

Research on the Renovation and Design of Art Spaces Based on the Concept of Green Healing

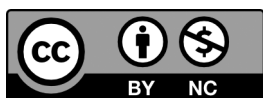
—Taking Wuhan East Lake Yu Art Space as an Example

Zhitong Chen

Hubei Institute of Fine Arts, Wuhan

Abstract: With the increasing physical and mental pressure on urban populations and the deepening of green development concepts, the integration of green healing and artistic spaces has become an important trend in the field of design. This paper takes the Yu Art Space in the second phase of East Lake, Wuhan, as the research object. Through field investigations and theoretical analysis, aiming at the problems existing in the site, such as spatial fragmentation, energy waste, non-environmentally friendly materials, insufficient plant integration, and lack of technology, a theoretical framework of “natural perception - psychological healing - aesthetic education and health preservation” is constructed. Based on this, renovation design strategies are systematically proposed from five dimensions: spatial layout, energy optimization, material application, plant integration, and technological empowerment. In practical application, the strategy is effectively transformed by reshaping the flowing space of “one heart with multiple cores”, introducing low-carbon technologies such as solar energy and ground source heat pumps, selecting environmentally friendly and innovative materials, constructing localized “five-senses” plant landscapes, and integrating intelligent interactive technologies. Research shows that the application of the green healing concept can significantly optimize the functions of art spaces and enhance visitors’ physical and mental experiences. This strategic system provides a practical path for the green transformation and quality improvement of similar spaces

Key words: Green healing; Art space; Space renovation; Wuhan East Lake; Five-senses experience



Copyright © 2025 by author (s) and SciScan Publishing Limited

This article is licensed under a [Creative Commons Attribution-NonCommercial 4.0 International License](https://creativecommons.org/licenses/by-nc/4.0/). <https://creativecommons.org/licenses/by-nc/4.0/>

China’s urbanization has developed rapidly, with the proportion of the urban population soaring from 26.21% in 1989 to 60.60% in 2019, fully demonstrating the great leap forward of China’s urbanization. However, with the rapid advancement of urbanization, the cramped urban living space and the sharp rise in the living pressure of urban residents have also led to the emergence of many psychological and physical problems. The “2024 National Mental Health Report” shows that the incidence of depressive emotions among urban residents reaches 23.6%, 8.2 percentage points higher than that of rural residents; 67.3% of urban respondents list “work/academic pressure” as the main concern, while the proportion of rural respondents is only 41.5%. “Getting close to nature and seeking healing” has become the core

Corresponding author: Zhitong Chen, Hubei Institute of Fine Arts.

Article Citation: Chen, Z., T. (2025). Research on the Renovation and Design of Art Spaces Based on the Concept of Green Healing—Taking Wuhan East Lake Yu Art Space as an Example. *Research on Art Design*, 1(1), 57-71.

demand of urban residents to relieve psychological pressure. The Fourth Plenary Session of the 19th Central Committee of the Communist Party of China put forward the strategic orientation of “promoting green development and promoting the harmonious coexistence of man and nature”, providing policy support for the transformation of space design. In this context, art spaces are upgrading from a single aesthetic function to a composite function of “ecology + healing + aesthetic education”. The in-depth integration of the two not only meets the mental health needs of urban residents but also conforms to the green development trend, and its coupling and practical value have become increasingly prominent(Cao Saixin, 2023).

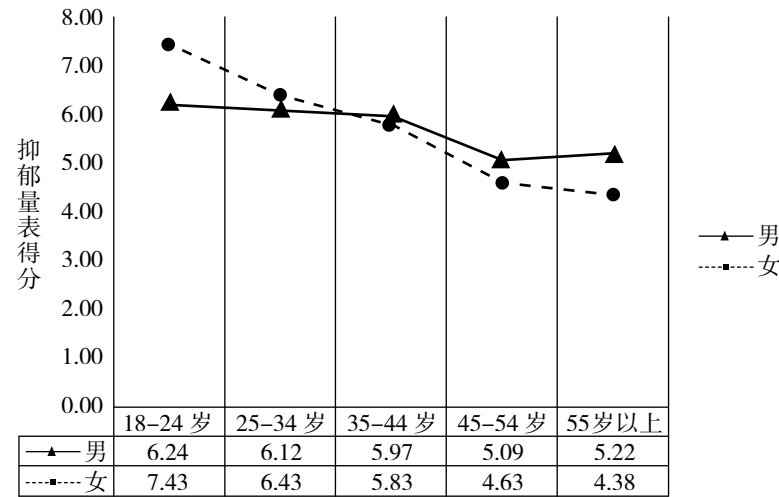


Figure 1 Depression levels of different genders in various age groups

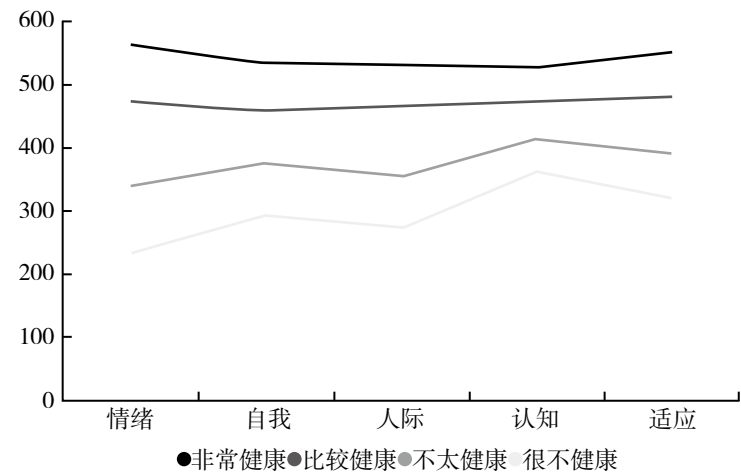


Figure 2 Self-assessed mental health levels in different dimensions

(The picture source: 2024 national mental health report)

The integration of the green healing concept and art spaces has unique value: art spaces provide a diversified expression carrier for healing and relieve emotions through aesthetic experience; green healing injects ecological connotations into art spaces and expands their spiritual service boundaries. The combination of the two achieves the dual effects of “aesthetic education nourishing the heart” and “natural healing”. This integration can not only optimize the ecological quality of space but also meet people’s deep pursuit of physical and mental health, providing a new path for the upgrading of urban public spaces.

The core goal of this research is to construct a complete strategic system for the renovation and design of art spaces under the green healing concept. Taking Wuhan East Lake Yu Art Space as a specific case, through systematically sorting out site problems and refining design key points, a implementable and replicable renovation plan is formed to provide theoretical support and practical reference for the ecological and healing upgrading of similar art spaces.

1 Theoretical Construction of Green Healing Concept and Art Spaces

1.1 Connotation and Development of the Green Healing Concept

The origin of the green healing concept can be traced back to human beings' inherent dependence on nature. In primitive society, human beings relied on the natural environment to obtain living resources and gradually discovered that natural elements such as sunlight, vegetation, and water flow can relieve physical and mental fatigue. After the Industrial Revolution, environmental degradation and population health problems became prominent, and this concept was gradually systematized: the research on restorative environments can be traced back to the 19th century. Olmsted found that the natural environment can regulate people's emotions, relieve pressure, and applied natural factors in garden design. Subsequently, in 1983, American psychologists Kaplan and Talbot proposed the concept of "restorative environment", defining it as an environment that can relieve people's mental fatigue and psychological pressure and has the effect of transforming emotions from negative to positive. Later, Kaplan conducted in-depth research on restorative environments, proposed the Attention Restoration Theory, and summarized the four major characteristics of restorative environments. In the same year, psychologist Ulrich proposed the Stress Reduction Theory, which holds that people under stress will have their pressure relieved when in a natural environment, thereby promoting the recovery of physical health(Yan Y S, 2024) .

In the contemporary context, the application of green healing in space design has expanded from medical scenarios (such as hospital gardens) to public spaces (such as urban parks and art venues), but there are still limitations: some designs only stay at the superficial form of "placing green plants", lacking in-depth consideration of "five-senses experience" and "ecological cycle"; at the same time, the problem of homogenization is prominent, failing to form differentiated designs combined with regional ecological and cultural characteristics(Liu Y, 2022).

1.2 Art Spaces as Carriers of Green Healing

The realization of the effectiveness of the green healing concept relies on physical space, and art spaces are the material basis for the implementation of its concept and perceptual experience. In the context of "harmonious coexistence between man and nature", green healing and art spaces form an interactive cycle system of "healing connotation - space carrier - value remodeling" through design integration, which can inject ecological and humanistic resilience into modern urban life.

Art spaces and green healing have a certain degree of natural compatibility: on the one hand, the core function of modern art spaces is to arouse spiritual resonance through aesthetic experience, while green healing aims to relieve psychological pressure through natural elements. Both take "human emotional needs" as the core and can form a synergistic effect of "aesthetics + healing"; on the other hand, the functions of art spaces are mostly based on display

functions such as art exhibitions and salons, lacking composite functions. The combination with the green healing concept provides a new paradigm for the innovative transformation of the functions of contemporary art spaces. Secondly, the openness and interactivity of art spaces can provide flexible carriers for green healing activities (such as plant-themed exhibitions and artistic creation with natural materials), breaking the functional limitations of traditional healing spaces(Wang Y C, 2023).

From the perspective of functional positioning, green healing art spaces have three core values: ecologically, through the use of renewable energy and the construction of plant landscapes, they reduce space energy consumption and improve the microenvironment; aesthetically, they combine natural elements with art exhibition to allow visitors to obtain aesthetic improvement in natural healing; socially, they provide a public field for people to interact and communicate, promoting community cohesion and cultural identity. For example, there are many universities around Wuhan East Lake, and green healing art spaces can become a dual platform for teachers and students to exchange art and relax physically and mentally(Li Y X, 2023).

2 Renovation and Design Strategies of Art Spaces Under the Green Healing Concept

The design of art spaces under the green healing concept has constructed a core design framework of “natural perception - psychological healing - aesthetic education and health preservation”. This framework aims to transform art spaces from a single display function into a comprehensive healing place that can stimulate sensory experience, relieve psychological pressure, and spread ecological aesthetics through multi-level and systematic design interventions. To achieve this goal, this research proposes the following specific design strategies from five core dimensions: spatial layout, energy optimization, material application, plant integration, and technological empowerment.

2.1 Spatial Layout: Constructing a “One Heart with Multiple Cores” Flowing Space System

With the goals of “breaking fragmentation, guiding experience, and functional integration”, a flowing space connecting multiple functional areas with a core hub is created, allowing visitors to perceive the healing atmosphere while wandering naturally.

Under the green healing orientation, the core hub is preferably located in the area with good lighting and landscape on the site to create a healing focus centered on “nature”. Landscape elements are configured in combination with regional ecological characteristics, and lightweight rest facilities are arranged around it. It not only guides the spatial movement line but also serves as a buffer node to meet people’s needs for staying and communicating, relieves the sense of oppression in regional transformation, and creates a relaxed atmosphere(Wang X F, 2017). The functional areas are divided into four modules around the hub. Traditional hard partition walls are abandoned, and connections are made through “flexible boundaries” such as green screens and translucent corridors to ensure functional independence without blocking visual connection; the exhibition walls adopt a modular design, and sufficient width is reserved for the movement line. Green plant elements are integrated throughout the process to make the sense of nature run through the visiting path and deeply strengthen the green healing experience.

2.2 Energy Optimization: Achieving Low-Carbon Cycle and Intelligent Management

Combined with the site's resource endowment, a low-carbon energy system of "renewable energy utilization + intelligent regulation" is constructed to reduce space energy consumption and create a stable and comfortable healing environment.

(1) Localized Application of Renewable Energy

The utilization of renewable energy should be based on the regional climate and geographical conditions to develop suitable types in a targeted manner. Solar energy collection and conversion facilities can be deployed in areas with sufficient light to replace part of the traditional energy; in areas with abundant water resources, a circulation system can be designed to collect and treat natural precipitation for non-drinking scenarios such as plant maintenance and site cleaning, reducing reliance on municipal resources. At the same time, it can be supplemented by geothermal energy, wind energy, etc., to form a multi-energy complementary system and improve the stability and sustainability of supply(Zhou Y M & Liu J Y, 2013).

(2) Plant-Led + Intelligent Assistance: Resource Cycle Management in Green Healing

Green plants are the core carrier of green healing spaces. They can not only relieve people's emotions through sensory experiences such as vision and smell, but also have natural ecological regulation functions, laying a solid foundation for resource cycle management. Through photosynthesis, plants continuously release oxygen, absorb carbon dioxide and harmful gases in the air, and simultaneously purify the indoor air; transpiration can naturally regulate the temperature and humidity of the space, creating a comfortable microclimate environment; at the same time, the interception effect of plant roots and soil can help rainwater infiltration and storage, promoting the natural cycle of water resources.

To maximize the ecological efficiency of plants, IoT sensors can be used to real-time monitor indoor temperature, humidity, air quality, and soil moisture. AI algorithms are used to accurately analyze resource needs and dynamically adjust the ventilation system and irrigation rhythm. For example, strengthen the ventilation cycle around plants when the air is dry, and supplement water on demand when the soil is short of water to avoid resource waste. This "plant-led, intelligent assistance" model not only adheres to the natural essence of green healing but also improves resource utilization efficiency through technological means, realizing the in-depth unity of healing functions and ecological benefits(Zhang L, 2015).

2.3 Material Application: Environmentally Friendly Materials and Recycling Mechanisms

In the process of art space design, the principle of "full-life-cycle environmental protection" is followed, and local, renewable, and recyclable materials are preferred to reduce carbon footprint, and at the same time, convey a natural sense of healing through material texture. At the same time, based on the functions of the art space, waste building materials are artistically transformed and recreated to convey emotions and beautify the environment(Zhang W L et al., 2009).

(1) Innovative Application of Local Materials

Tap into surrounding regional material resources to reduce transportation energy consumption and costs. For example, materials used for structural decoration, exhibition walls, and indoor furniture are mostly local wood and stone, which reduce the carbon footprint. The traces of time and tactile texture of the materials themselves are also a sustenance and expression of emotions. By touching and feeling, users can mobilize their senses to experience the natural texture of the materials to achieve a sense of healing.

(2) Artistic Regeneration of Old Materials

For the original waste materials of the site (such as stone materials and metal components of old buildings), new value is endowed through design transformation. Construction waste can be appropriately transformed to beautify facilities and recreate sculptural display works of art. It beautifies the environment and conveys the connotation of green design.

(3) Design of Recycling Mechanisms

Adopt a “modular and easy-to-disassemble” design to facilitate the subsequent recycling of materials. The exhibition walls are set with standard module splicing, and the connectors use reusable metal buckles. Later replacement only requires disassembling the modules instead of overall demolition; furniture adopts a tenon-mortise structure or detachable screws to avoid recycling difficulties caused by glue fixing

2.4 Plant Integration: Creating a “Five-Senses Healing” Plant Landscape

Following the principle of “right tree for the right place”, focusing on local plants of the site, through the five-senses design of vision, hearing, smell, touch, and taste, a three-dimensional plant healing system is created, taking into account ecological stability and healing functions.

(1) Scientific Configuration of Local Plants

In terms of the priority configuration of local plants, visually select plants suitable for the four seasons to form a rhythm of “scenery in all seasons”; auditorily use the sounds generated by the interaction between specific plants and natural elements to create natural soundscapes; olfactorily match aromatic plants in leisure and functional areas to improve spatial odor and assist healing; tactilely set up touch experience areas with instructions to guide touch perception; gustatorily divide participatory herb planting areas to allow visitors to participate in taste experience through simple operations and deepen the sense of healing.

(2) Integration Design of Plant Landscapes and Space

In the integration design of plants and space, “vertical greening + flower boxes” are used around the building to soften the hard appearance, and local arbor trees are used at the entrance to form a natural guide; multi-layer plant configuration is adopted on both sides of the road according to the movement line level to create a sense of rhythm; green plant partitions are used inside the exhibition area to divide the space and avoid sight obstruction, and small potted plants are used to decorate key areas to soften the exhibition atmosphere.

(3) Ecological Model of Plant Maintenance

The maintenance adopts a “low-intervention and sustainable” model, replacing chemical fertilizers with organic fertilizers, and pesticides with biological control, combined with an intelligent irrigation system to reduce resource waste and environmental impact.

2.5 Technological Empowerment: Constructing an Intelligent Interaction and Online Experience System

In terms of experience design, focusing on “offline intelligent interaction + online extended experience”, breaking the time and space limitations of traditional art spaces, and taking into account the interest and coverage of healing experiences(Lü Y J, 2010).

(1) Offline Intelligent Interaction Design

In terms of offline intelligent interaction design, the personalized navigation system is combined with immersive devices. First, in building a personalized navigation system, navigation tools suitable for multiple systems can be developed. After scanning the code to log in, visitors can obtain exclusive visiting routes according to interest tags, and AR tags are set next to the exhibits to assist in deepening cognition. Secondly, immersive devices are equipped with VR experience equipment in specific areas to create virtual natural healing scenes; interactive projections are installed in leisure areas to present dynamic effects with visitors' actions to enhance the sense of interaction. Intelligent service robots can also be equipped in the space to support voice interaction and navigation functions, and can recommend leisure areas and soothing content for anxious visitors through emotion perception.

(2) Online Extended Experience System

In terms of online extended experience, first, expand the user group in space simulation, build a 3D online exhibition hall to support panoramic roaming, and provide remote explanation services for people who cannot attend. Build an interactive communication platform on the online activity App, set up an exclusive sharing area for users to exchange experiences, regularly launch themed creation activities, and excellent works can be displayed in the offline exhibition hall to form a linkage closed loop. Online tools can also collect and improve data-based healing feedback in a timely manner, add an emotion recording function, and generate personal healing reports based on user data to provide support for the optimization of subsequent experiences and the functional activities of the venue.

3 Practice of Renovation and Design of Green Healing Art Spaces—Taking East Lake Yu Art Space as an Example

3.1 Analysis of Site Basic Conditions and Current Situation

East Lake Yu Art Space is located in the Gumeng Huitang area of the second phase of Wuhan East Lake. It was originally an abandoned administrative restaurant, and the site's basic conditions have both advantages and disadvantages. In terms of location, it is surrounded by universities such as Wuhan University, with a strong academic atmosphere, and is close to the East Lake Greenway, with good traffic accessibility. The negative oxygen ion concentration reaches 2000-3000 per cm^3 , with superior ecological endowment, forming a three-state pattern of "forest - water - architecture". In terms of spatial structure, the total area of the site is about 800 m^2 . The original building is divided into multiple small spaces by load-bearing walls. the external lake surface is separated by fish pond enclosures, the water system connectivity is poor, there are a lot of idle corners, and the space utilization rate is low. In terms of current use, the site has been abandoned for a long time, only retaining the basic building frame. Energy, materials, plant configuration, etc., have not met the needs of art space and healing functions, and no effective use scenarios and operation models have been formed.

区位分析.

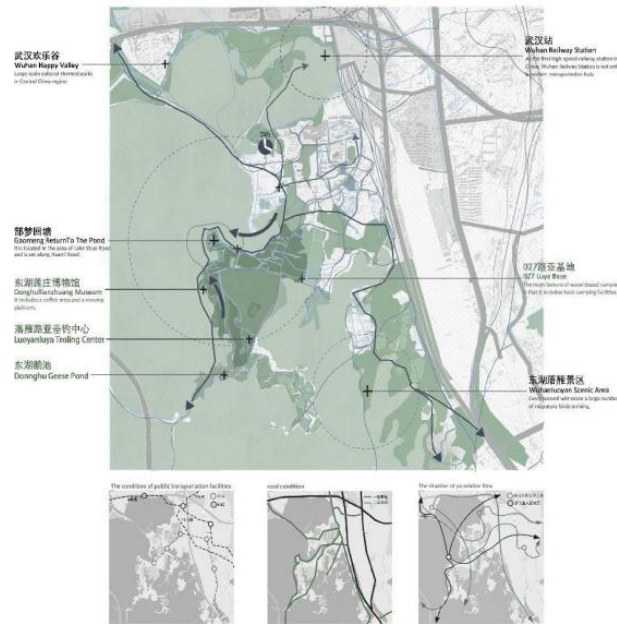


Figure 3 Site location analysis



Figure 4 Real scene around the site

(Image Source: Drawn by author, Photographed by the author)

3.2 Diagnosis of Existing Core Problems

(1) Spatial Fragmentation and Single Function

The site presents a decentralized and fragmented distribution. The building is disconnected from the surrounding greenway and lotus pond. The internal functions are limited to basic exhibition, lacking composite functions such as leisure, popular science, and interaction, which cannot meet the diverse needs of different groups of people.



Figure 5 Real scene around the site



Figure 6 Real scene around the site

(Image Source: Photographed by the author)

(2) High Energy Consumption and Unreasonable Utilization

Energy supply relies on the municipal power grid, and renewable energy, such as abundant solar energy and wind energy in Wuhan, is not utilized; the lighting system is mainly incandescent lamps and fluorescent lamps, with a low light energy conversion rate, and there is a waste phenomenon of “always-on lights”, without an intelligent energy management system.

(3) Non-Environmentally Friendly Materials and Serious Waste

The building facade adopts natural stone, which causes high transportation energy consumption and ecological damage; the glass curtain wall has poor thermal insulation, and the indoor paint contains formaldehyde; construction waste is not recycled and is directly landfilled, with a low material recycling rate.



Figure 7 Current situation of the facade of the old building



Figure 8 Current situation of the building's glass curtain wall

(Image Source: Photographed by the author)



Figure 9 Characteristic bridges around

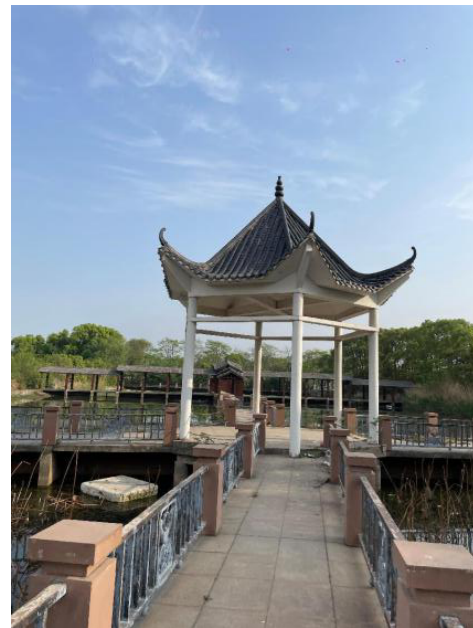


Figure 10 Abandoned mid-lake pavilion on the site

(Image Source: Photographed by the author)

(3) Weak Plant Integration and Insufficient Functions

The types of plants are single, mainly cedar and camphor trees, lacking healing plants such as aromatic and colorful ones; the plant landscape is disconnected from buildings and roads, with a simple community structure, and the ecological and healing functions have not been fully exerted.

(4) Lack of Technology and Single Experience

There are no intelligent navigation, security, and environmental monitoring systems in the site space, and there is a lack of interactive equipment such as VR/AR; no online display platform has been built, the communication and experience boundaries are limited, and it cannot meet the technological and immersive needs of modern people.

3.3 Application of Design Strategies and Spatial Transformation

(1) Explicit Level: Spatial Form and Material Expression

In terms of spatial form, the “one heart with multiple cores” flowing layout is adopted, with the atrium as the core,

connecting functional modules such as the core exhibition area, leisure area, and popular science area through corridors and green screens, blurring regional boundaries, and creating a non-fragmented movement line system. The exhibition walls adopt a modular design that can be freely combined to adapt to different exhibition needs, and sufficient flowing space is reserved to ensure the smoothness of the visit.



Figure 11 First-floor space explosion diagram

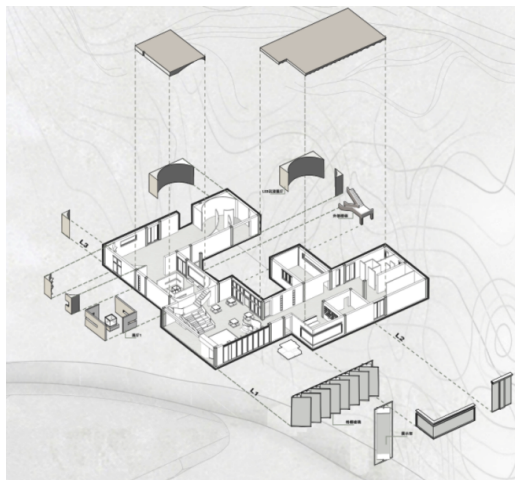


Figure 12 Second-floor space explosion diagram

(Image Source: Drawn by the author)

In terms of material expression, priority is given to local environmentally friendly and recycled materials: the walls adopt diatomite paint produced in Jiangxia District, which has the functions of absorbing formaldehyde (adsorption capacity 0.12mg/g) and adjusting humidity (40%~60% humidity adaptation), and can be mixed with natural colors such as light rice and light green; the floor is made of linen flooring produced in Huanggang, with linseed oil and rosin as raw materials (natural ingredients account for 90%), antibacterial rate up to 99%, and warm foot feel, avoiding the sense of alienation caused by cold and hard materials; the exhibition props and furniture adopt bamboo fiber composite materials and recycled wood to retain the natural texture; the facade is replaced with permeable bricks made of steel mill waste, and the old building materials are artistically transformed into decorative installations to realize resource circulation.



Figure 13 Partial material diagram

(Image Source: Drawn by the author)

The construction of the plant landscape follows the principle of “right tree for the right place”, configuring local plants such as cherry blossoms, lotus flowers, and ginkgo biloba to build a “four-season garden”; “vertical greening + flower boxes” are used around the building to soften the hard appearance, multi-layer plant configuration is adopted on both sides of the road, and green plant partitions are used inside the exhibition area to make natural elements run through the whole process.



Figure 14 Partial material diagram



Figure 15 Flower garden exhibition area

(Image Source: Drawn by the author)

(2) Implicit Level: Experience Design and Emotional Resonance

In the five-senses experience design, vision creates layers through the color changes of plants in the four seasons; hearing uses natural soundscapes generated by bamboo forests and water features; smell plants aromatic plants such as lavender and sweet-scented osmanthus in leisure areas; touch sets up touchable plant belts in the popular science area; taste arranges herb planting areas in the gardening experience area for visitors to make tea drinks and realize full-sensory healing.

In terms of interactive participation, scenes such as gardening workshops and plant maintenance pools are set up to encourage visitors to participate in planting and creation; AR tags are integrated into the exhibition, and scanning can view the 3D models of exhibits and creation backgrounds; interactive projections are installed in the corridors of the leisure area to present dynamic effects with visitors' actions and enhance fun.

景观节点分析.

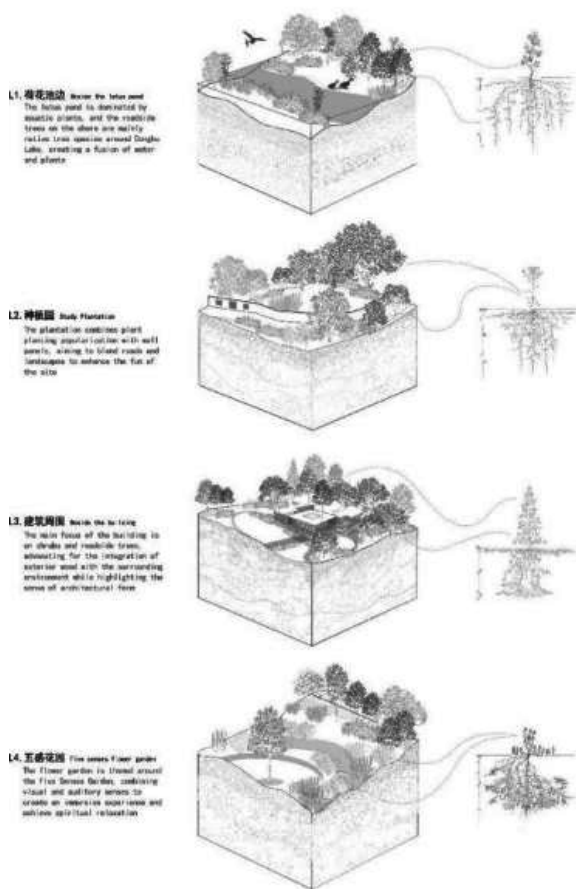


Figure 16 Flower garden exhibition area

五感植物配置示意图

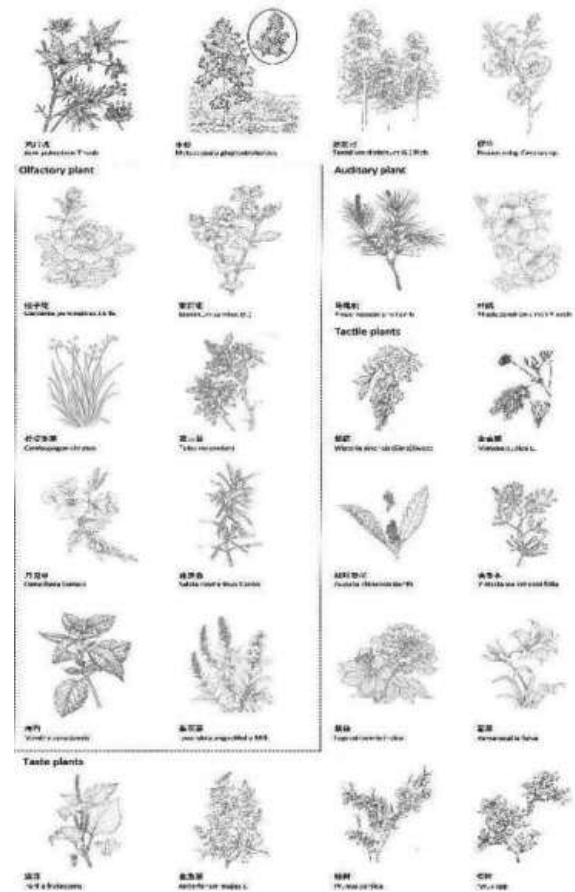


Figure 17 Flower garden exhibition area

(Image Source: Drawn by the author)

In the digital art scene, an intelligent technology exhibition hall is built, introducing VR experience equipment to construct a virtual scene of “East Lake natural healing”; a mobile APP and intelligent navigation robots are developed to provide personalized route recommendations and voice explanations; a 3D online exhibition hall is built to realize the linkage between offline and online and extend the experience boundary.



Figure 18 Technology-plant theme installation exhibition hall

(Image Source: Drawn by the author)

3.4 Renovation Effects and Value Embodiment

In terms of functional improvement, the space has been upgraded from a single exhibition to a composite carrier of “green + healing + popular science + aesthetic education + interaction”, covering multiple functions such as exhibitions, leisure, and research, meeting the needs of different groups such as young people, middle-aged and elderly people, and children. In terms of experience optimization, through flowing space, five-senses design, and technological empowerment, an immersive and personalized experience is created, breaking the static viewing mode of traditional art spaces and enhancing participation and emotional resonance.

In terms of the symbiosis of ecology and culture, the utilization rate of renewable energy has been improved, energy consumption has been reduced by 30%, the material recycling rate has been significantly increased, and the functions of plant landscapes in purifying air and regulating microclimate have been enhanced; at the same time, it integrates the regional culture and ecological characteristics of East Lake, responds to the context of East Lake through spatial form and plant configuration, enhances visitors' cultural identity and sense of belonging, and realizes the unity of ecological, social, and cultural benefits.



Figure 19 Café effect schematic diagram

(Image Source: Drawn by the author)

4 Conclusion

Research shows that the green healing concept has effectively expanded the functions of art spaces through five dimensions: space, energy, materials, plants, and technology, solved the core problems of East Lake Yu Art Space, improved visitors' experiences, and verified the feasibility of the "natural perception - psychological healing - aesthetic education and health preservation" framework. However, the research has limitations such as a single sample and insufficiently deepened technical details. In the future, it is necessary to strengthen the integration of interdisciplinary theories, promote the in-depth integration of technology and nature, extend the strategy to more spaces such as rural areas and communities, and improve the green healing art space system.

References

- [1] Cao S X. (2023). *Research on the physical and mental health restoration effects and influencing paths of urban greenway environments*. Sichuan Agricultural University.
- [2] Yan Y S. (2024). *Research on the landscape space design of Lingnan water town pastoral complex based on the restorative environment theory*. Guangzhou University.
- [3] Liu Y. (2022). From evidence-seeking to evidence-based: A discussion on an evidence-based built environment design method. *Decoration*, (3), 133-135.
- [4] Wang Y C. (2023). *Research on the design of community communication spaces from the perspective of art therapy*. Zhongyuan University of Technology.
- [5] Li Y X. (2023). The power of natural healing—Garden health preservation methods and key points of plant configuration. *Modern Horticulture*, 46(14), 117-120.
- [6] Wang X F. (2017). *Research on the design application of "healing environment" in hospital public spaces*. Southwest University.
- [7] Zhou Y M & Liu J Y. (2013). Age-appropriate design of outdoor environments in residential areas. *Architectural Journal*, (3), 60-64.
- [8] Zhang L. (2015). *Localized application of parametric architectural design*. Taiyuan University of Technology.
- [9] Zhang W L, Liu Z Z & Wang M J. (2009). Research progress and development trends of smart grids. *Power System Technology*, 33(13), 1-11.
- [10] Liu Y L, Cheng P Y & Li J. (2025). Landscape regeneration design of industrial heritage sites in southwest China based on geographic information. *International Journal of Information Technologies and Systems Approach*, 18(1).
- [11] Lü Y J. (2010). On Chinese green buildings. *Shanxi Architecture*, 36(4), 37-38.