

# The application of the five senses landscape in the park- taking Jingzhou Mingyue Park as an example

## Abstract

With the rapid development of economy and modern technology, people's spiritual demands have been further heightened. In addition, the pandemic has caused many changes in people's psychology, making them increasingly longing for natural environments and multi-sensory experiences. As a common landscape in people's lives, gardens play an important role in enriching people's lives and improving the living environment. This study focuses on Mingyue Gong Park and uses literature analysis to study the current status of multi-sensory design. It combines survey methods and observation methods to study the practical application of multi-sensory design in Mingyue Gong Park. Through the analysis of the current situation, existing problems are identified and improvement measures are proposed.

**Keywords:** sensory design, landscape design, multi-sensory experience, Mingyue Park

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## Introduction

The application of the five senses in landscaping can enhance people's multi-sensory experience in gardens, satisfy their spiritual needs, and utilize visual, auditory, olfactory, gustatory, and tactile senses to enhance the sensory experience of the landscape, enrich its levels and diversity, and create a more comfortable and beautiful landscape system. Currently, the concept of the five senses is being applied in many landscape designs. This article focuses on the specific analysis of sensory design in garden landscapes.

## Concepts related to sensory landscapes

**Five senses:** The human body has five sensory organs - the eyes, nose, tongue, ears, and skin - which generate the five senses of vision, smell, taste, hearing, and touch, respectively. These senses are connected to the visual nerves, olfactory cells, taste buds, auditory nerves, and nerve endings, respectively. The sensory organs transmit information to the brain to help individuals understand and perceive the external environment. Piaget cognitive psychology research results show that: human beings feel the outside world 60% from the visual, 20% from the auditory, 15% from the sense of touch, 3% from the sense of smell, 2% from the sense of taste, "multi-sensory" interlinked, mutual influence.<sup>1</sup> Furthermore, the five senses serve as important channels for communication with the outside world. They form the basis of human perception and allow individuals to comprehend and experience the external world, ultimately influencing their behavior.

## Five senses design analysis

**Visual design:** Visual design plays a crucial role in landscape architecture, as it allows people to perceive and experience dynamic and static scenes through their vision.<sup>2</sup> By incorporating elements such as points, lines, and surfaces, visual impact can be enhanced in the garden. Different color elements are used to enrich the landscape, attracting people's sensory experiences through visual intuitiveness. "Jasper makeup as high as a tree, ten thousand hanging green silk sash", "the garden cannot be closed in spring, a kind of apricot wall", with strong colors and seasonal plants combined with scattered and dense design to give people a bright sensory experience. The combination of vibrant colors and seasonal plants, along with a well-designed layout that balances density and spacing, provides a distinct sensory experience.

In medical research, Ulrich's study of patients recovering from cholecystectomy in a suburban Pennsylvania hospital found that patients with a view of trees out the window had fewer negative situational assessments from nurses, used less-strength pain relievers, and had fewer minor post-operative complications.<sup>3</sup> People can have the effect of promoting physical and mental health through vision, and the fulfillment of instinctive desires that arise unconsciously when they establish contact with plants, etc., through the five senses. Vision accounts for 75% to 87% of the effect of the environment on the five senses of the human body, and is the main part of the five senses.<sup>4</sup> Kang Ning<sup>5</sup> used brainwave changes as the evaluation index of psychological impact to objectively and quantitatively reflect the human body's emotional feelings and took the most basic paved plaza, inter-water, and plant community landscapes as the evaluation object to carry out a differential comparison of the changes in the dominant brainwave components, and the results showed that: plant community landscapes have a more positive effect on the human body's physical and mental relaxation state, and the effect of inter-water landscapes is similar to that of plant community landscapes, and the effect of plant community landscapes is the least; and the effect of plant community landscapes on men's emotional smoothness is more obvious than that of women. The results showed that the plant community landscape had a more positive effect on the human body's physical and mental relaxation state, the inter-water landscape and the plant community landscape had similar effects, and the paved plaza landscape had the smallest effect, and the plant community landscape had a more pronounced effect on the emotional stabilization of men than women.<sup>6</sup> In domestic research, scholars mainly focus on the study of visual scale and elements of visual experience. In terms of visual scale, landscape design can be divided into visual scale and non-visual scale based on visual sensory experience. Visual scale landscape design exhibits more artistic and emotional characteristics.<sup>7</sup>

**Auditory design:** Hearing is second only to the visual perception of the external environment of the senses, many landscapes are still stuck in the visual design of the main, while Liulaitchev from the perspective of perceptual psychology that "the landscape is a visual-centered perceptual process of cognition of the environment, including the visual process of the landscape and the action media process.<sup>8</sup> People's experience of landscape is not a single visual experience, but a multi-sensory experience. Different from western visual culture, China has always regarded hearing as an important

way to perceive the world, and various natural or artificial “sound landscapes” have already appeared in the gardens of Tang Dynasty.<sup>9</sup> The sound of the garden depicted in Tang poetry is divided into animal sounds: “Staying in the butterfly dance, from the delicate warbler cha-cha cries” (Du Fu, “walking alone on the riverside in search of fragrance”); silk and bamboo sounds: such as “Pavilion when the mountain color when the pillow, the building quiet xiao sound down the wind” (Zhu Qingyu, “the title of the emperor’s team of extra horse harnessed by the side of a team”); the sound of wind and rain; wind and rain, the sound of the forest pavilion. Forest Pavilion”); the sound of wind and rain: “furnace smoke and clouds, forest leaves and rain sound” (Huangfu Ran “with Pei Shaofu Anju Temple to the rain”); the sound of water: the sound of springs, “slanting vertical bridge to see the island potential, far away from the mountains and rocks for the sound of springs” (Wang Jian “Xue twenty pool pavilion”). Modern gardening is the continuation of traditional gardening techniques in the use of soundscape to analyze the degree of people’s love for auditory elements of the landscape combined with modern technology to increase multi-level soundscape. Soundscape (soundscape) is a concept put forward by the Canadian musician Schafer Murray (R. Murray Schafer) in 1960, different from the traditional sense of the physical level of understanding of the sound, Schafer believes that the sound is related to the people, and the same as the landscape, the sound is also a kind of landscape.<sup>10</sup> The earliest research on soundscape in China is Li Guoqi’s doctoral dissertation<sup>11</sup> “Soundscape Research and Sound Design” in 2005, which links the sound in life and the human environment, and researches the relationship between human-sound-environment, discusses the difference between soundscape science and traditional acoustic environment science and traditional landscape science, and makes up for the fact that traditional Landscaping only consider the inadequacy of visual landscape, established soundscape science as a basic discipline in the science of human habitat, and laid the aesthetic foundation of soundscape thought.<sup>2</sup>

**Olfactory design:** The sense of smell is the most sensitive human sensory experience, there are in people’s daily life environment, each environment has a kind of smell, research has found that olfactory memory is the most lasting memory, smell has the ability to guide people in the memory of the instantaneous time and space travel and orientation, through a certain smell will remind people of the corresponding scene or memory. For example, the smell of watermelon will make people think of summer, the smell of disinfectant will make people think of hospitals and generate fear, and the smell of baked sweet potatoes will make people remember their childhood with warmth in their hearts. Related research found that the use of essential oils or plant aroma and other related substances to stimulate, regulate the body’s related functions, can be treat, reduce, prevent disease, and alleviate uncomfortable symptoms, and this method is called aromatherapy,<sup>12</sup> now used in the design of many wellness gardens.

**Gustatory design:** At this stage, taste design is less applied in the landscape, although the surface of taste has little relationship with the landscape, there are inextricable links between the five senses, and each sense plays a role on the basis of the other senses, for example, people think that a certain kind of fruit is fresh and delicious because of its bright color. In landscape design, gardeners use a variety of ways to attract more visitors, and make everyone physically and mentally happy, feel relaxed, in the landscape to increase the edible plants, through the picking, and eating process to increase the interactivity and fun, but also enhance the characteristics of the landscape. Edible Landscape (Edible Landscape) can be traced back to the early gardens where animals were kept in captivity or plants were grown. Many Chinese and foreign traditional landscape gardens are both

production of edible function, fruits and vegetables, food, medicinal herbs are important planting objects. In the 1980s, landscape gardener Robert Kourik (Robert Kourik) proposed the concept of “Edible Landscape”, referring to the use of edible plants in garden design instead of ornamental garden plants, and to achieve certain landscape effects.<sup>13</sup> In special times, some edible plants can take on the heavy responsibility of healing, with the physiological relief of depression, antidepressant and antiseptic efficacy, and at the same time in the application of medicine, it has the stomach, diuretic, preventing anemia and moisturizing the skin.<sup>14</sup>

**Tactile design:** The sensation produced by skin tactile receptors in contact with mechanical stimuli is called haptics, which can be used to express comfort and affection and can keep us mentally stable. There is a close relationship between human beings’ ability to have extensive and delicate learning and the diversity and complexity of human tactile learning. Haptic landscape development began in the 1950s after the blind, since then in landscape design people have begun to pay attention to the application of haptic design, but the current application of haptic design has yet to be studied.

## Selection of the study area

Mingyue Park is located in Jingzhou City, Hubei Province, China, north of the ancient city wall of Jingzhou, south of the area of Jingsha Avenue, east of the intersection of Jingsha Avenue and Jingzhou Avenue, and west of the former red-brick fishery area of the city gate of Xiaobeimen. Mingyue Park planning park’s total area of 21.53 square hectares, of which the park green space area of 6.51 square hectares, and the water body area of 11.89 square hectares. There are many small bridges in the park, such as the Seekers Bridge, Mingyue Bridge, Wangyue Bridge, Longfeng Bridge, etc. Walking on the small bridges, shuttling on the river ponds, one step at a time, as if one were swimming in a painting, nature, humanities, interplay, harmony and unity. The construction of Mingyue Park follows the original historical appearance, tries to preserve the original ponds and historical features, and restores the original water system, featuring the water village green space, echoing the ancient city wall. The street lamps on the paths of the park have the golden phoenix as the design element, the lampshade with the chimes as the prototype, and a thousand garden lamps with unique characteristics of Chu culture, which dress up the whole park with ancient colors, and quite a charm of Jingchu. The national wetland park around the ancient city of Jingzhou will be passed on for a long time until the millennium, planning and fixing the modern and future mode of famous historical and cultural city + urban wetland, becoming the urban green heart of Jingzhou, the kidney of the ancient city and an important ecological space in the center of the city. This essay analyzes the application of the five senses design in the garden, combines it with the field investigation and analysis, and puts forward the optimization strategy for the park landscape and so on. (Figure 1)



Figure 1 General layout of Mingyue Park.



## The application of five senses design in the garden

According to the actual situation of the park, the park design elements such as terrain, water bodies, garden paths, plants, buildings and public design were investigated, and the application of each element in the five senses design was analyzed.

**Application of five senses design in the terrain:** The application of visual landscape in the terrain: Mingyue Park is a wetland park with great Jingchu book characteristics, with an ecological barge as the main form, natural undulation of the road, and laying the lawn, flowers and trees in it. There are viewing bridges, trestles and other undulating spaces in the park, and the tour route is mainly centered around the city wall and the river, with a wider line of sight. (Figure 2)



Figure 2 Aerial view of Mingyue Park from east to west.

**Application of five senses landscape in the road:** The application of visual landscape in the road: the road is mainly paved with bricks, different stone combinations, convenient for the crowd to walk, and also has the function of fire prevention, along the line of stone masonry road and the ancient city wall echo, so that people seem to be in the ancient times to attract people to think. Forest trails using cobblestone broken puzzle delicate and beautiful waterfront walkway and brick paving route is basically parallel to the water surface (figure 3), visit the line of sight with the water parallel, leisure area walkway using colorful plastic track to give people visual impact, stimulate the human sports cells.



Figure 3 A wooden plank road.

Tactile landscape in the application of the road: the park's road pavement uses bricks, wood, cement, plastic, lawn combination of different paving to the soles of the feet of different tactile sensations, thus triggering different psychological changes, some of the stone

paving on the feet also has a massage effect. In addition, the design of the park also takes into account the disabled, and there is a whole set of barrier-free routes in the park (figure 4).



Figure 4 Floor plan nodes.

**Application of five senses landscape in water body:** The application of visual landscape in water landscape: In recent years, the environment of Mingyue Wetland Park has been improved continuously, and many wild birds are inhabiting here, and many aquatic plants (figure 5) such as reeds and lotus leaves are planted in the water, and many kinds of water-supporting plants, floating plants and submerged plants are matched to give people multi-level aquatic plant landscape. In addition, the reflection of plants along the shoreline and the play facilities on the water also enrich the water landscape and enhance the visitors' experience. The application of tactile landscape in water features: the water features of Mingyue Park are designed with hydrophilic platforms and hydrophilic slopes (figure 6) and there are fewer walking steps, so the hydrophilicity is not strong.



Figure 5 Aquatic plant.



Figure 6 Shoreline paving.

The application of auditory landscape in the early water features: Mingyue Park is mostly static water, when the boat passes by or the water animals swim will sound (figure 7), moving water such as fountains, waterfalls, waterfalls, streams less design, no diverse auditory enjoyment.



Figure 7 Boats on the water.

The application of olfactory landscape in the crystal: the park water surface is larger, the water quality is clearer, there are a lot of aquatic plants planted in the water, you can smell the plant fragrance after flowering, the water smells fresher (figure 8).

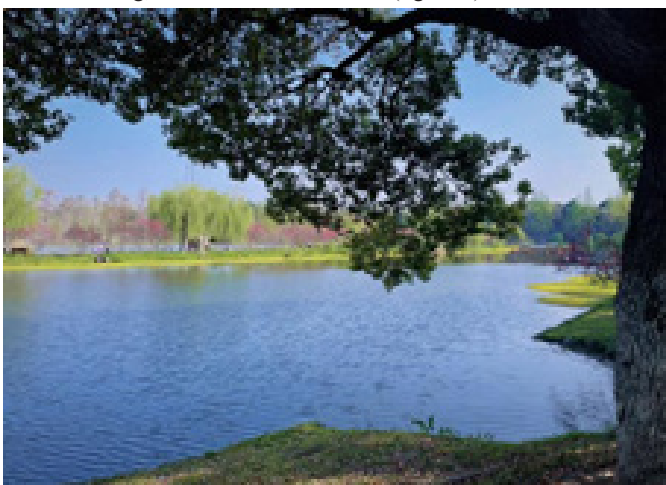


Figure 8 Clear water quality.

**Application of five senses landscape in plants:** The application of visual landscape in plants: the greening planting project plants 80 varieties of large and small trees, totaling about 10,000 plants (figure 9), the main varieties of yew, cherry, cherry, lotus, ginkgo, magnolia and so on. The greening project planted 52 varieties of color blocks, a total of 64,712 square meters. Planted azalea, iris, large-flowered gardenia, golden-leaved privet, thornless boneset, reeds, purple iris, southern spring and many other varieties. Seasonally changing vegetation is planted along the roadside, presenting different landscapes as the seasons change. The vegetation in the garden is staggered, before and after the cover, and color changes, such as the use of ginkgo and chicken maple, maple to create “stop sitting love maple forest evening, frost leaves red than February flowers” in the maple forest dyed rendering of autumn, the garden color overall experience is better. (Table 1)

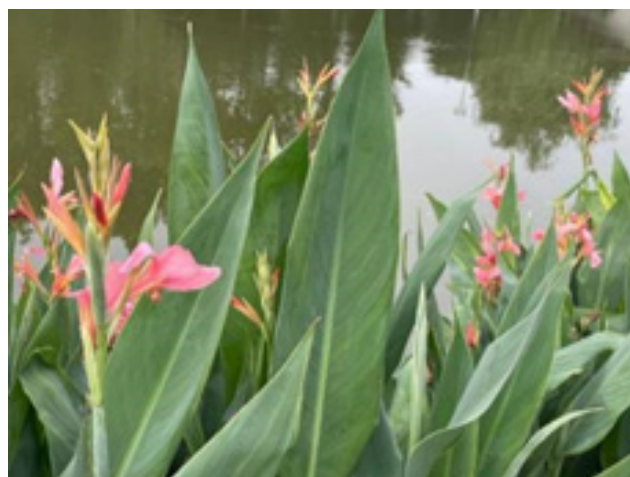


Figure 9 Visual plant.

Table 1 Composition of common plant families

Composition of common plant families	
Rosaceae	Fabaceae
Poaceae	Cupressaceae
Oleaceae	Magnoliaceae
Amoryllidaceae	Sapindaceae
Hamamelidaceae	Apocynaceae
Ulmaceae	Araliaceae
Lythraceae	Salicaceae
Berberidaceae	Asteraceae
Rutaceae	Asparagaceae
Iridaceae	Lauraceae
Malvaceae	Areaceae
Theaceae	Pinaceae
Cannaceae	Nymphaeaceae
Platanaceae	Moraceae
Ginkgoaceae	Celastraceae

Application of taste landscape in plants: At present, edible plants planted in the park include orange (figure 10), grapefruit, pomegranate, loquat, which have certain interactions when visitors view the landscape, but it is still to be improved.



Figure 10 Tactile plant.

The application of olfactory landscape in plants: the smell will make people produce a certain associative response, can use the fragrance of plants to create a certain mood, “the lotus wind to send aroma, bamboo dew drops clear sound” to create a fresh and elegant summer (figure 11), “not a cold bone, that the plum blossom pungent



fragrance? “ is the winter that comes to the face of the clear cold Linglie. In the garden of fragrant flower plants are gardenia, cherry blossom, peach blossom, spring, golden chrysanthemum, etc., the seasonal distribution of uniformity, the plant’s fruity aroma can also attract visitors, the experience effect is better.



Figure 11 Olfactory plan.

The application of tactile landscape in plants: the texture of plants will give people different feelings psychologically, and also give people different tactile experiences. The texture of plants and their branches, leaves, flowers and fruits, tree shapes related to a large number of plant species in Mingyue Park to give people a different feeling, such as leathery magnolia, Helianthus annuus, leaves have pilose chicken claw maple, the leaf shape of the peculiar tortoise back bamboo, leaf blade slender willow, bamboo leaves to give people a variety of enjoyment (figure 12).

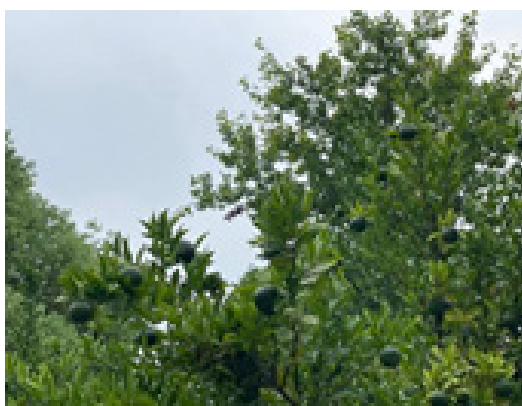


Figure 12 Taste plant.

The application of auditory landscape in plants: through the wind blowing leaves will emit different sounds to form an auditory landscape, such as the wind blowing bamboo leaves, rain hitting bananas, as well as the sound of falling leaves, etc. in the Mingyue Park embodiment of the more obvious. In addition, the plants also attract birds and insects to rustle in the bushes.

The application of visual landscape in vignettes: the park entrance guide board, exhibition racks are brightly colored and shaped with city wall elements, and traditional Chinese patterns, and there is a sculpture of Qu Yuan in the center of the square with a strong Chu culture atmosphere. There are also symbols of Chu culture elements on the railings, seats and garbage cans in the park.

The application of auditory landscape in vignettes (figure 13): the application of auditory landscape in vignettes is not much, mainly embodied in the sound, the overall auditory embodiment of the garden in the bugs and birds, children’s frolicking sound, singing and dancing, cars, boats, running water, talking, hawking and so on.

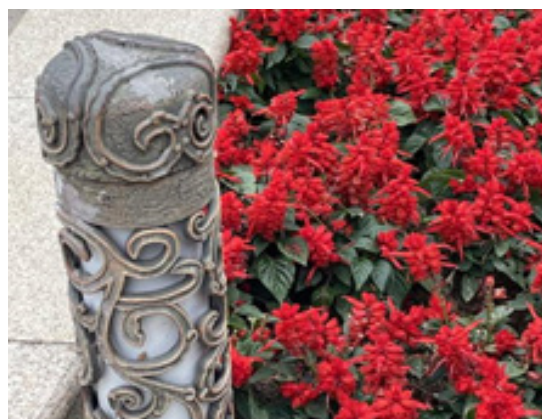


Figure 13 Landscape light.

Tactile landscape in the application of vignettes (figure 14): the garden sculpture, display, architectural vignettes of numerous, diverse materials, combined with three-dimensional sculpture to show the characteristics of the garden.



Figure 14 Railing with traditional motifs.

### Optimization strategy of five senses design in Mingyue Park

After the survey and the five senses of design-related theory, the overall experience of Mingyue Park is good, but there are still some aspects that can be improved, summarized as follows:

- (1) Visually, Mingyue Park is rich in plant collocation, highlighting the variety of color collocation in aquatic plants, tree and shrub color changes are more bland, can be enhanced in plant form creation and collocation, so that there are scenic views of the four seasons, the combination of natural form and artificial creation, to improve the visual enjoyment. Grasp the proportion of the garden elements, as far as possible to play the landscape visual effect of plants and water bodies, increase the type of water features, such as the design of waterfalls and water-friendly landscapes to enrich the visual experience at the same time to give people more layers of sound landscape. Around the stack can be seasonally set up cold fog facilities, the formation of fairyland valley landscape, people pass by the water features, water fog not only visually brings a dreamy feeling, but also allows people to feel the cool touch of water fog, in addition to the water fog can adsorb dust, purify the air, produce negative oxygen ions, and plants and soil after the role of the production of a fresh natural breath, which is also a sense of smell experience.

- (2) Mingyue Park is adjacent to Jingzhou Avenue, there are many people and vehicles coming and going, the park is full of vendors and amusement facilities, and there are various natural and other sounds, and the auditory landscape design generally adopts the three methods of positive design, negative design and zero design: the positive design that is, adding new sound elements in the original sound landscape; the negative design that is, removing the sound elements in the auditory landscape that are not coordinated with the environment and are not necessary.<sup>13</sup> The park should deal with the negative sound accordingly, planting more plants that can attract insects and birds as well as those that can produce sound with the help of wind to create a comfortable sound environment. Provide food and suitable nesting conditions for animals such as birds to increase the audiovisual effect of the animal landscape.
- (3) The entire park of aromatic plants to give people an intuitive feeling is not obvious, later can set up a special of aromatic plant area, to avoid the confusion of fragrance, plants with a reasonable grasp of the flowering season of aromatic plants, aromatic concentration, etc., in the corresponding places to plant the corresponding plants, such as entrances, nodes planted in a strong aroma of the plant to attract tourists. You can also use the taste of local specialty food to increase local memories with the help of vendors, and deal with unpleasant smells in the park in a timely manner.
- (4) Tactile, water projects in the park to increase people's water activities, can further understand people's needs for hydrophilic landscapes, increase Tingbu, fountains and other facilities. On the ground pavement, there are certain material changes to give people a different time and space experience, but many pavement articulation is not natural, richness and interest can be improved, part of the ground pavement aging there are security risks. In the structures, vignettes and ground pavement material temperature, touch choice on the consideration of the feelings brought to the visitors.
- (5) Sense of taste on the park's existing edible plants, with a certain degree of interest, visitors have a certain sense of participation in the park can continue to enhance the planting of species and characteristics of the garden, combined with edible landscapes to enrich the plants in the garden, and to provide visitors with scientific information on edible plants, increasing the taste experience of visitors. At the same time the visual sense of taste also has a certain impact, in the design of the two will be combined to create a richer taste environment.

## Summary and conclusion

With the development of landscape gardening and the improvement of the economic level at this stage, people are pursuing a higher quality of the surrounding environment. In the past, most of the focus of the park design was on the visual and ignored other senses, which greatly reduced the visitor's sense of experience. This paper is based on the

current status of the five senses design research and the investigation of Mingyue Park found that some of the problems, and to provide some optimization measures, in landscape design and functionality should be more combined with the current design trends, people-oriented, from the multi-sensory considerations of people's needs to provide a better sensory experience, combined with the five senses of the design principle to play the role of the landscape and plants, to create a better environment for people.

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## Conflicts of interest

All authors declare that there is no conflicts of interest.

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