Warm tones may evoke comfort, while cool tones can promote tranquillity.

G)Interactive Water Features:

Incorporate interactive water features. Design features like splash pads, interactive fountains or water walls that users can engage with, enhancing both visual and auditory perceptions.

H)Develop areas to attract birds and butterflies.

Choose plants that attract these creatures, providing users with visual interest and the opportunity to observe and connect with nature.

Figure 138 positive distractions like filling bird feeders may decrease the anxiety that invariable accompanies medical treatment (Marcus & Sachs, 2014).

By Jeremy Lee(2015)

Design Strategies to Improve Positive Natural Distraction:

Figure 139 The Earth and Sky Garden features a variety of planting and seating for small groups (Marcus & Sachs, 2014).

By Clare Cooper Marcus（2014）

Figure 140 An attractive garden, domestic in scale and design and with a variety of places to sit and walk and things to look at and touch, will encourage older residents to exercise and spend time outdoors, thus contributing to their overall health. Graham Garden, Saanich Community Hospital, Victoria, British Columbia. Designer: LeFrank & Associates (Marcus & Sachs, 2014).

By Jeremy Lee （**2014**）

A) Create the potential for wildlife observation, such as plants that attract birds or butterflies, bird feeders, bird baths or nests or a fishpond. Bird feeders and birdbaths placed within view of a group area (lounge, day room or dining room) are particularly popular. A variety of birds will find gardens appealing if they are planted with a variety of evergreen and deciduous trees, groundcovers, vines climbing on walls and climbers, perennial herbs and shrubs that provide an attractive habitat for diversity. There should be sensitivity to possible cultural differences and confirmation that the majority of the resident population actually enjoys birds.

Figure 141 The viewing platform is a popular spot from which to observe wildlife in the water below.

By Jessy Bergeman (2014)

B) In addition to providing outdoor spaces, explore opportunities for indoors through indoor gardens, atriums and potted plants, also provides views of existing nature or landscaping designed for the healthcare facility and people can view it through the windows ; nature art and sound; and other elements of "biophilic design". For example , the naturalistic stream is visible through the glass doors and windows at the end of the hallway, as well as from a large waiting room. One nurse commented: "This is the first place I 've worked where I felt like I 'm outside in a garden all the time! "Smilow Cancer Hospital at Yale New Haven Hospital, New Haven, Smilow Cancer Hospital at Yale New Haven Hospital, New Haven

Figure 142: Indoor waiting room with window through naturalistic stream
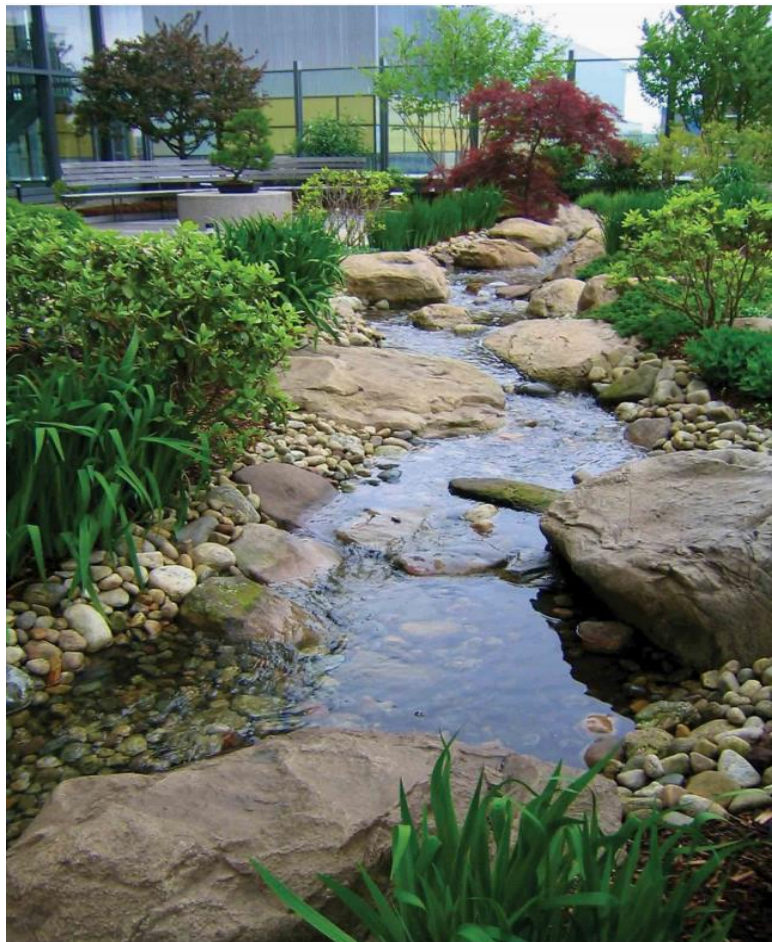
By Naomi Sachs (2014)

Design Strategies to improve Sacredness.

A) Mature trees (or trees that will mature in a relatively short period of time) can provide a symbolic sense of longevity. Indeed, studies have shown that people who live in tree environments will live longer (Takano, Nakamura, and Watanabe 2002).

B) Study plant species of special sacred or cultural significance to the occupant community.

C) Precious Pathways: Elevate the sacred ambiance of the landscape by guiding visitors along pathways that require a deliberate journey to reach. Implementing the principle of "the path bends and reveals," where the pathway gradually unfolds, leads visitors to precious destinations. This deliberate journey fosters a sense of reverence and anticipation.

D) Sequential Spatial Organization: Establish a sequence of spatial layers within the landscape, each demarcated by gates or thresholds. As visitors progress through these layers, they encounter deeper, more secluded, and increasingly sacred environments.

The ultimate destination, the holy place, remains concealed until visitors pass through several outer gates, cultivating a sense of spiritual progression and exploration.

E) Tranquil Views: Cultivate Zen views by strategically positioning viewing windows along pathways. These windows provide glimpses of distant scenery as visitors approach or pass by, evoking a feeling of serenity and communion with nature. However, ensure that the distant vista is not visible from where visitors pause, preserving an aura of mystery and reverence for the sacred landscape.

Design Strategies to Improve Positive Design Features

 A) Choose design elements that are clear and easily recognizable to create a sense of comfort and familiarity for visitors, as suggested by Cooper Marcus in her book "Healing Gardens: Therapeutic Benefits and Design Recommendations." Avoid abstract artworks that may be challenging for individuals to understand or emotionally connect with. Instead, consider incorporating charming animal sculptures or nature-themed murals, which have been shown to evoke feelings of joy, tranquillity, and connection to the natural world. For instance, installing a whimsical sculpture of a friendly woodland creature or painting a mural depicting a serene forest scene can help create a welcoming and calming atmosphere in the therapeutic landscape, thus promoting relaxation and well-being among visitors.

Design Strategies to improve Holism.

A)Integration of Historical Context:

Incorporate elements of the site's history, cultural heritage, and traditions into the design to create a sense of continuity and connection with the past.

B)Consideration of Geographical Environment:

Utilize the natural features of the site, such as topography, vegetation and climate, to inform the design and create a harmonious relationship between the landscape and its surroundings.

C)Creation of Restorative Spaces: Design areas within the landscape that promote relaxation, contemplation, and rejuvenation, providing opportunities for visitors to connect with nature and restore their well-being.

D)Continuous Evaluation and Adaptation: Regularly evaluate the effectiveness of the design strategies and adapt them as needed to ensure that the therapeutic landscape continues to meet the needs of its users over time.

Design Strategies to Improve Vitality.

A) Level of Scale: Ensure that different elements within the landscape vary in size but are proportionate to one another. This creates a well-ordered range of sizes, forming a cohesive whole by tying the centres together.

B) Strong Centres: Design the landscape with strong centres, which are recursively made up of smaller strong centres. Each strong centre contributes to the vitality and coherence of the whole landscape.

C) Boundaries: Establish boundaries within the landscape using ring-like centres made up of smaller centres. These boundaries intensify the bounded centre while connecting it with the surrounding environment, maintaining a balanced relationship.

D) Alternating Repetition: Create a pattern of alternating repetition of elements within the landscape with subtle variations. This recursive repetition forms a field effect, resulting in a harmonious and cohesive environment.

F) Good Shape: Design the landscape with a good shape as a whole, composed of coherent centres. This results in a profound and effective landscape design that enhances the well-being of its users.

G) Local Symmetries: Incorporate various symmetrical segments within the landscape that interlock and overlap with each other. These local symmetries create coherence among the centres, contributing to the vitality of the landscape.

H) Deep Interlock and Ambiguity: Integrate forms that interlock centres with their surroundings, creating ambiguity and deep coherence between them. This enhances the interconnectedness and vitality of the landscape.

I) Contrast: Utilize sharp contrasts between different elements within the landscape to intensify the character of each centre. These contrasts bring vitality and dynamism to the landscape design.

J) Gradients: Ensure that qualities vary gradually across space within the landscape, forming new centres with a field effect as a whole. This gradual variation contributes to the overall vitality and coherence of the landscape.

K) Roughness: Introduce local irregularities within the landscape, responding to environmental demands and constraints. These irregularities add depth and character to the landscape design, enhancing its vitality.

L) Echoes: Incorporate deep underlying similarities within the landscape, derived from similarities in the process of creating them. These echoes add richness and coherence to the landscape design.

M) Simplicity and Inner Calm: Design the landscape with a sense of inner calm and simplicity, removing unnecessary elements to create a serene environment conducive to healing and well-being.

N) Not-Separateness: Ensure that all centres within the landscape deeply connect and melt into their surroundings, promoting a sense of connectedness and peace. This deep coherence enhances the vitality and harmony of the landscape.

In conclusion, we would like to emphasize that the same design strategy will often enhance multiple different indices simultaneously. As a result, a particular strategy may be repeated across various indices. Additionally, these strategies do not encompass all possible design strategies in therapeutic landscape design but rather describe some common and outstanding design cases as ignition. The selection of strategies is based on the fundamental principles and rules of the indices.

6.2 Example of Strategies Implementation

A example of therapeutic landscape for elderly are shown below, which applies the HTLD-indicators (E) strategies.

6.2.1 Roger Smith Memorial Garden

Project name	Roger Smith Memorial Garden
Project location	Schaumburg, IL, United States
Project area	Approx. 4047 square meters
Design Team	Hitchcock Design Group (USA)

(1)Design Concept

Friendship Village is a senior living community in Schaumburg, Illinois, USA. The therapeutic landscape, formerly known as the Roger Smith Memorial Garden, was built in memory of longtime Friendship Village board member and resident Roger Smith. It offers outdoor sitting areas, seasonal plantings, an outdoor activity area for young and old alike (a golf artificial green) and a multi-use area (shuffleboard or temporary seating for outdoor gatherings).

(2) Introduction to the Program

The Therapeutic Landscape is an appropriately scaled space formed by the enclosure of the two-story residential wing of the retirement community. The landscape is richly planted and well-maintained, featuring outdoor seating arranged in a simple and clear

manner. Long and short circular walks provide different levels of exercise options for older people. The design plan is shown in Figure 143.

Figure 143: Master Plan of Roger Smith Memorial Garden

By Hitchcock Design Group, (2010)

For walkways, there is a brick paver terrace sitting area at the entrance to the therapeutic landscape that connects to a coloured concrete loop walkway. Seniors can choose from a long loop around the landscape or take a shortcut through the multi-purpose area in the centre of the garden. Regarding seating, almost all of the seats in the therapeutic landscape are wooden, with backrests and armrests, shaped and sized to fit the ergonomics of older people. Many areas of the gardens provide sitting space, offering plenty of options for seniors to sit in the sun or shade. In the western part of the therapeutic landscape, many movable tables and chairs are placed for the elderly to arrange as they wish. In terms of planting, the varieties, colours and textures of the plantings are diverse and seasonal, including a wide variety of trees, shrubs and flowering herbs, as well as a raised lawn. Flower colours include white, silver, yellow, orange and red (including *Daylily, Plantain Lily, Busy Lizzie, White Hydrangea, Petunias, and Bee Balm*) specifically chosen to align with the visual characteristics of the elderly.

(3) Summary of Design Features

The therapeutic landscape at Friendship Village is pleasantly scaled, with landscaping amenities humanely designed for the elderly. The simplicity and clarity of the design

enhance the perceivability of the gardens, making them comfortable and visible from the windows of most residential buildings. There is a far greater proportion of greenery than hard paving. The form of the garden activity space is not homogenized, providing a common recreational space for older and younger visitors, thereby enhancing social interaction among older people.

(4) Analysis the design strategies for Roger Smith Memorial Garden

1. Enhancing Sense of Control

The design strategy improves users' sense of control through the multifunctionality of the same space. For example, the artificial turf area serves as a putting green, croquet court, special event seating, and performance area. This multifunctionality allows users to make choices, thereby enhancing their sense of autonomy and control within the space.

2. Improving Balance

The landscape achieves visual balance through thoughtful selection of trees and shrubs, strategically mixing evergreen and deciduous varieties. This selection ensures that the landscape maintains a connection with nature throughout the year, avoiding a barren appearance in any season. The curved geometric shapes used in the layout, along with the balanced colour scheme of plants and site materials, further contribute to a visually harmonious environment.

3. Strengthening Self-Identity

The garden encourages self-identity through individual and group activities, such as croquet games, performances, and special events. These activities provide users with opportunities to express themselves and engage with others, reinforcing their sense of identity.

4. Improving Social Support

As a memorial therapeutic garden within Friendship Village, the space benefits from local board and foundation support, specifically from Roger Smith's contributions. This backing fosters a strong sense of community and social support among residents.

5. Enhancing Legibility

The simple loop design ensures that elderly users, including those with dementia, can navigate the space easily without getting lost. This clear layout contributes to the overall accessibility and usability of the garden.

6. Promoting Fearless Confrontation with Death

Seasonal plantings in the garden serve as a symbolic reminder of the life cycle, encouraging users to reflect on their own lives. The garden also features a memorial flag in honour of Roger Smith and meandering pathways that invite contemplation, providing a space for meditation and existential reflection.7. Encouraging Physical Movement and Exercise

The garden design promotes physical activity through features like the croquet area and looped pathways. The variety of plants and visual stimuli within the space encourages users to walk, exercise, and explore the garden.

8. Increasing Spatial Complexity

The garden design emphasizes complexity through diverse plantings with varying colours and textures, particularly at eye level. This consideration is essential for older adults, some of whom may walk in a semi-stooped position. The preservation of the original undulating terrain in non-paved areas adds to the visual richness of the landscape.

9. Enhancing Cultural Beliefs

The garden integrates cultural symbolism by commemorating Roger Smith, the garden's earliest sponsor and board chief. The inclusion of memorial elements, such as a flower flag, highlights the theme of remembrance and reinforces the connection between the users and the cultural heritage of the community.

10. Increasing Mystery

Curved pathways and varied topography within the garden create a sense of mystery, encouraging exploration and discovery. These design elements enhance the user's experience by leading them to hidden or obscured areas of the landscape.

11. Improving Social Relationships

Social interaction is facilitated through spaces like the shuffleboard court, multi-purpose performance area, and shaded seating with tables and chairs. These areas provide ample opportunities for users to engage with each other, fostering a sense of community.

12. Enhancing Uniqueness

The uniqueness of the garden is preserved through a thorough analysis of the site's natural features, topography, and existing vegetation. The diverse plant species, rich colors, and textures, along with the seasonal variety, make the garden a distinct and special place for the elderly.

13. Improving Sense of Safety (Refuge)

All seating in the garden is strategically placed in shaded, secluded areas, such as near large trees. This placement ensures that users do not feel exposed, providing a sense of refuge and safety.

14. Enhancing Sense of Security

The garden features non-slip paving materials, and the space is enclosed by buildings and appropriately surrounded by trees and shrub fences, creating a secure environment for the elderly.

15. Improving Perceptual Experience

The garden's design emphasizes plants with bright, saturated colors that cater to the visual needs of older adults, particularly those with cataracts. The careful selection of colors and plants enhances the perceptual experience for users.

16. Improving Physiological Comfort

Seating throughout the garden consists of wooden benches with armrests, designed to meet the ergonomic needs of older adults. The seating areas, often located near entrances, are complemented by lush plantings, ensuring that users feel welcomed and connected to nature.

17. Enhancing Appeal

The garden's main entrance is designed to offer attractive views, drawing visitors into the space. The use of curved paths and abundant natural elements enhances the garden's visual appeal, encouraging users to explore further.

18. Improving Interaction with Nature

The garden's extensive green spaces and diverse vegetation encourage users to interact with nature. Research shows that even short exposure to nature-dominated spaces can provide emotional and physical benefits, making this interaction an essential aspect of the garden's therapeutic value.

19. Fostering a Sense of Belonging

Cultural activities and regular visits from older adults are part of the garden's programming, fostering a sense of belonging among users. Providing tools like brooms and rakes allows residents to participate in maintaining the garden, further enhancing their connection to the space.

20. Enhancing Positive Design Features

Clear and recognizable design elements are used to create a sense of comfort and familiarity for visitors, making the garden a welcoming and reassuring space.

21. Improving Holism

The design integrates elements of Roger Smith's history and the cultural heritage of Friendship Village, creating a sense of continuity with the past. The design also considers the geographical environment, utilizing the natural features of the site to create a harmonious relationship between the landscape and its surroundings. Functional zoning within the garden accommodates various activities and needs, contributing to the overall holistic experience.

22. Boosting Vitality

The garden's strong centres, such as the multi-purpose performance area and shuffleboard court, create focal points of activity that contribute to the overall vitality of the space. Local irregularities in the landscape design add to this sense of vibrancy, making the garden a dynamic and engaging environment for users.

7.Conclusion

7.1 Research Background and Theoretical Foundation

This doctoral dissertation aims to explore and propose therapeutic landscape indicators and strategies designed to enhance the physiological, psychological, and spiritual well-being of the elderly. It also investigates the practical application of these indicators, particularly in elderly care institutions and medical centers in Yunyan District, Guiyang. The research focuses on emerging trends in therapeutic landscape design in both Eastern and Western contexts, emphasizing the integration of nature with medical environments. To improve therapeutic landscapes in elderly care institutions in Guiyang, this study establishes a comprehensive set of Holistic Therapeutic Landscape Design indicators (HTLD-indicators(E)), providing a concrete and feasible template for developing an objective evaluation system for rehabilitation landscapes.

Against the backdrop of global aging, urbanization, and environmental degradation, healing landscapes have demonstrated significant value as a key framework for promoting holistic health. By integrating natural elements, healing landscapes support comprehensive well-being, including physical, psychological, and spiritual health. This research highlights that in urban environments, designing accessible and nature-centered spaces is crucial for addressing the diverse needs of populations. These spaces not only improve quality of life but also promote sustainable urban

development, underscoring the necessity of prioritizing healing landscape design in future medical and urban planning.

Therapeutic landscape research examines the relationship between nature and human health, emphasizing the healing effects of natural spaces on physiological, psychological, and spiritual levels. The theoretical foundation of this study is rooted in interdisciplinary research, including landscape design, environmental psychology, well-being geography, and traditional Chinese medicine (TCM). In both Eastern and Western cultures, therapeutic landscapes have deep historical roots. In ancient China, influenced by Taoism, Feng Shui, Buddhism, and Confucianism, nature and healing were closely integrated. In contrast, Western approaches evolved from ancient Greek traditions through medieval Europe to modern mechanized medical models. With the growing global emphasis on green spaces and holistic medicine, modern China is rediscovering the health value of TCM in relation to natural environments, gradually forming new therapeutic landscape design methodologies.

Landscapes are not only objects of observation but also spatial representations of social life, reflecting the interactions between humans and the environment. Healing landscapes are defined as physical environments that help individuals transition from a state of internal disharmony to harmony on spiritual, psychological, and physical levels. The perspective of TCM enriches the theoretical foundation of healing landscapes by emphasizing harmony between humans and nature. The integration of herbal medicine, acupuncture, and other practices contributes to the creation of environments with therapeutic functions.

7.2 Evolution and Integration of Eastern and Western Therapeutic Landscapes

In the historical evolution of healing landscapes, Eastern traditions developed from nature worship, religious rituals, and the integration of traditional medicine with natural environments, eventually forming concepts of gardens and healing spaces. Meanwhile, Western traditions evolved from religious rituals to empirical and mechanized medicine, recognizing the role of natural environments in physical and mental recovery, as seen in monastic herb gardens and landscape hospital designs. In recent years, modern developments in healing landscapes have integrated both Eastern and Western philosophical and scientific approaches, emphasizing systematic, holistic, and human-centered design principles widely applied in medical institutions and elderly care facilities.

China's research on healing landscapes started relatively late. While largely based on the analysis and summarization of Western literature, it has lacked foundational breakthroughs. However, in the wake of the COVID-19 pandemic, public health and psychological well-being have become popular research topics, covering areas such as plant design and forest therapy. Research methods are increasingly incorporating evidence-based techniques and contemporary assessments. Traditional Eastern approaches, such as Taoist retreat gardens and Buddhist Zen gardens, emphasize natural harmony and disease prevention, whereas Western traditions developed labyrinth gardens and monastic herbal gardens focusing on disease treatment. China's healing landscape theories are gradually incorporating Western evidence-based methodologies while integrating TCM practices, including Feng Shui and Taoist exercises, to explore the effects of gardens on patient rehabilitation and health improvement.

Future development in this field will continue to advance by integrating modern design principles with traditional wisdom, enhancing the role of healing landscapes in promoting physical and mental health, and creating more harmonious and sustainable environments for social well-being. Therapeutic landscape research exhibits a diverse and cross-cultural character, encompassing theoretical exploration and practical applications. Western research emphasizes community gardens, medicinal plants, and green infrastructure in healthcare environments, focusing on horticultural therapy, stress relief, and patient experiences. In contrast, China's research is gradually shifting toward emerging fields such as green hospitals, horticultural therapy, and healthy urban planning. Although still in its early stages, it mainly draws upon Western theories.

7.3 HTLD-indicators(E): Holistic Therapeutic Landscape Design Indicators

The design of therapeutic landscapes not only focuses on the benefits of natural elements for physical health but also considers how to meet the specific needs of different users, particularly patients and vulnerable groups, through careful planning. Design concepts based on evidence-based design and philosophical approaches provide theoretical support for therapeutic landscapes. The former explores the impact of landscapes on rehabilitation through empirical research, while the latter focuses on understanding the therapeutic effects of landscapes through logical reasoning and conceptual analysis. The framework for constructing Holistic Therapeutic Landscape Design Indicators (HTLD-indicators) further clarifies key factors,

including natural elements, social support, physical activity, and positive natural distractions, providing guidance for designing more effective therapeutic landscapes.

In the future, as interdisciplinary collaboration deepens and systematic research progresses, therapeutic landscapes will play a greater role in the development of healthy cities and sustainable urban environments, promoting global well-being. In summary, theories such as Kaplan and Kaplan's Restorative Attention Theory, Cooper Marcus's Healing Landscape Theory, and Christopher Alexander's "Pattern Language," combined with traditional Chinese medicine (TCM) theories, provide a comprehensive framework for holistic therapeutic landscape design. Alexander's structural patterns, such as local symmetry, deep interlocking, and simplicity, align closely with the balance and harmony principles of traditional Chinese medicine. The application of Yin-Yang and Five Elements Theory, as well as the Zangxiang (viscera-state) theory, not only enriches design methodologies but also deeply integrates cultural and philosophical dimensions, further enhancing design connotations.

This holistic design approach not only promotes the physical and psychological well-being of users but also fosters a profound connection between humans and nature, creating environments that meet bodily needs while facilitating mental healing. By integrating tangible and intangible elements, the proposed therapeutic landscape design aims to create spaces that offer healing, tranquility, and a sense of belonging. As the synergistic effects of these theories continue to be explored, the field of therapeutic landscape design is expected to expand and find broader applications.

In conclusion, the holistic therapeutic landscape design method integrates multiple theories and strategies to create environments that promote physical, psychological, and spiritual well-being. This method combines evidence-based design principles, philosophical approaches, and traditional Chinese medicine theories to comprehensively meet the diverse needs of therapeutic landscape users. Drawing from the theories of 16 scholars, the proposed 33 indicators provide a scientific framework for evaluating and optimizing the therapeutic efficacy of landscapes. Design strategies such as the five-sense design strategy, nature therapy design strategy, and sacred space design strategy offer practical approaches to achieving the ideal therapeutic landscape by improving each indicator. These strategies not only enhance user perception but also deepen the human-nature connection, ultimately promoting holistic recovery.

Looking ahead, as interdisciplinary collaboration deepens and systematic research progresses, therapeutic landscapes will play an even greater role in healthy city development and sustainable practices, advancing global well-being. Integrating order

and spatial organization strategies into therapeutic landscape design significantly enhances users' overall health and well-being. The symmetry and sense of balance in design not only evoke a sense of sacredness and harmony but also align with traditional Chinese medicine principles and modern psychological theories.

By carefully designing open, semi-open, and enclosed spaces while ensuring accessibility, these landscapes not only provide aesthetic pleasure but also deliver tangible benefits for physical, psychological, and spiritual recovery. The use of plants and natural elements to create diverse spatial experiences not only enhances the layering of therapeutic environments but also fosters deeper connections between users and nature. Future research and practice should continue to explore innovative approaches to strengthen these design strategies, ensuring that therapeutic landscapes remain inclusive and accessible for all users.

7.4 Quantitative Experiments and Case Studies

In the application of holistic therapeutic landscape design approaches, the therapeutic garden of Panzhou Traditional Chinese Medicine Hospital in Guizhou provides a space for accelerated recovery by harmonizing with nature for both patients and medical staff. Meanwhile, the Elizabeth and Nona Evans Therapeutic Garden integrates a meditation garden, an exploration garden, and a horticultural therapy garden to meet the diverse needs of different groups, thereby promoting both physical and mental well-being. Additionally, psychological component experiments, such as studies on the therapeutic effects of Icelandic natural landscape imagery and the impact of narratives in the Roman Temple Garden in Portugal on psychological well-being, further confirm the positive influence of natural landscapes on mental health, providing theoretical support and practical evidence for therapeutic landscape design.

This study systematically reveals the mental health benefits of Icelandic natural landscape imagery for Chinese tourists through quantitative experiments and theoretical analysis. The experimental results indicate that two-dimensional images of landscapes such as glacial lakes, the Blue Lagoon, and ice caves significantly enhance participants' sense of well-being (Group A: 89%, Group B: 88.4%), with the effect being independent of physical presence at the location, thereby verifying the universal therapeutic value of natural landscape imagery. The regression model further identifies key factors influencing the healing effect: escape from daily stress, perception of open space, and visual appeal positively drive mental health, whereas personal preference biases may weaken the effect. This finding supports both the Biophilia Hypothesis and Prospect-Refuge Theory while providing new empirical evidence for environmental psychology, demonstrating that two-dimensional natural

imagery can serve as a low-cost, easily accessible psychological intervention tool, particularly for alleviating cognitive fatigue and anxiety in high-stress populations.

Additionally, the study proposes the development of multi-sensory healing products by integrating visual, auditory, and olfactory stimuli to enhance therapeutic effects through immersive experiences. For example, embedding QR codes in healing photo albums to play natural soundscapes or incorporating scent diffusion devices with pine forest aromas can provide users with a more comprehensive psychological recovery environment. On a technological level, AI image generation models based on GANs algorithms offer the possibility of large-scale production of customized therapeutic landscapes, though their training requires a substantial amount of high-quality natural image data (5,000-6,000 images).

From a practical perspective, Iceland's unique natural landscapes are not only a core attraction for tourism but also a critical global resource for psychological health interventions. The study advocates for strengthened protection of natural landscapes to ensure ecological sustainability while promoting the international development of healing tourism. Findings from the comparative experiment in Portugal further expand the study's scope, revealing the potential value of cultural narratives and placebo effects in therapeutic landscape design. Future research could explore the differentiated impact of cross-cultural narratives on mental health.

In summary, this study provides scientific evidence for the psychological therapeutic mechanisms of natural landscapes and offers innovative insights for landscape design, mental health interventions, and eco-tourism planning. Under the integration of technology and culture, balancing nature conservation with human healing needs will be a key direction for future research.

Narratives play an essential role in therapeutic landscapes, serving as tools for transmitting traditions and cultural values, evoking emotions, establishing connections, and offering perspectives on human experiences. In therapeutic landscapes, narratives help visitors achieve a sense of transcendence and inner peace through healing stories, myths, and religious spaces. Studies have shown that narratives positively impact mental health. For instance, Greenawalt (2014) found that narratives help improve mood and reduce anxiety, while Liu et al. (2016) demonstrated that healing narrative interventions effectively alleviate depression and anxiety symptoms in university students.

Therapeutic landscapes consist not only of physical environments (such as trees and flowers) but also intangible factors (such as historical backgrounds, personal

experiences, and religious beliefs). Although these intangible factors cannot be scientifically measured, they play a crucial role in the healing process. Globally, the concept of therapeutic landscapes has been widely applied. For example, in Tibetan and Central Asian temples, people have reported experiencing healing changes through pilgrimage experiences. Narratives function beyond the physical level; they are equally significant at symbolic and spiritual levels.

Positive psychology experiments in the 1990s indicated that narratives significantly enhance participants' overall health status. Gesler (1996) also demonstrated the effectiveness of narratives in therapeutic landscapes through his research in Lourdes. An experimental study conducted in the garden adjacent to the Roman Temple in Évora, Portugal, created fictional healing stories and disseminated them through social media platforms, collecting feedback from 100 visitors. Results showed that visitors who heard the stories reported significantly higher levels of health and well-being than those who did not (p < 0.001), further validating the critical role of narratives in therapeutic landscapes.

In conclusion, this study conducted at the garden next to the Roman Temple in Évora, Portugal, provides strong evidence that narratives significantly enhance visitors' perceptions of health and well-being in therapeutic landscapes. The findings highlight that incorporating narratives into therapeutic landscape design deepens visitors' connections with their environment and effectively improves mental health outcomes.

7.5 Future Development and Prospects

Future research should continue exploring the potential of narratives in various therapeutic landscapes and examine how different types of narratives influence user experiences and health outcomes. A case study in Yunyan District, Guiyang, further illustrates the potential of designing holistic therapeutic landscapes for the elderly. By addressing their physiological, psychological, and spiritual needs, the HTLD-indicators(E) framework provides a comprehensive model for enhancing quality of life and supporting elderly well-being.

As China faces the challenges of an aging society, applying these indicators in therapeutic landscape design becomes increasingly important for providing sustainable solutions to improve health and happiness in the elderly population. Research on the physiological, psychological, and spiritual characteristics of the elderly underscores the multifaceted needs that therapeutic landscape design must address. Declines in sensory, motor, and cognitive functions necessitate supportive environments that optimize daily activities while ensuring safety and accessibility.

From a psychological perspective, environments should promote social interaction, reduce loneliness, and provide emotional support. On a spiritual level, the elderly seek a sense of belonging, security, and opportunities to confront and understand the inevitability of death.

Using questionnaire surveys and GST grey statistical analysis, this study establishes a solid framework for understanding the importance of various indicators in elderly care. The HTLD-indicators(E) provide practical guidance for designing therapeutic landscapes that meet the comprehensive needs of the elderly, improving their quality of life and promoting well-being. Future research should continue exploring the specific needs of different elderly populations and refine these indicators to better address the unique challenges faced by aging individuals.

7.6 Strategies for Enhancing Indicators and Case Analysis

Based on the HTLD(E) indicator system, this study systematically proposes a set of design strategies for therapeutic landscapes for the elderly, covering 35 core indicators such as control, coherence, cultural beliefs, and sensory experiences. Findings indicate that diversified spatial design (e.g., combining private meditation areas with open social zones), integration of natural elements (e.g., seasonal plants and water features), and embedding cultural symbols significantly enhance elderly users' physical and mental health and subjective well-being.

On the technical level, the study emphasizes the importance of integrated indoor-outdoor design (e.g., indoor gardens at the Dana-Farber Cancer Institute) and accessibility features (e.g., non-slip pathways, handrail designs), directly addressing the elderly population's core needs for safety and accessibility. Additionally, incorporating cultural narratives and historical elements (e.g., Feng Shui principles and commemorative sculptures) not only enriches the therapeutic meaning of landscapes but also enhances users' health perception through the placebo effect.

Future research can further explore the integration of technology (such as AI-generated landscapes and virtual reality) with traditional design approaches, particularly in personalized therapeutic scenarios. Moreover, attention should be given to how cross-cultural differences affect design strategies, such as variations in regional preferences for natural symbols (e.g., birds and color choices). On a practical level, establishing dynamic evaluation mechanisms through user feedback will help continuously optimize landscape functionality while enhancing inclusivity and sustainability in community engagement.

In conclusion, this study demonstrates that therapeutic landscape design must balance objective quantitative indicators with subjective experiences. A multi-level, multidimensional strategy integration is essential to achieving mental and physical rehabilitation goals for the elderly population.

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APPENDIX

APPENDIX

APPENDIX 1

Questionnaire for research on how narrative influence psychological well-being in therapeutic landscape in Roman Temple Garden

Questionnaire on the perception of the level of health and well-being of visitors after visiting the Temple of Diana Garden. A Likert scale questionnaire.

Are you familiar with the healing story of the Roman Temple and Diana Garden?

- Very familiar

- Somewhat familiar

- Not familiar at all

To what extent did the healing story of the Diana enhance your visiting experience?

- A lot

- Somewhat

- Not at all

To what extent did the healing story of Diana make you feel more connected to the place?

- A lot

- Somewhat

- Not at all

To what extent did the healing story of Diana impact your perception of the garden as a healing place?

- A lot

- Somewhat

- Not at all

How much do you agree or disagree with the statement: "The story of Diana of made me feel calmer and more peaceful"?

- Strongly agree

- Agree somewhat

- Neutral

- Disagree somewhat

- Strongly disagree

How much do you agree or disagree with the statement: "The story of Diana of made me made me feel more hopeful and optimistic"?

- Strongly agree

- Agree somewhat

- Neutral

- Disagree somewhat

- Strongly disagree

How much do you agree or disagree with the statement: "The story of Diana made me feel more positive about my own health and well-being"?

- Strongly agree

- Agree somewhat

- Neutral

- Disagree somewhat

- Strongly disagree

Based on your visit to the Temple of Diana, how would you rate your overall level of health and well-being?

- Excellent

- Good

- Fair

- Poor

- Very poor

What is the likelihood of recommending the Roman temple and Diana garden to someone looking for a healing or spiritual renewal location?

- Very likely

- Somewhat likely

- Neutral

- Not very likely

- Very unlikely

Any additional comments or feedback you would like to share about your experience at Roman temple and Diana Garden.

Thank you for your participation!

Questionnaire A for study therapeutic Landscape and residents' preference of the Golden Home

Hello, this questionnaire survey is part of the doctoral thesis of Chinese PhD student Bao Guotai at the University of Evora, Portugal, which aims to improve the urban quality of the City's outdoor spaces, particularly the outdoor environments of healthcare settings. This survey is for research use only and your personal information will be kept strictly confidential. Thank you for supporting.

Place of investigation: Golden Home

1. Your gender is: A. Male B. Female

2. Your age is: A. 0-17 B. 18-35 C. 36-45 D. 46-64 E. ≥65 years old

3. You are a: A. Patient or convalescent B. Family member, friend or visitor C. Staff member

4. Where you feel most comfortable when you are tired or uncomfortable:

A. hospital B. home C. Park D. quiet temple or church E. countryside F. mountain G. river E. other, please specify.

5. How much time do you spend outdoors on an average day? (when the weather is good)

A. less than 30minutes B. < 2 hours C. 2-6 hours D. >6 hours

6. Are you satisfied with the outdoor environment here?

A. very satisfied B. quite satisfied C. average D. quite dissatisfied E. very dissatisfied

Please briefly explain why:

7.What elements of the outdoor landscape in Golden Home do you feel promote your physical and mental health? (Multiple choice)

A. greenery B. brightly coloured flowers C. calm water D. fountains E. sculptural vignettes F. gazebos

Please add or specify:

8. What kind of outdoor landscape would you like to see here? (Multiple choice)

A. Open (no fencing, no visual obstruction) B. Enclosed (with fences and visual block)

C. For viewing only D. with interaction E. Classical Chinese Style F. Classical European style

G. Japanese Zen Style H. Modern , new and Simple J. Visually Impactful K. Calm

L. Religiously characterised

Please add or specify:

9.What features would you like to see in your outdoor landscape? (Multiple choice)

A. Provide open space B. Provide for the enjoyment of nature (e.g., viewing of animals, plants, water features, rocks, and other natural landscape elements C. Provide places to interact with natural elements (e.g., places to grow plants or interact with animals)

D. Provide space for outdoor exercise (with/without exercise facilities) E. Provide space for meditation F. Provide display of religious beliefs.

G. Provide space for gathering activities.

Please add or specify:
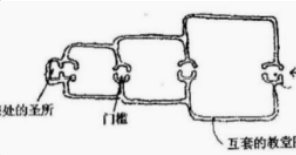
APPENDIX 3
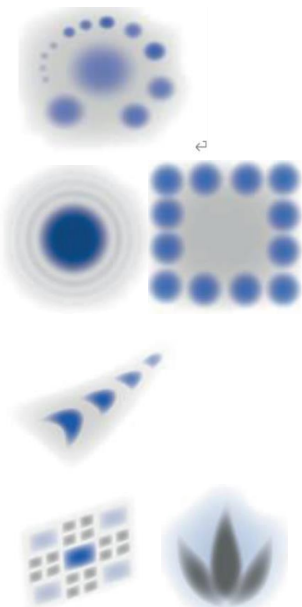
Questionnaire B for residents to evaluate the therapeutic landscape in Golden Home based on HTLD-indicators(E)

Questionnaires are distributed in person, and each questionnaire comes with a personal explanation provided by distributor. An additional booklet is included to offer further clarification.

indicator	Explanation of content	level of satisfaction				
		excellent	good	general	mediocre	poorly
Sense of control	Does it have easy access, and the freedom to utilize it and visible from main entry or gathering areas and have clear signage?					
Coherence	Does it have a harmonious setting where all elements unite as a whole, like in theme parks or rock gardens?					
Balance	Do you feel here has good proportion of soft and hard landscapes, light and shadow areas, and open to concealed spaces and different plants are well designed and maintained and harmonious with one to the other . and you feel that this place brings you peace , calm and happiness.					
Self-identity	Do you feel you are accepted in the landscape and yourself. Do you feel purpose of meaning of life when stay here?(Personally when I am in beautiful landscape , I do feel power .)					
Social support	Does it support different level of social interaction within design elements like good seating arrangements and place to socialize ?					
Legibility	Do you think here is well-structured and easily understandable spaces that are navigable and recognizable. And you easily know what every facility, objects function and what to do in each place.					
Fearless towards death	Do you feel helps them to understand how death is and they do not feel fear in the therapeutic landscape.					

indicator	Explanation of content	level of satisfaction				
		excellent	good	general	mediocre	poorly
Physical activity and exercise	Does this therapeutic landscape offer various incentives for exercise, such as different walking paths of varying lengths and difficulties, unique spots to reach like a gazebo, and engaging activities spread throughout the area?					
Complexity	Do you feel this therapeutic landscape has many visual elements, encompassing diverse plant life, colours, and varied outdoor furniture, offering many different activities and things to watch?					
Uniqueness	Do you think this place encompasses both tangible and intangible qualities of a place, linking with value. Does this place is very unique ? Does it irreplaceable? .You feel if this place disappears ,it will have huge influence for Guiyang from social, cultural, political, and historical perspective.					
Interaction with nature	Does here offer you a good natural outdoor space, offering ample opportunities to connect with nature.					
Mystery	Does this place evoke curiosity and wonder, encouraging you to explore more? Do you see Cues encouraging exploration? For instance, pathways leading to more distant landscapes .					
Social relationship	Do you think this landscape is very important for the society and get a lot of attention and support from the government?					
Good visual experience(prospect)	having a good view of the therapeutic landscape and understand the environment easily.					
Personal experience	You are having conversation with the therapeutic landscape based on background, childhood and belief. So based on this element , how do you like here ?					
A sense of safety (refugee)	Do you feel safe psychologically? such as a bench placed in the corner in front of a large tree. And tree trunk supports your back when you watch others?					
security	Is it safe to be in the therapeutic landscape? Anyone stole your					

indicator	Explanation of content	level of satisfaction				
		excellent	good	general	mediocre	poorly
	properties, and you see strangers very often?					
Scaredness	Does the therapeutic landscape have some space like these ? 					
perception	Does here have good sensory experiences. You are very satisfied with colour, shape, aroma, sound, texture, and spatial experiences contributes to fostering a positive five sense-involved experience ?					
Physiological comfort	Do you feel comfortable to stay here? Good temperature ? wind ? and fresh air ? Do you want to stay some longer time and feel refreshed ?					
Appealing	Does this therapeutic landscape look appealing?					
Opportunities for choice	Do you feel that you have many different activities to do or see or watch or listen here? different places to go? Open semi-open or closed place ?					
Well maintained	Does this therapeutic maintained well ? no broken wall , no broken pavement ?					

indicator	Explanation of content	level of satisfaction				
		excellent	good	general	mediocre	poorly
Well designed	Do you think this place design very well ? it has many functionalities and feel satisfied with the design ?					
Sense of belonging	Do you feel that you are part of here and very welcomed by other people ?					
Positive design features	Do you think the visual elements positive visual elements, for example there is no abstract negative art pieces here?					
Holism	Do you think this place is like healthy human body, every parts coordinates perfectly with among various elements—historical context, geographical environment, regional culture, functional zoning, and landscape systems?					
Vitality	Does this therapeutic landscape have these character ? (more explanation are in brochure) levels of scale, strong centres, boundaries, alternating repetition, positive shape, good shape, local symmetries, deep interlock and ambiguity, contrast, gradients, roughness, echoes, simplicity, inner calm, and not-separateness?					

indicator	Explanation of content	level of satisfaction				
		excellent	good	general	mediocre	poorly
User involvement in design	Do you feel welcomed to give advice to improve or change the therapeutic landscape?					
Cultural belief	Do you feel this therapeutic landscape is related to your culture ?For example , If you are Buddhist, do you see some Budda sculpture here ?					
Historical event	Does here historically related to some healing story? Or many people are healed from diseases by living here historically ?					

Brochure for more explanation for each indicator accompanying the questionnaires.

A sense of control: people must be aware of its existence, have easy access and the freedom to utilize it as they desire. This means the therapeutic landscape should be visible from main entryways or gathering areas and have clear signage if not directly visible.

Social support: therapeutic landscape should support different level of social interaction. Studies reveal therapeutic landscapes within healthcare facilities that

design elements like seating arrangements and location impact how these spaces are utilized.

Physical movement and exercise: therapeutic landscapes offer various incentives for exercise, such as different walking paths of varying lengths and difficulties, unique spots to reach like a gazebo and engaging activities spread throughout the area

Positive natural distractions: a therapeutic landscape should authentically resemble a natural outdoor space, offering ample opportunities for people to connect with nature. It serves as a refuge, providing a break from the sights, smells and sounds experienced indoors.

Coherence: refers to a harmonious setting where all elements unite as a whole, like in theme parks or rock gardens.

Legibility: involves well-structured and easily understandable spaces that are navigable and recognizable, allowing objects to be identifiable and functional for any activity.

Complexity: is defined by the number of visual elements in the landscape, encompassing diverse plant life, colours and varied outdoor furniture, offering possibilities for more activities and content.

Mystery: evokes curiosity and wonder, prompting individuals to explore further. Cues encouraging exploration must be provided. For instance, pathways leading to more distant landscapes trigger a desire to explore. Conversely, closed-door houses don't attract exploration and are not considered good examples of mystery.

A sense of safety (refugee): feel safe, a bench placed in the corner in front of a large tree. And tree trunk supports the back .

Good visual experiences (prospect): having a good view of the therapeutic landscape and understand the environment easily.

A sense of control: people must be aware of its existence, have easy access and the freedom to utilize it as they desire. This means the therapeutic landscape should be visible from main entryways or gathering areas and have clear signage if not directly visible.

Social support: therapeutic landscape should support different level of social interaction. Studies reveal therapeutic landscapes within healthcare facilities that design elements like seating arrangements and location impact how these spaces are utilized.

Physical movement and exercise: therapeutic landscapes offer various incentives for exercise, such as different walking paths of varying lengths and difficulties, unique spots to reach like a gazebo and engaging activities spread throughout the area.

Positive natural distractions: a therapeutic landscape should authentically resemble a natural outdoor space, offering ample opportunities for people to connect with nature. It serves as a refuge, providing a break from the sights, smells and sounds experienced indoors.

Positive design features: by choosing clear and positive visual elements, designers can help create a tranquil and therapeutic landscape.

Natural resources: include natural elements such as plants, sunlight, air, temperature and water, from which the body benefits through biochemical and physiological processes.

Well-designed: therapeutic landscape has good functionality.

Well maintained: after the therapeutic landscape is built.

Appealing: it looks attractive and users like this therapeutic landscape.

Historical events: History related to the site of therapeutic landscape.

Cultural beliefs: the users' beliefs which is related to the site and cultural background of the users.

Social relationships: how the therapeutic landscape is viewed by the society, the government.

Personal experiences: each user has conversation with the therapeutic landscape and they live inside by their own ways and their background, childhood and their belief and experience would influence the communication between them and therapeutic landscape.

Self-identity: users feel they are accepted in the therapeutic landscape and they accepted therapeutic landscape and themselves. They feel they have purpose of meaning of life in the therapeutic landscape.

Fearlessness toward death: therapeutic landscape helps them to understand how death is and they do not feel fear in the therapeutic landscape.

Uniqueness: encompasses both tangible and intangible qualities of a place, linking them with value. "Genius loci" represents another intangible heritage value present in environments where cultural resources are created and maintained. On-replicability. Significance in social, cultural, political and historical contexts.

Experiential quality: constitutes an essential aspect as how the users feel the place.

User involvement in design: this emphasizes that design in therapeutic landscapes must involve the users of these spaces; the designers themselves should be users of therapeutic landscapes.

Perception: enhancing sensory experiences. Enhancing colour, shape, aroma, sound, texture and spatial experiences contributes to fostering a positive perceptual encounter.

A sense of belonging: they feel that they are part of the therapeutic landscape.

Balance: a key principle in Holistic Therapeutic Landscape Indicators (HTLD-indicators), is derived from traditional Chinese theories:

A) In Yin-Yang theory, balance is reflected in aspects like the proportion of soft and hard landscapes, light and shadow areas and open to concealed spaces.

B) Following the Five Elements theory, balance is achieved through element configuration targeting therapeutic effects based on users' physical attributes.

C) Altering the spatial aura and Five Elements attributes of the therapeutic landscape leads to holistic recovery in physical, psychological and spiritual aspects.

D) Selecting a therapeutic landscape address involves Feng Shui principles like finding the main dragon, observing surrounding mountains, understanding water features, pinpointing vital residential areas and choosing an auspicious site.

E) Plant selection emphasizes balance by choosing plants with both Yin-Yang and Five Elements attributes, considering therapeutic effects on human organs and seasonal changes.
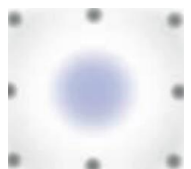
Holism: the therapeutic landscape, like the human body, requires coordination among various elements—historical context, geographical environment, regional culture, functional zoning and landscape systems.

Sacredness: They encompass levels of scale, strong centres, boundaries, alternating repetition, positive shape, good shape, local symmetries, deep interlock and ambiguity, contrast, gradients, roughness, echoes, simplicity, inner calm and not-separateness
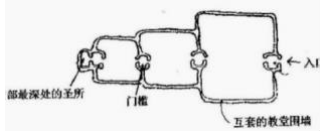
The table in below is also included for more explanation for indicator of Sacredness.

name of character	explanation of character	diagram

level of scale	Centres intensify each other when they are different in size. The gap between different scales must not be very large, and practically, one centre would be half or twice the size of another. The gap between different scales must not be very large, and practically, one centre would be half or twice the size of another. If there is a well-ordered range of sizes, a field effect is formed, and then, a whole is made by tying the centres together.	
strong centres	A living whole contains strong centres within it. The concept of a strong centre is applied recursively; every strong centre is made up from multiple smaller strong centres. The concept of a strong centre is applied recursively; every strong centre is made up from multiple smaller strong centres. Nevertheless, there is often a principal strong centre in a whole.	
boundaries	The ring-like centre, made up from smaller centres, forms a field-like effect that intensifies the centre that is bounded. It also unites the centre that is bounded with the world beyond the boundary. It also unites the centre that is bounded with the world beyond the boundary. Note that the order of the magnitude of the boundary and the centre that is bounded needs to be the same.	
alternating repetition	Centres are intensified when they repeat with subtle variation. Alternating repetition is not just simple repetition because what is repeated is modified according to their positions as a whole. When this rule is applied recursively to all entities, spaces between the entities, and the process of repetition, beautiful harmony is created. When this rule is applied recursively to all entities, spaces between the entities, and the process of repetition, beautiful harmony is created. The pattern of repeating centres forms the field effect, and as a result, wholeness emerges	
positive shape	A living whole only has strong centres, where every part of space has the positive shape as a centre. There is never any leftover from an adjacent shape.	
good shape	A living whole has a good shape as a whole that is made up from multiple coherent centres. Good shape is the attribute of the whole, but the whole must be made up from intense centres that themselves are whole. Good shape is the attribute of the whole, but the whole must be made up from intense centres that themselves are whole. Note that the result of a good shape is not only to make things beautiful but also to make them more profound and effective	
local symmetries	A living whole contains various symmetrical segments that interlock and overlap with each other. This feature of symmetry is called local symmetry to distinguish from overall symmetry. This feature of symmetry is called local symmetry to distinguish from overall symmetry. Each local symmetrical segment consists of smaller centres and creates a coherence of the centres. Each local symmetrical segment consists of smaller centres and creates a coherence of the centres. Local symmetries are not distinct but overlap with each other.	

deep interlock and ambiguity	A living whole has some forms that interlock centres with its surroundings. The centres and their surroundings interpenetrate through a third set of centres that ambiguously belong to both. The centres and their surroundings interpenetrate through a third set of centres that ambiguously belong to both.	
contrast	A centre is intensified by the sharp distinction between the character of the centre and surrounding centres. For example, the forms of contrast are black/white, dark/light, empty/full, solid/void, and busy/silent. For example, the forms of contrast are black / white, dark/light, empty/full, solid/void, and busy/silent. The difference between opposites not only separates things but also brings them. The difference between opposites not only separates things but also brings them together.	
gradients	Qualities vary gradually, not suddenly, across space in a living whole. A graded series of different-sized centres forms new centres that have a field-effect as a whole. A graded series of different-sized centres forms new centres that have a field effect as a whole.	
roughness	A living whole has some local irregularities within them. The irregularities are caused by adapting to irregularities in the environment and the irregularities are caused by adapting to irregularities in the environment and responding to the demands and constraints from other nearby centres, not by arbitrary decisions in the design. In that sense, roughness is a form of perfection	
echoes	A living whole contains deep underlying similarities within it. These similarities do not exist merely at a superficial level, but they exist at a deeper level of the structure, derived from similarities in the process of creating them. These similarities do not exist merely at a superficial level, but they exist in a deeper level of the structure, derived from similarities in the process of creating them.	
simplicity and inner calm	A living whole has certain slowness, majesty, and quietness, i.e., a state of inner calm. This quality derives from inner simplicity, where everything that is unnecessary is removed. It does not refer to simplicity in the superficial sense but refers to the true simplicity of the heart	
not-separateness	In a living whole, any centres deeply connect and melt into their surroundings, not separate from them. To achieve this connectedness, the boundary between the centres and their surroundings are fragmented or gradient. a result of this deep coherence, things feel completely at peace	

Vitality: it is the life force or energy that animates spaces and makes them feel alive, vibrant, and harmonious. Precious Places ,Sacred Place ,Zen Views would achieve vitality.

Pattern Name	Pattern Description	Implementation Method	Pattern
Precious Places	The most effective way is for people to walk a distance to reach these places. This follows the principle of "the path bends and reveals".	Spatial Organization: Sequence	
Sacred Place	At each layer, there are gates as signs; entering the gates leads to deeper, more secluded, and sacred atmospheres. The deepest part is the holy place, accessible only after passing through several outer gates. The deepest part is the holy place, accessible only after passing through several outer gates	Spatial Organization: Sequence	
Zen Views	If viewing windows are placed just right, when people approach or pass by, they can catch a glimpse of the distant scenery. However, the distant view is not visible from where people pause. However, the distant view is not visible from where people pause.	Spatial Organization: Sequence	