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Innovative and Optimized Design of Urban Public Spaces from the Perspective of Landscape Design

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Abstract: Urban public spaces are the core carriers for citizens' daily interactions and leisure activities, and their quality is directly related to the livability of the city and the happiness of residents' lives. At present, some public spaces in cities have problems such as single functions, insufficient ecological resilience, lack of adaptability for all ages, and low humanistic recognition, which make it difficult to meet the diverse needs of citizens. From the perspective of landscape design, this article first analyzes the three core issues existing in public spaces: "disconnection between function and demand", "separation between ecology and landscape", and "separation between culture and space". Then, it focuses on four dimensions: functional adaptation, ecological empowerment, friendliness for all ages, and humanistic infiltration. Innovative and optimized strategies are proposed, including the construction of landscape-oriented diverse activity scenarios, the creation of low-maintenance ecosystems, the improvement of landscape-oriented adaptation facilities, and the implantation of local cultural symbols. All strategies focus on specific implementation design methods, aiming to achieve functional upgrades and quality improvements in urban public spaces through systematic intervention in landscape design, and provide references for related design practices.

Keywords: Urban public space; Landscape design; Innovation and optimization

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1. Introduction

As urbanization enters a high-quality development stage, citizens' demands for public spaces have shifted from "basic usage" to "quality experience". Public spaces need to undertake multiple functions such as regulating the microclimate, maintaining social interaction, and inheriting culture. However, at present, there are misunderstandings in public space design such as "emphasizing form over function", "focusing on short-term appreciation over operation and maintenance", and "emphasizing unity over difference", such as the lack of scene division, the disruption of ecological circulation, insufficient matching facilities, and the loss of cultural characteristics. Landscape design can solve these problems through scientific planning, which is of great significance for improving the quality of urban space and enhancing citizens' sense of belonging.

2. Landscape Design Perspective Analysis of Existing Problems in Urban Public Spaces

From the perspective of landscape design, the core issues of current urban public spaces are mainly concentrated in three

aspects: “disconnection between function and demand”, “separation of ecology and landscape”, and “separation of culture and space”. At the functional level, many public spaces adopt a “one-size-fits-all” design model without taking into account the usage needs of different groups of people: In many pocket parks around old communities, only simple fitness equipment and flagstone paths are set up, without designated children’s activity areas. This leads to children chasing and playing around the fitness equipment, posing safety risks. At the same time, there is a lack of sunshade seats for the elderly to rest. During morning and evening rush hours, only a few young people stop briefly, resulting in low space utilization. At the ecological level, some public spaces overly pursue “ornamental value”, choosing exotic and precious plants and using high-density hardened paving On both sides of some commercial streets in the new towns, tropical shrubs that require frequent watering and fertilization are planted. These shrubs have high maintenance costs and are difficult to adapt to the local climate, with a mortality rate of 30% in summer. Meanwhile, the sidewalks are paved with impermeable granite, which is prone to water accumulation during heavy rain, not only affecting traffic but also damaging the surface ecological cycle. At the cultural level, most newly-built public spaces lack regional characteristics and simply copy popular design styles both at home and abroad: Some newly-built squares around historical and cultural urban areas feature modern minimalist metal landscape ornaments, which are out of place with the traditional ancient buildings in the surrounding area. This makes it difficult for citizens to resonate emotionally and fails to pass on the city’s cultural memory. All these problems need to be solved through innovative and optimized landscape design [1].

3. Landscape Design Strategies for Innovative Optimization of Urban Public Spaces

3.1. Functional adaptation: Build landscape-oriented and diverse activity scenarios

In response to the issue of the single function of public spaces, it is necessary to take landscape design as a link to build diverse activity scenarios that are suitable for different groups of people and different time periods, achieving “one space with multiple uses”. With the design concept of “elastic landscape”, movable wooden seats and low flower beds are set up around the central lawn of the public space. On weekdays, it serves as an open space for citizens to rest and have picnics. On weekends, through the assembly of seats and the construction of a temporary stage, it can be transformed into an activity venue for community cultural performances. By taking advantage of the height difference of the terrain, a stepped landscape platform is designed. The lower layer is paved with anti-slip and permeable pavement, serving as a sports area for children’s roller skating and skateboarding. The upper layer is planted with trees to provide shade and long stone benches are set up as a rest area for parents to watch over and communicate. At the same time, smart lockers and drinking water stations are set up at the entrance of the space to meet the daily usage needs of citizens. This landscape design not only avoids the waste of space functions but also, through the organic combination of plants, paving and facilities, satisfies the activity needs of different groups of people, effectively enhancing the practicality and vitality of public spaces.

3.2. Ecological Empowerment: Creating a low-maintenance landscape ecosystem

The ecological optimization of public spaces should abandon the concept of “emphasizing aesthetics over ecology”, and through landscape design, create an ecosystem that is low-cost, low-maintenance and highly resilient, achieving the unity of ecological value and practical value. Adopting an “ecological priority” landscape design strategy, the original concrete revetments in public spaces were demolished and replaced with gentle slope ecological revetments. Local pebbles and native aquatic plants (such as reeds and calamus) were alternately arranged, which not only enhanced the material circulation between water and land but also provided habitats for fish and birds, significantly reducing the soil erosion rate around the revetments. In the selection of greenway pavement, a mixture of permeable concrete and crushed stone is adopted to ensure a permeability rate of over 30%, effectively solving the problem of water accumulation in greenways during heavy rain and reducing the pressure of urban waterlogging at the same time. In terms of plant configuration, local native plants are mainly used, combined with shade-tolerant ground cover plants (such as Ophiopogon japonicus and Cymbidium goeringii), forming a multi-layered plant community of trees, shrubs and grasses. This not only reduces

the maintenance costs of watering and pruning (annual maintenance expenses can be reduced by about 40%), but also improves the microclimate around the greenway. In summer, it can lower the surrounding temperature by 3-5℃ Provide citizens with a cool walking environment to achieve a dual improvement in ecological benefits and user experience of public spaces [2].

3.3. All-age friendly: Improve landscape adaptation facilities

Public spaces need to take into account the usage needs of people of different ages and physical conditions through landscape design, and create friendly spaces without discrimination. In terms of barrier-free design, gentle slope landscape paths are adopted to replace traditional steps. Low shrubs are planted on both sides of the paths as safety guides. Permeable bricks with an anti-slip coefficient of ≥0.6 are selected for paving. Meanwhile, blind paths and tactile indication bricks are set at the starting and ending points of the slopes. For the infant and toddler group, a closed parent-child activity area is designed in the corner of the public space. Thornless plants are planted around it to form a natural barrier. The ground is covered with 5cm thick EPDM rubber particles, and landscape seats that can fix baby strollers and small play facilities are equipped. For the elderly, arc-shaped seats with armrests are set up under the shade of trees, with the distance between the seats controlled at 0.8 meters to facilitate communication. Around them, native plants with medicinal value (such as mint and honeysuckle) are planted. This not only provides a rest space but also serves as a science popularization function. Through these landscape-adapted facilities, public spaces can truly be enjoyed by all ages.

3.4. Humanistic infiltration: Implant local landscape cultural symbols

The cultural empowerment of public spaces requires the implantation of local cultural symbols through landscape design, allowing the spaces to carry the city's memory and enhance citizens' emotional identification. Taking "inheriting regional cultural memory" as the core of the landscape design, in the design of the landscape walls on both sides of the public space streets and alleys, local traditional building materials (such as blue bricks, grey tiles, and rammed earth) are adopted. The historical building patterns of the old town (such as traditional storefronts, window lattices, and brick carvings) are presented in the form of reliefs. Meanwhile, glass display cabinets are set up below the landscape walls. Display the old items donated by citizens (such as old farm tools, old photos, and traditional handicrafts), allowing people to feel the historical changes of the city while walking. At the nodes of the streets and alleys, small landscape squares are designed by making use of idle spaces. Inspired by local traditional folk cultures (such as paper-cutting, New Year pictures, and operas), the ground paving of the squares is designed with patterns corresponding to the cultural elements, and seats with folk shapes (such as paper-cut patterned backrests and opera character-shaped stools) are set up, which not only meet the rest needs of citizens but also reflect the local folk culture. In addition, in the design of street lamps in the streets and alleys, the traditional shapes of local lamps (such as palace lanterns and horse lanterns) are borrowed, and energy-saving LED light sources are adopted. When they are lit at night, cultural patterns are projected onto the ground through light projection, creating a warm cultural atmosphere while avoiding the disturbance of strong light to residents' lives. Through these landscape designs, let public spaces become carriers for inheriting urban culture and uniting citizens' emotions, and enhance the cultural appeal and sense of belonging of public spaces [3].

4. Conclusion

The innovative optimization of urban public spaces is not merely about "landscape transformation", but rather about achieving a coordinated improvement in functionality, ecology, friendliness, and humanity through the systematic intervention of landscape design. The four major strategies proposed in this article, ranging from building diverse activity scenarios to creating low-maintenance ecosystems, from improving facilities suitable for all ages to implanting local cultural symbols, all focus on specific design details and implementation paths, avoiding vague conceptual explanations and ensuring that each strategy can be transformed into practical and implementable solutions. In the future, the design

of urban public spaces still needs to further integrate smart technologies (such as intelligent irrigation systems, human-sensing lighting, and citizen demand feedback platforms) with citizen participatory design, making landscape design more in line with the actual needs of citizens and truly achieving the goal of "people-centered" space creation. Through continuous innovation in landscape design, urban public spaces will not only be "venues for activities", but also become core carriers that carry the vitality, ecological value and cultural memory of the city, providing solid support for the high-quality development of the city and the improvement of residents' living standards.

Disclosure statement

The author declares no conflict of interest.

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