APPLICATION OF PSYCHOLOGICAL ELEMENTS IN LANDSCAPE DESIGN OF PUBLIC GARDENS

Xueling Zhang, Shuhua Li*

Abstract

The psychological needs of residents are key issues in the landscape design of public gardens. This paper aims to optimize the application of psychological elements in the landscape design of public gardens. Based on theories on environmental psychology and methods for garden design, the author conducted a questionnaire survey on the opinions and needs of residents in a district of Suzhou, eastern China's Jiangsu Province. From the perspective of psychology, the influencing factors of residents' sense of safety and comfort for the landscape of public gardens were identified, and several countermeasures were put forward to improve the landscape design of public gardens. The results show that most residents are concerned with the safety of children's entertainment facilities in public areas; the common defects with the landscape of public gardens include poor sense of participation, safety and territory; landscape design should satisfy the psychological needs of residents, making their lives more harmonious; landscape designers should focus on increasing the attractiveness of the landscape of public gardens, giving overall consideration to the ornamental, living, and recreational features of the landscape. This research lays a theoretical basis for improving the landscape design of public gardens and the living quality of residents.

Key words: Psychological Elements, Public Gardens, Landscape Design, Questionnaire Survey.

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INTRODUCTION

The Internet is a double-edged sword. It reduces the cost of information exchange but alienates the neighbors; it facilitates shopping and entertainment but results in sub-health status of people (Xiao, Deng, Liang et al., 2015; Coulson, 2014; Devine-Wright & Batel, 2013). Therefore, how to make use of the landscape design of public gardens and make people leave their houses to enjoy life in garden landscapes and release themselves is an important topic of urban landscape design (Finkel, Eastwick, Karney et al., 2012; Miho, Masayuki, Harumi et al., 2015).

With the improvement of people's living standards, they are more demanding in the quality of life, and the demand for living has evolved from a functional level to the emotional and spiritual level (Fan, Yi, & Jun, 2011, Qin, Shen, Shao et al, 2013, Yan, 2010). However, the design concept of designers still stays at a functional level, that is, to satisfy the functional requirements of the residents; therefore, although the planning and design of the landscape of public gardens is good enough, the relation between neighbors has not been improved, and the satisfaction of residents for the landscape design of public areas is declining (Polat & Akay, 2015; Bringslimark, 2007). Residents are increasingly aware of the importance of health and leisure, and they are more demanding in space. The design of public landscape should be people-oriented and fully consider the residents' psychological needs, so as to create safe and comfortable public spaces.
(Young, Sanchez, & Wilton, 2013; Kemperman & Timmermans, 2008).

According to above-mentioned situations, this paper studies the garden landscape of a residential community in Xiangcheng District, Suzhou City, Jiangsu Province, China, and adopts questionnaire survey to collect data from the residents; then it calculates the data, finds out problems existing in the landscape of the community, and analyzes and evaluates from the perspective of the psychological needs of residents; moreover, it also proposes suggestions for improving the landscape design of the public gardens. Based on individual psychology, this paper provides a theoretical basis for the development and optimization of the landscape design of public gardens (Li, Cheng, & Yuan, 2018).

ENVIRONMENTAL PSYCHOLOGY AND LANDSCAPE DESIGN OF PUBLIC GARDENS

Theory of environmental psychology

Environmental psychology is the study of the relationship between individual behavior, psychology, and environment; The environment here includes the physical environment and the social environment, and the environmental psychology means that people are subject to the influence of physical environment, such as noise, air, temperature, space, and crowding, etc. (Liu, Ming & Lu, 2014; Hanamura, 2015; Zhang & Wang, 2012). Environmental psychology mainly studies the relationship between the environment and the people. It regards human beings and the nature as a whole, it's not limited to the study of individuals, instead, it considers the interaction between people and the nature within certain social and organizational range and under certain cultural environment, moreover, it reflects people's psychological needs in the design of the environment, so as to achieve the purpose of improving the quality of life of people while perfecting the environment at the meantime (Li & Cheng, 2019).

The design of the environment is carried out based on human needs, people's needs can be divided into three stages: wealthy stage, well-off stage, and food-and-cloth stage, see Figure 1. The food-and-cloth stage is the first stage, in which the environment can give people a comfortable feeling, and it satisfies their safety needs and physiological needs; the second stage is the well-off stage, in which the environment can meet people's higher-level psychological needs, and give them a sense of belonging, it can satisfy their needs for social contact and esteem; in the third stage, the environment can give people a sense of self-actualization, and this stage can only be achieved after the first two stages have been realized. The usual environmental design is based on the first two stages, it mainly meets people's needs for comfort, social contact and sense of belonging (Zhang, 2018).

![Figure 1. Theory of hierarchy of needs](image)

The needs for comfort mainly include psychological comfort and physiological comfort. In environmental psychology, the theoretical basis of the feeling of comfort includes needs for safety, natures, scales and personalization of the environment, wherein safety is a basic need of people for the design of the environment, it can meet people's basic safety needs for space. The needs for the sense of belonging mainly include aspects such as controllability, easy identification, and balance, etc.; when one enters a new environment and needs balance, one way is to change oneself and adapt to the environment, the other way is to change the environment and make it suitable for the behavior and habits of the people, and the latter method can make people have a sense of historical belonging easier (Li, Cheng, Song et al., 2019).

Concepts of landscape design of public gardens based on psychology

The connotation of landscape mainly has two aspects, one is the visual landscape, including the space and the plants in the landscape.
perceived by people within their visual range; the other aspect includes the connection between the landscape and the people, people’s requirements for the landscape, and their feelings when immersing in the landscape. A good landscape design is often based on multiple subjects such as psychology, physiology, art, and science. The design of public landscape generally includes the planning and design of the field area, the use of natural terrain, the arrangement of spatial relationships, the integration of overall landscape style, the layout of roads and waterscape, the illumination design, and public facilities, etc., besides functionality and usability, the design should also satisfy peoples’ visual and psychological feelings.

According to the theory of needs, the landscape design should satisfy the three levels of human psychological needs. In terms of physiological needs, people demand a comfortable environment with fresh air and sufficient sunlight; and they need an environment in which their personal safety and property can be guaranteed and their privacy is not violated; in terms of the sense of belonging, it is mainly satisfied by increasing social activities and interpersonal communications; A higher-level demand is the need for self-actualization, and landscape design can add recreational venues, such as chess room, gym, and library in public communities to exert people’s potentials, so that they can gain psychological satisfaction, and their needs for esteem could be achieved.

People perceive the environment through their perceptual system. Human perceptual system mainly includes auditory sense, visual sense, tactile sense, and gustatory sense. Via proper guidance of the perceptual system, environmental design can increase people’s interaction with the environment, make them merge into the landscape and get close to the nature, the natural atmosphere created by the landscape is conductive to increase people’s comfortable feeling. Different landscapes would bring different feelings for people, and the landscape design should be based on the perception of people’s perception system, as shown in Table 1, the design of the environment should fully consider people’s feelings and increase the residents’ experience for the environment.

<table>
<thead>
<tr>
<th>Types of perception</th>
<th>Sensor</th>
<th>Residents’ feelings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auditory sense</td>
<td>Wind, talk, flowers, birds, insects, animals</td>
<td>It can render vitality to the boring environment and make the environment more energetic.</td>
</tr>
<tr>
<td>Tactile sense</td>
<td>Texture and texture of landscape sketch</td>
<td>The smoothness makes children more willing to touch and play, and the rough texture gives residents a sense of antiskid and safety.</td>
</tr>
<tr>
<td>Olfactory sense</td>
<td>Flowers, trees, etc.</td>
<td>Let the residents feel the nature multiple times, fragrance can make people feel refreshed, more integrated into the nature, taste the nature.</td>
</tr>
<tr>
<td>Visual sense</td>
<td>Color, material and landscape</td>
<td>Different appearances create different scenes to give residents different feelings and play different guiding roles.</td>
</tr>
</tbody>
</table>

**Table 1. Landscape and perception**

**PSYCHOLOGICAL ELEMENTS IN THE LANDSCAPE DESIGN OF PUBLIC GARDENS**

**Questionnaire for the landscape design of public gardens in Suzhou**

This study takes the Xiangcheng District of Suzhou City as the research object; it aims to find out shortcomings in the design of the landscapes within this area through survey, further humanize the residential area, and improve people’s living standards. Based on the theory of psychology, this paper analyzes the shortcomings in the landscape design of public gardens, so that it could be more beneficial to the development of the city. (Li, Cheng, & Xiao, 2018) To better understand the characteristics of the psychological needs of residents, a questionnaire survey was conducted among the residents in the community to investigate their satisfaction and use of the landscape in the public gardens. According to the three aspects of the theory of the needs of environment, the content of the questionnaire had been set into three parts: the sense of belonging, the degree of comfort, and the feeling of communication, as shown in Table 2.
A total of 542 questionnaires were distributed, of which 513 were valid, and the effective rate was 94.64%. The age and gender distribution of the respondents is shown in Figure 2, as can be seen in the figure, the male-to-female ratio of each age group is close to 1:1, the age group with the largest proportion in the respondents is the middle and old age group, people in this age group are bearing the responsibility of the entire family, they pay great attention to the health of the elderly and children, and their concerns about the public area landscape show that they attach great importance to the living environment; the elderly are the main users of the public environment, so their opinions are critical and to the point.

**Table 2. Questionnaire**

<table>
<thead>
<tr>
<th>Classification</th>
<th>Questions</th>
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<tbody>
<tr>
<td>Comfort degree</td>
<td>Is there any hidden danger in children’s leisure area?</td>
</tr>
<tr>
<td></td>
<td>Whether the community lighting can be fully covered.</td>
</tr>
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<td></td>
<td>Is the coverage of green plants reasonable?</td>
</tr>
<tr>
<td>Sense of belonging</td>
<td>Are you satisfied with the planning of the community?</td>
</tr>
<tr>
<td></td>
<td>Are you satisfied with the appearance of the building?</td>
</tr>
<tr>
<td>Feeling of communication</td>
<td>Are you satisfied with the layout of the parking lot?</td>
</tr>
<tr>
<td></td>
<td>Are you satisfied with the public facilities in the community?</td>
</tr>
<tr>
<td></td>
<td>Will you join the entertainment community of the parents?</td>
</tr>
<tr>
<td></td>
<td>Do you often participate in communication activities with your neighbors?</td>
</tr>
</tbody>
</table>

The analysis result of the reasonableness of greening is shown in Figure 4. It can be seen from the figure that 54.31% of the residents think that the landscape greening in the public area is reasonable, 41.23% of them think the greening is a little bit too much, some places are overdesigned, and the overall greening is not balanced; only 4.46% of the residents think that the greening is not reasonable. Overall, the greening is relatively reasonable, overgrown plants need to be properly pruned in summer, or they will cause certain disturbances to the sightline.
The survey results of residents' satisfaction with the landscape are shown in Figure 5. It can be seen from the figure that the residents' satisfaction with the landscape is relatively low. They are not satisfied with landscape greening, fitness facilities, waterscape, sculpture, and other aspects, and the dissatisfaction with fitness facilities and waterscape accounts for a larger proportion. Through extensive research we can see that there are shortcomings in many aspects of the landscape of public gardens such as the sense of participation of the environment, the sense of safety, and the sense of territory. The design of the landscape should meet people's psychological needs ranging from children's entertainment facilities to the care of the elderly, so as to make the life of the residents more harmonious.

The layout of the plants in the horizontal and vertical spaces forms the integrity of the landscape. The arrangement of the plants should be in harmony with the artistry of the overall design and fully exert its functions. The landscape design of the Yintai Garden contains one axis, one belt, one ring, and four green centers; the overall hierarchy is shown in Figure 6. One axis refers to the axis of symmetry in the center, there's only one axis in the entire landscape; one ring refers to the main ring road and the surrounding landscape belt along the road, the four green centers refer to the four public green spaces distributed in the community. The integrity of the entire area is not good, the layout of the plants is unreasonable, resulting in poor symmetry of the landscape and unclear main axis.

The survey results of the familiarity of residents for the community are shown in Figure 7, it can be seen from the figure that only 13.63% of the residents are very clear about the layout of the public landscape, and the rest of the residents are not familiar or partially familiar.
with the overall landscape, and some residents seldom live in the community. During the survey we found that the distinguishability of the landscape is not good, the structure is not systematic enough, and it takes a long time to find a building or a position in the area, so it makes people have a tense feeling, and they lost their sense of belonging to the landscape of the garden in the public area (Zhang, Li, Li et al., 2019).

**Figure 8. Neighborhood communication**

![Graph showing distribution of neighborhood communication](image)

The survey results of the neighborhood communication are shown in Figure 8. It can be seen from the figure that nearly half of the residents are reluctant to carry out activities in public residential areas, basically they have no contact or exchange with their neighbors, only 16.1% of them often chat with each other, and 31.58% of them just greet each other out of politeness and seldom talk to each other; it can be seen that there are few resident activities in the public spaces of the entire area, and how to make the public places more attractive to residents is a matter needs to be considered during the design process.

**Suggestions for the design of gardens in Suzhou based on the analysis of psychological elements**

From the above survey results, it can be seen that there are a few problems in the degree of comfort of the landscape design of the residential community in Suzhou: first, although the green area is sufficient, it has not met the ornamental needs of the residents, the landscape is not well structured, and is not visually pleasing; second, the design of some residential area does not conform to the principle of humanized design; there are great safety hazards in the children's entertainment area, and the consideration is not thorough enough during the design process; third, the distribution of the stream of people has not reflected the combination of dynamic and static streams, and the privacy and openness have not been separated.

The distinguishability of the landscape is not perfect enough, and the integrity is not good, the inheritance of regional culture is basically not reflected at all, and the overall satisfaction of the residents with the landscape is not high, so their sense of belonging is not strong. The situation of neighborhood communication is not optimistic, the utilization rate of public facilities is not high, and there are few places suitable for leisure and entertainment; all these problems would directly affect the communication in the community and thus cannot meet the needs of residents for communication.

The landscape design of public gardens should be based on the physiological and psychological needs of residents. Residents of different ages have the needs for communication, and appropriate communication is conducive to the healthy growth of children. The current social relationship would easily lead to autism, and most cases are caused by unhealthy communication environment in childhood; communication is helpful for young people to relieve the stress in life, but most of them just surf the internet at home, the frequency of normal communication is relatively low, and their health conditions begin to go wrong; communication is also beneficial to the physical and mental health of the elderly, and their needs for communication are the strongest; they often play chess and have fun together. Therefore, landscape design needs to be based on the psychological needs of the residents, so as to improve their life quality.

**CONCLUSIONS**

This paper took the landscape design of public gardens in a certain area as an example to investigate the residents' opinions on the garden landscape and their psychological needs, then it analyzed the factors influencing the residents' sense of safety and comfort; moreover, aiming at the problems existing in the landscape design of the gardens, it proposed suggestions for
improving the landscape design of the public gardens, and the main conclusions are as follows:

(1) People’s requirement for the safety of children’s entertainment facilities is the highest, in terms of safety and the use of children’s entertainment facilities, most residents think that there are certain potential safety hazards in children’s entertainment facilities, and in the landscape design, we should improve the safety of such facilities.

(2) Residents’ satisfaction with the landscape of public gardens is relatively low, indicating that the landscape of public gardens has shortcomings in many aspects such as the sense of participation, the sense of safety, and the sense of territory, therefore, landscape design should meet people’s psychological needs, so as to enhance their sense of belonging and the feeling of happiness.

(3) The landscape design of public gardens should comprehensively consider the landscape’s ornamental, living, and recreational features. In the design process, we should lay stress on the physiological and psychological needs of the residents, and apply environmental psychology to landscape design, so as to improve the quality of public garden landscapes and the residents’ satisfaction.

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