

Original Research Article

## Landscape space renovation design of old residential area based on environmental psychology

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**Abstract:** In the process of urban renewal, the physical space renovation of old residential quarters has expanded from simple building repairs to comprehensive improvements in public landscape spaces. This paper explores the problems existing in the landscape spaces of old residential quarters and their psychological impact on residents. Combining theories from environmental psychology, it proposes targeted renovation design principles and implementation strategies. The research emphasizes that renovation should focus on the interactive relationship between "space-behavior-psychology." Through micro-renewal, hierarchical division, and participatory design, a safe, comfortable, and community landscape environment with a strong sense of belonging can be created. This, in turn, enhances residents' quality of life and promotes sustainable community development, providing a psychological dimension of design reference and practical pathways for the renewal of old urban residential quarters.

**Keywords:** environmental psychology; old residential quarters; landscape space; renovation design

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### 1. Introduction

Old residential quarters are an important component of urban renewal. However, the design of their landscape spaces often fails to meet the needs of modern residents, leading to a decline in their quality of life. Environmental psychology provides a theoretical foundation for understanding and improving people's psychological experiences in specific spaces. Faced with common problems in old residential quarters such as monotonous spaces, unclear boundaries, and functional deficiencies, research on how to enhance the environmental quality of these communities through scientific and reasonable design is particularly important. This paper will analyze these phenomena and propose feasible renovation strategies.

### 2. Problems in the landscape space of old residential quarters and their psychological impact

The landscape spaces of current old residential quarters generally suffer from design flaws. From the perspective of environmental psychology, these defects directly trigger negative psychological experiences for residents and limit their daily activities<sup>[1]</sup>.

#### 2.1. Monotonous spaces evoke boredom

The green spaces in many communities have a single form with a lack of plant diversity. Hard paving areas are too large, with repetitive materials and colors. Leisure and recreational facilities are few in variety and outdated. This visual environment, lacking variation, easily leads to residents feeling bored and reduces their willingness to stay and engage in activities within it.

#### 2.2. Unclear boundaries lead to insecurity

The boundaries between public and private spaces are often blurred. For example, public green spaces are sometimes occupied by individual households, and public passages are too close to residential windows. This confusion in spatial hierarchy deprives residents of a clear sense of territory and control in public areas, easily raising concerns about privacy intrusion. Furthermore, corners with insufficient lighting and obstructed sightlines increase worries about personal safety, especially among women and the elderly.

#### 2.3. Insufficient functionality hinders resident activities and communication

Existing spaces often fail to effectively support specific activities for residents of different age groups. There is a lack of dedicated areas suitable for safe play for children, sports for teenagers, quiet rest for the elderly, and conversation for caregivers. This functional deficiency or mix-up reduces opportunities for residents to naturally

meet and interact.

### 3. Renovation design principles based on environmental psychology

#### 3.1. Enhancing environmental attractiveness

Design should aim to enhance the attractiveness of the environment. By combining plants with different seasonal features, colors, and textures, installing public art installations or interesting landscapes, a variety of sensory experiences can be provided. Rich environmental stimuli can attract attention, spark interest, and help alleviate mental fatigue.

#### 3.2. Dividing spatial hierarchy and strengthening sense of territory

Based on the theory of territoriality in environmental psychology<sup>[2]</sup>, clear distinctions should be made between public spaces, semi-public spaces (e.g., green areas between buildings), and semi-private spaces (e.g., quiet courtyard corners). Low hedges, subtle changes in ground level, landscape markers, etc., can be used for symbolic separation. Clear spatial hierarchy can provide residents with a psychological sense of security and belonging to specific areas, encouraging them to maintain the semi-public areas near their own building entrances.

#### 3.3. Supporting diverse activities and encouraging social interaction

According to behavior setting theory, design should actively create specific places suitable for various activities. Setting up functionally clear and non-interfering zones, such as fitness areas, chess/card areas, children's play areas, and seating areas for group conversation, is key. Reasonable seating arrangements (e.g., grouped seating) and good sightline design (facilitating child supervision and observation of surroundings) can effectively encourage people to linger and initiate communication, thereby fostering community interaction and strengthening social ties among residents.

### 4. Implementation strategies for renovating landscape spaces in old residential quarters

Translating the design principles of environmental psychology into actionable renovation measures can be advanced from two levels: spatial layout and detailed design.

#### 4.1. Establishing a clear and reasonable spatial layout

The goal of spatial layout is to help residents form a clear spatial cognition while meeting psychological needs in different scenarios<sup>[3]</sup>. Implementation can be divided into three steps:

First, conduct an inventory of the current spatial situation and match it with needs. Through on-site surveys, identify problematic spaces such as idle corners, congested pathways, and underutilized green areas. Combine this with resident interview results (e.g., the elderly needing nearby rest spots, children needing safe activity zones) to clarify the functional positioning of each area. For example, plan the central open area as a public activity hub, design the narrow spaces between buildings as adjacent rest areas, and transform idle strips along walls into continuous walking paths, forming a three-level spatial system of "core gathering - neighborhood rest - linear connection."

Second, use soft separation to strengthen spatial hierarchy. Based on territoriality theory, divide public, semi-public, and semi-private spaces using non-rigid means to avoid a sense of isolation from physical barriers. The public activity hub can adopt an open layout, complemented by large lawns and gathering squares to meet collective activity needs. Semi-public spaces (e.g., building entrance areas) can be defined using 1.2-1.5 meter high hedges, changes in ground material (e.g., from asphalt to permeable bricks), or small landscape features (e.g., stone benches, flower pots) to create a "building-specific" sense of territory. Semi-private spaces (e.g., quiet rest corners) can be formed through shading trees, slight elevation changes (30-50 cm difference), and enclosed seating arrangements, creating a relatively enclosed environment to meet residents' needs for solitude or small-group conversation.

Third, optimize traffic flow and spatial accessibility. Pedestrian path design should balance continuity and interest, avoiding the spatial fragmentation caused by straight paths cutting through green areas. Curvilinear walkways can be used to connect various functional zones, with landscape nodes (e.g., small water features, flower borders, signage) along the way to enhance the walking experience. Ensure walkway width is no less than 1.2 meters, add accessible ramps (slope  $\leq 1:12$ ) and anti-slip paving to meet the needs of the elderly and disabled.

Additionally, create transitional spaces (e.g., small platforms, pergolas) at the junctions between walkways, rest areas, and activity hubs to reduce interference between different functional zones and improve the comfort of spatial transitions.

## **4.2. Designing detailed and practical landscape elements**

### **4.2.1. Activating idle spaces, creating emotional landmarks**

For common idle corners in old residential quarters (e.g., abandoned flower beds, spaces along walls, empty areas between buildings), adopt a "micro-renewal" model for activation, endowing spaces with uniqueness and emotional value. For example, transform idle spaces between buildings into community memory display corners using old photo pavement tiles, nostalgic-themed sculptures (e.g., models of old bicycles, sewing machines), and planting trees donated by residents to evoke emotional connection to the community. Utilize spaces along walls to create vertical gardens using modular planting boxes for climbing plants (e.g., roses, pothos) and seasonal flowers, both beautifying the environment and providing residents with opportunities for close contact with nature. For smaller scattered empty spaces, create pocket gardens with low shrubs, perennial herbs, and movable planter boxes, paired with compact seating, forming comfortable scenarios of "seeing green out the window, entering a garden upon stepping out."

### **4.2.2. Catering to all-age needs, refining facility details**

Facility design should follow the principle of "all-age friendliness," considering the physiological and psychological needs of different age groups, with a focus on safety, comfort, and interactivity.

(1) Facilities for the Elderly. Set up rest seats with backrests and armrests (seat height 45-50 cm, armrest height 75-80 cm) at intervals of about 50 meters along rest areas and walking paths, with space underneath for canes or wheelchairs. In fitness areas, choose gentle equipment (e.g., Tai Chi wheels, ellipticals), surrounded by 3-5 cm thick rubber anti-slip mats to prevent falls. Add emergency call buttons and well-lit nighttime rest spots to alleviate safety concerns of the elderly.

(2) Facilities for Children. Children's play areas should be fully enclosed (fence height  $\geq 1.2$  meters), with surfaces like EPDM rubber mats or sand pits to reduce impact injuries. Choose equipment that balances fun and safety, such as low slides, spring riders, and climbing nets, avoiding sharp edges and excessive heights. Additionally, provide seating for supervising parents around the play area with unobstructed sightlines, meeting the psychological need for "proximity supervision."

(3) Universal Facilities. In public activity hubs, provide flexibly combinable tables and chairs for activities like chess, cards, or handicrafts. Install drinking water stations, waste sorting stations, and shade/rain shelters along walking paths to enhance convenience. Introduce interactive landscape elements, such as touchable water walls, sound-emitting paving tiles, or "wish walls" for resident messages, to increase the sense of participation and fun.

### **4.2.3. Integrating natural elements, alleviating psychological stress**

Natural elements can effectively reduce anxiety and enhance psychological comfort. Renovation should strengthen residents' contact with nature.

(1) Plant selection. Adopt the principle of "native species as the mainstay, with seasonal interest." Choose adaptable native plants like Chinese scholar trees, ash trees, and lilacs, combined with flowering plants like roses, irises, and daylilies to form a multi-layered planting structure of trees, shrubs, and ground cover. Plant aromatic plants (e.g., mint, lavender, osmanthus) in rest areas and pocket gardens to alleviate mental fatigue through olfactory stimulation. Plant shade trees (e.g., plane trees, goldenrain trees) around children's play areas and public hubs to lower summer temperatures and create a cool, comfortable activity environment.

(2) Ecological landscape design. Construct ecological swales, rain gardens, and other sponge city facilities to collect and purify rainwater, addressing drainage issues in old quarters while providing residents with a window to observe nature. Install small water features (e.g., shallow pools, bubblers) to mask environmental noise with the sound of water, creating a tranquil atmosphere. Reserve some "wild areas" within green spaces for native grasses and plants to attract birds and insects, enhancing biodiversity and allowing residents to feel the vitality of nature.

(3) Multi-sensory experience creation. Beyond visual and olfactory senses, incorporate tactile and auditory experiences. For example, install touch walls with different materials (wood, stone, metal) in rest areas for children to explore; plant vegetation with unique leaf textures (e.g., Monstera, hosta) along paths to encourage touch; use layered lighting design (main lights + auxiliary lights + ambient lights) to create a warm, soft nighttime environment, avoiding discomfort from harsh glare and eliminating the unease caused by dark corners.

## **5. Conclusion**

In summary, landscape space renovation design for old residential quarters based on environmental psychology focuses not only on visual aesthetics but also emphasizes residents' psychological experiences and social needs. By implementing strategies such as spatial layout optimization, functional zone clarification, and micro-renewal, the living environment for residents can be effectively improved, enhancing their sense of security and belonging. Future designs should pay more attention to resident participation and feedback to ensure renovation plans truly meet the actual needs of the community. This will achieve harmonious coexistence between people and nature, people and the environment, contributing to the creation of livable cities.

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