

Research on the Design Strategy of Ageing-friendly Recreational Landscape Based on the Five Senses Experience

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Received: 21 August 2022; **Accepted:** 15 September 2022; **Published:** 12 October 2022

Abstract:

The global elderly population is increasing year by year and the issue of ageing for the elderly has become a hot topic of concern in all walks of life. Researchers in the direction of landscaping have confirmed that green spaces affect the life and health of the elderly. The retired elderly are more dependent on the outdoor landscape environment, which is the main place for socialising, fitness and recreation. Age-appropriate landscapes for the elderly are of relevance. Accordingly, the subject proposes age-appropriate landscape design strategies for the elderly in five aspects: visual, auditory, tactile, olfactory and taste, after analysing three aspects: physical health, mental health and social health. It provides a reference for the design of age-appropriate recreational landscape.

Keywords:

Five Senses of Landscape, Ageing Appropriateness, Recreational Landscape

1. Introduction

Population ageing is considered to be a major worldwide social issue in the 21st century. According to the latest projections by the United Nations, the proportion of the global population aged 65 and above is expected to rise from 10% in 2022 to 16% in 2050. How to deal with the series of problems brought about by ageing is the focus of researchers in various disciplines. [1,2] A great deal of research has been done in the direction of landscaping, which has shown that residential green spaces affect the microbial diversity of the indoor environment and influence the health of life. The residential green space is the outdoor environment where the elderly have direct contact and stay the longest. [3,4] Scientific evidence shows that green space is effective in alleviating mental illness, and that green space is about the health of human life. [5] An increase in the amount of green in residential areas is negatively correlated with mortality,[6] and green and blue spaces in streets can prevent depression in the elderly. Therefore, age-appropriate recreational landscape design for the elderly is crucial for the ageing population.

2. Application of the Five Senses Theory in Landscape Design

2.1. The Five Senses and the Five Senses Experience

[7,10] Professor Junhua Zhang points out that the original term “five senses” comes from the five roots in Buddhism, namely “eye root, ear root, nose root, tongue root and body root”. The five roots here are the five sensory organs of the eyes, ears, tongue, nose and skin. They can be divided into two stages: ‘sensation’ and ‘perception’, or the five senses in the narrow and broad sense. In the narrow sense, it refers to the visual, auditory, olfactory, gustatory and tactile sensations of the five basic senses - the eyes, ears, nose, tongue and skin - on the surrounding environment; in the broader sense, it refers to the transfer of information received by the five sensory organs to the brain for organisation, recognition and processing, rising to the level of consciousness to form a higher level of awareness of the environment. This perception is an integrated experience, understanding and emotional engagement with the environment.

Experience is an experience or feeling. According to the understanding of psychology, experience is a series of sensation, perception, thinking, imagination and memory of things by our multiple senses of sight, hearing, touch, smell and taste, which eventually leaves a deep impression in our mind and the things experienced will be more real. From the perspective of sensory experience, landscape can be divided into visual landscape, auditory landscape, tactile landscape, olfactory landscape and taste landscape, which is also known as five-sensory landscape, also known as multi-sensory landscape.

People learn about something by first observing it with their eyes and forming an initial impression, and then they will choose the corresponding senses to experience things and form different feelings according to the different situations of things. [8] In his study of the general sense of art and design, Mr. Zhongshu Qian pointed out: “In everyday experience, sight, hearing, smell, touch, and taste can often communicate or traffic with each other, and the fields of the eye, ear, tongue, nose, and body of each sense can be indiscriminate. Colours can seem to have a temperature, sounds can seem to have an image, warmth and cold can seem to have a weight, smells can seem to have a sharp edge.” [9] In elaborating on his understanding of design, the famous Japanese designer Kenya Hara said: “The human being is not only a sensoryist combination of receiving organs, but also a sensitive memory regenerating device, capable of reproducing various images in the mind according to memory”. The various images that appear in the human body are a grand picture of several sensory stimuli and the interweaving of one’s regenerative memories at the same time.

2.2. The Application of the Five Senses Experience in Landscape Design

People’s feelings about the landscape are comprehensive and three-dimensional, and the five senses are the best interpretation of the landscape experience. At present, there are relatively few special design practice projects based on the five senses design theory, and most of the projects are designed with visual feelings as the starting point, lacking a comprehensive design that can better interpret the five senses experience. The design can be enriched by the form, space, colour and light and shadow of the landscape elements. The sound of the wind blowing through the trees, the sound of water, the sound of sound and other natural and artificial sounds can be used to increase the experience of the different functional areas of the space. Aromatic

plants in the landscape environment are a major component of the olfactory environment and can be used to stimulate the sense of smell to increase the pleasure of the space experience. The design of taste is usually based on plant fruits, herbs that can be tasted, vegetables and so on. From the perspective of safety, hygiene and health, the taste experience can be set up as a separate experience area with certain management interventions to enrich the social activities of the elderly. The sense of touch is mainly experienced through skin and body contact. For example, the microclimate environment will produce moderate stimulation to the skin, and landscape seating, turf and ground coverings are usually the elements with more physical contact. The tactile experience can be met through the specific design of the corresponding elements.

3. Five Senses Experience Design for Recreational Landscape Based on Health Analysis of the Elderly

3.1. Analysis of the Health State of the Elderly

[11] Health is not only the absence of diseases and disorders, but health is a state in which all three aspects, physiological, psychological and social, are good. Physiological health mainly refers to the ability of healthy body organs to maintain a good physiological state by protecting or adapting to changes in the outside world. Mental health is usually considered to be a matter of mental or well-being. Social health mainly refers to the ability to lead a life independently or to participate in activities of a social nature, and to be able to integrate into society and establish good social relationships with others. The main social influences related to health are income level, literacy, couple relationship, marital status, social interaction, social security system, etc. Retirement is accompanied by various physical and psychological illnesses, ageing of body organs and physiological functions, and a gradual weakening of the ability to adapt and perceive the environment in which they live. Common diseases of the elderly are shown in Table 1.

Table 1. Common diseases of the elderly.

Health Status	Common Health Problems
Physiological Health	Reduced vision, reduced hearing, loss of smell and taste, reduced skin sensitivity, reduced intelligence, hypertension, hyperlipidemia, hyperglycaemia, heart disease, coronary heart disease, stroke, diabetes, cervical spondylosis, chronic back and leg pain, chronic bronchitis, etc.
Mental Health	Depression, anxiety, schizophrenia, Alzheimer's disease, insomnia, mental abnormalities associated with cerebrovascular disease, etc.

3.2. Health Benefits of Natural Landscapes

Research has shown that outdoor natural landscapes can be effective in improving the physical, psychological and social health of older people. Researchers have explored the health benefits of natural landscapes for people from a physical, psychological and social health perspective, as shown in Table 2.

Table 2. Health benefits of natural landscapes.

Health Status	Specific elements of health improvement
Physiological Health	Reduces blood pressure, relieves pain, facilitates recovery from cardiovascular disease, reduces obesity, improves sleep, strengthens the immune system, etc.
Mental Health	Improves mood, reduces anxiety, relieves depression, enhances self-identity, etc.

Social Health	Promote social interaction, foster social cohesion, reduce crime and improve neighbourhood relations
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3.3. Analysis of the Current Situation of Ageing-friendly Community Environment in China

In China, in the home based and community based elderly care service system, the community is the most important living space carrier for the elderly. Older people move more frequently and stay longer in the community environment, so the ageing-appropriate community environment is of great significance to the health benefits of older people. In the current planning and design standards for residential areas in China, there are no systematic and clear requirements for the ageing-friendly design of the community environment. According to the fourth sample survey on the living conditions of the elderly in China's urban and rural areas, the satisfaction of the elderly with various items in the community environment is generally low, with 45.17% satisfaction with environmental greening, 30.47% satisfaction with fitness activity areas and only 40.9% satisfaction with barrier-free facilities, as shown in Figure 1 and Figure 2.

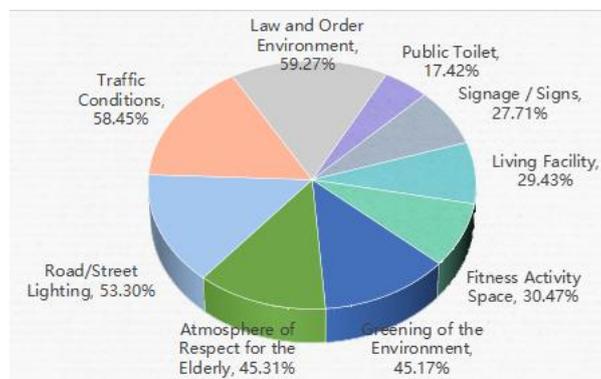


Figure 1. Older people's satisfaction with various community environments (Source: Fourth Sample Survey on the Living Conditions of Older People in Urban and Rural China).

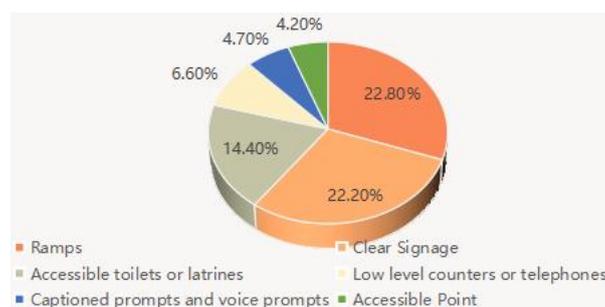


Figure 2. The configuration of barrier-free facilities in the community (Source: Fourth Sample Survey on the Living Conditions of the Elderly in Urban and Rural China).

3.3. Ageing-friendly Landscape Design Strategies for the Five Senses Experience

The problem of inadequate ageing in the community is of two kinds: one is that the corresponding outdoor landscape packages have not yet been designed, and the other is that the existing landscape environment cannot meet the needs of the elderly. The following is how to create an ageing-friendly recreation landscape design from the perspective of the five senses of the landscape, in order to cope with the problem of inadequate ageing of the community landscape environment and provide ideas for the

improvement of the landscape environment and environmental reconstruction in the later stage.

3.3.1. Visual Landscape

The landscape environment can give the most direct experience is the visual experience, landscape space level in the greenery, small pieces, paving and other elements can be directly in the eyes. The visual beauty of the landscape should take into full consideration the clever application of the laws of formal beauty in the composition of landscape elements, and the design should pay attention to the application of proportion, rhythm, symmetry and balance and other formal beauty. The design of age-appropriate landscapes should take full account of this generation's preferences and perceptions of beauty, and pay attention to the combination and collision of classical and modern. In addition to the formal beauty of the landscape to stimulate the vision, the dynamic landscape and the change of light and shadow of the landscape also have a greater impact on the vision. The dynamic activity of the landscape makes the space interesting, and the change of light and shadow can enrich the layers of the space and effectively stimulate the visual feeling.

3.3.2. Aural Landscape

The sound of wind, water, birdsong and other natural sounds can penetrate deep into the heart and have a certain healing effect on people's mood, but if the sound is too loud it becomes noise, the recreation landscape design should be based on different environmental conditions to choose the appropriate plant volume, plant density, pay attention to the location of the water landscape design and the choice of fountain height. The design should be based on the living environment of the elderly to comprehensively assess the control of the size of the sound produced by the landscape components, fully consider the natural sound of the sense of movement, in stages, in levels of the design. Studies have shown that music has a certain healing effect on people's health, landscape design can be appropriately set up according to the functional places of elderly people's activities, effectively stimulating the sense of hearing to achieve the purpose of health and wellness.

3.3.3. Olfactory Landscape

As odours may produce allergic reactions to some people, the design avoids the discomfort of different people to odours and often planting flowers and plants for the improvement of odours in spatial areas. The landscape design should pay attention to the function of taste experience and its wellness, and may consider a space design that integrates indoor and outdoor to meet the uniqueness of odour in the experience and avoid the fusion of odours. Fun activities for odour identification can be added to the design, focusing on the participation of older people. Studies have shown that the scent of lilacs can relieve toothache, the scent of geraniums can relax bronchial smooth muscle, and plant scents can have an impact on human thinking and behaviour. In the design of recreational landscapes, the choice of plants can be considered in terms of physical well-being, air purification, insect repellent and sterilisation, while plants also complement and improve the four senses of sight, hearing, smell and touch.

3.3.4. Tactile Landscapes

Tactile experience is primarily an experience that arises during contact with different materials and landscape components. In the early design, the main focus was

on the tactile design of accessible blind paths, targeting the tactile experience of the visually impaired. The wellness function of fitness equipment should be considered in the age-appropriate landscape design for recreation and rehabilitation. For example, in the design of seats and fitness equipment, the idea of Chinese medicine physiotherapy is added to increase the tactile sensation of the blood position to meet the health and wellness needs of the elderly. In addition to the functional improvement of supporting facilities in the recreation landscape, consideration should be given to the tactile sensation of hard paving to meet the foot massage during fitness walks and to increase the number of art pieces and water features that can interact with the elderly. The tactile experience of hands and feet, limbs and skin should be fully considered in the creation of the whole landscape environment, so as to increase the pleasure of the elderly to experience the landscape space and effectively enrich the experience of outdoor activities for the elderly.

3.3.5. Taste Landscape

There is a relative lack of special design for the sense of taste in landscape design. Ways to increase the taste experience in landscape design can be herbs, plants, water, fruits, etc. The design can filter out beneficial and tasty plants and landscapes and integrate them into the recreational landscape environment through clever design to add a different sense of experience. Taste experience places can be designed separately in the landscape space to increase social opportunities, providing a social platform for the elderly and indirectly improving their health.

4. Conclusions

As an important place for the health and well-being of the elderly, the landscape environment can effectively alleviate the social problems brought about by ageing. The ageing-friendly landscape design of the five senses experience provides an optimisation idea for the existing landscape that is not suitable for the elderly. The design should be based on a comprehensive assessment of the physical functions of the elderly and the environment of the area in which they live. Although the five senses experience landscape design mentioned in the article can improve the shortcomings of the existing landscape, the shortcoming is the lack of comprehensive scientific data to support it. Before the specific design is implemented, it should also be based on spatial simulation experiments as far as possible, combining VR experiences with medical test data to provide a scientific basis for the implementation of an age-appropriate spatial environment. At present, due to the lack of experimental equipment, targeted experiments cannot be carried out. Later on, the project will be deepened in the form of research questionnaires to provide data support for the design of age-appropriate recreational landscapes.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

This work was supported by the 2022 Research Project on Philosophy and Social Sciences in Universities in Jiangsu Province, grant number 2022SJYB1850.

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