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DESIGN OF URBAN ECOLOGICAL SPACES IN THE CONTEXT OF AN AGING SOCIETY

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As societies age and ecological concerns intensify, integrating ecological principles into urban environments has become essential, yet traditional community spaces often fail to serve all age groups. Using Chengdu's Luxiao TOD community as a case study, this paper introduces a "cross-generation ecological aesthetic garden" design strategy that enhances both environmental quality and social inclusivity. This framework offers theoretical foundations and practical guidelines for advancing age-friendly urban spaces and promoting ecological civilization.

Key words: *environmental design**,** ecological aesthetics; urban design, aging society.*

INTRODUCTION

Urban ecological spaces serve as the vital support for people's daily lives, alleviating environmental stress from living, recreation, and work in dense urban settings. In an aging society, enhancing eldercare services is a hallmark of social progress, and buildings must deliver not only basic functions but also emotional value: meeting needs for health, convenience, and comfort. Traditional community layouts suffer from spatial fragmentation, intergenerational segregation, and limited contact with nature, all of which demand urgent attention. Without scientific and effective integration of ecological spaces, developments cannot qualify as modern green buildings. Drawing on project case studies, this paper examines how urban design can be organically fused with ecological principles.

PURPOSE

This research aims to show, how to enrich both the material and spiritual lives of the elderly by fostering their social participation through features such as a "Healing Garden" and a "Bird Garden." These interventions are intended to stimulate seniors' enthusiasm, providing comprehensive spiritual comfort and physical care within the community, embodying a truly people-oriented development philosophy.

RESULTS AND DISCUSSION

Ecological Aesthetics and Functional Planting

With the world's population aging rapidly, ecological aesthetics and functional plant space design have become vital to creating environments that truly serve older adults. At the core of this approach is the balance between ecological performance and visual appeal, ensuring that designs both function effectively and

offer a pleasing, easily navigable landscape for seniors. For instance, integrating diverse plant communities in senior-friendly parks or green corridors not only enhances air purification and water management but also produces layered, highly distinguishable vistas that aid orientation for the elderly (fig. 1) [1]. Moreover, emphasizing native species improves ecological adaptability and fosters a sense of regional familiarity, while reducing the confusion that non-native plantings can cause.

Fig. 1. Vanke Guoshou Jiayuan, Chengdu, China

Layered Plant Configurations

Designs should incorporate multiple vegetation strata: trees, shrubs, and groundcovers (fig. 2), to support biodiversity and deliver year-round interest. This tiered approach provides habitat for wildlife and a dynamic visual environment that changes with the seasons. Special attention to phenological cues (e.g., flowering or leaf color changes) can help seniors recognize and enjoy each seasonal transition.

Fig. 2. Yanyuan Phase III, Beijing, China

Innovative Materials and Green Technologies

Achieving an age-appropriate setting also relies on new materials and technical systems (fig. 3). Permeable pavements, photovoltaic canopies, and rainwater harvesting optimize resource use and improve site sustainability, crucial for maintaining safe, slip-resistant surfaces for older users [2]. Additionally, green roofs offer vertical greening in dense urban areas, bringing accessible nature within immediate reach of seniors.

Fig. 3. Superblock in Sant Antoni, Spain

Digital Design Tools

The rise of digital technologies provides powerful new methods for planning age-friendly landscapes. GIS analyses inform scientifically grounded plant selections, while 3D simulations allow designers to preview seasonal effects and refine layouts before construction. Furthermore, smart irrigation systems ensure precise water delivery, protecting plant health in varying climates and maintaining consistent, attractive greenery for the elderly.

Interdisciplinary Collaboration

True innovation emerges at the intersection of disciplines. By engaging ecologists, botanists, gerontologists, and urban designers, communities can achieve a holistic integration of ecological service and senior-centered aesthetics [3]. Botanists guide species choice, gerontologists advise on spatial ergonomics, and ecologists optimize ecosystem functions – together crafting landscapes that are both scientifically robust and age-appropriate.

Ecological and Social Benefits

From an ecological standpoint, carefully assembled plant communities markedly boost green-space services: air purification, water filtration, biodiversity conservation, and microclimate regulation, all of which improve seniors' quality of life. Favoring native species lowers maintenance demands and strengthens ecological resilience. Furthermore, these plantings can mitigate urban heat islands by providing shade and cooling through transpiration, creating comfortable outdoor gathering spaces.

Socially, age-friendly natural areas such as wetland parks offer safe, restorative interactions with nature that enhance both physical health and mental

well-being. Research links frequent use of such spaces to reduced stress and improved mood among older adults. Additionally, community-based ecological education and participatory design events promote environmental stewardship and social engagement, reinforcing seniors' sense of agency and belonging.

Looking ahead, integrated designs must continue to support the coexistence of seniors and nature, advancing both ecological resilience and social vitality, and offering innovative solutions to the challenges of an aging society.

CONCLUSIONS

In an aging society, integrating ecological aesthetics with functional planting design has emerged as a key trend in senior-friendly landscapes, enhancing both environmental quality and seniors' restorative experiences. This approach simultaneously advances ecological protection and age-appropriate enjoyment, offering innovative solutions to the challenges of demographic change.

Looking forward, as the population ages and seniors' living standards rise, ecological landscape design for the elderly will expand into urban planning, eldercare, and rehabilitation settings, providing both beauty and therapeutic benefits.

Ultimately, the fusion of ecological aesthetics and functional planting is not only a design innovation but also a strategic imperative for improving seniors' quality of life and promoting sustainable, inclusive urban development. Through interdisciplinary collaboration, technological innovation, and age-sensitive design principles, we can create high-quality, resilient spaces that support an age-friendly society.

REFERENCES

1. Ulrich R. S. View through a window may influence recovery from surgery. *Science*. 1984. Vol. 224. Iss. 4647. P. 420–421.
2. He Q., Deng X., Fei N. Chengdu TOD Urban Design Guidelines. *Construction Science and Technology*. 2021. Vol. 21. Iss. 02. P. 23–24.
3. Zhou Y. Research on the environment creation system of aging communities. 2020. *Journal of Aging and Environment*. Vol. 16. Iss. 21. P. 36–38.

ШМЕЛЬОВА-НЕСТЕРЕНКО О., ВАН Ці

ПРОЄКТУВАННЯ МІСЬКИХ ЕКОЛОГІЧНИХ ПРОСТОРІВ У КОНТЕКСТІ СТАРІННЯ СУСПІЛЬСТВА

У міру старіння суспільства та загострення екологічних проблем інтеграція природоохоронних принципів у міське середовище стає вкрай необхідною, проте традиційні громадські простори часто не враховують потреби різних вікових груп. На прикладі TOD-спільноти Лушяо в Ченду ця стаття пропонує стратегію «міжпоколіннєвого екологічно-естетичного саду», яка підвищує екологічну якість простору та забезпечує соціальну інклюзивність. Запропонована модель містить теоретичні засади та практичні рекомендації для розвитку дружніх до людей похилого віку міських просторів та сприяння формуванню екологічної цивілізації.

Ключові слова: *дизайн середовища, екологічна естетика; міський дизайн; старіюче суспільство.*