



Research on the Application of Ecological Design in the Creation of Cultural and Creative Spaces

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Abstract. This article aims to explore the application of ecological design concepts in the creation of cultural and creative spaces, delving deeply into its core principles and practical approaches. By integrating multiple principles such as aesthetics and sociality, and taking the fusion of natural elements, the use of sustainable materials, and public participation and interaction as entry points, ecological design is incorporated throughout the spatial layout, visual creation, and functional planning. Ecological design not only enhances the aesthetic value and cultural connotation of cultural and creative spaces through natural materials and environmentally friendly processes, but also strengthens public environmental awareness and promotes the social dissemination of ecological concepts through scene-based and interactive designs.

Keywords: Ecological Design; Cultural and Creative Spaces; sustainable development

1 Introduction

In recent years, the global cultural and creative industry has witnessed a rapid development trend. The contribution rate of the cultural and creative industry to economic growth has been continuously increasing, covering various fields such as art and design. The importance of cultural and creative spaces has become increasingly prominent. The demand for cultural products and services from people has continued to grow, which has led to a significant increase in the demand for cultural and creative spaces by numerous cultural enterprises, studios, and artists. For instance, there has been a construction boom of cultural and creative parks in many cities. Take the 798 Art Zone in Beijing as an example, which was originally an electronic industrial area and has been transformed into a cultural space integrating galleries, art studios, cultural stores, and catering services, attracting numerous tourists and artists from home and abroad.

With the development of cities, a large number of idle spaces from old industrial buildings, warehouses, etc. are waiting to be updated and utilized. Transforming these old buildings into cultural and creative spaces is one of the effective ways for urban renewal. On the one hand, it can preserve the historical memory and architectural

cultural heritage of the city; on the other hand, it can provide low-cost and distinctive space venues for the cultural and creative industries. For example, Tianzifang in Shanghai was transformed from old alleys. During the renovation process, the appearance and spatial layout of the stone gatehouse buildings were retained, and the interior was transformed into various creative shops, studios and art exhibition halls. This not only continued Shanghai's regional cultural characteristics but also met the development needs of modern cultural and creative industries, and at the same time added new cultural landscapes to the city. Cultural and creative spaces, as public or commercial spaces in the city, also need to implement ecological design concepts in the design and operation process, use environmentally friendly materials, which not only reduces the negative impact on the environment but also provides users with a healthier and more comfortable space environment, and also meets the requirements of society for sustainable development.

2 Research Objectives and Significance

2.1 Research Objectives

With the continuous acceleration of the pace of modern social development, people's demands for the quality of life are gradually increasing, and the creation of indoor environments is receiving more and more attention. Ecological design is not merely a design activity; it is also the restoration of the urban environment and the fundamental way to achieve a harmonious unity between humans and nature[1]. With technological breakthroughs and the widespread adoption of green living concepts, traditional indoor spaces have failed to meet the expectations of contemporary people for a quality lifestyle. People are more inclined to choose living environments that are low in energy consumption, highly comfortable, and environmentally friendly. Against this backdrop, the design concept centered on ecological priority has rapidly developed. Ecological design emphasizes the harmonious coexistence of indoor and natural environments, and focuses on using natural elements and environmentally friendly materials to create modern indoor spaces, providing people with both beautiful and practical living or working environments[2].

2.2 Research Significance

This article, from a theoretical perspective, explores the integration mechanism of ecological design and cultural creative spaces, expands the research boundaries in the intersection of environmental design and the cultural industry, improves the application theory system of ecological design in cultural scenarios, and provides theoretical support for subsequent research. In future practice, the research results can provide replicable green transformation paths for cultural creative space design. Through the application of environmentally friendly materials, low-carbon space layout, and the construction of ecological interactive scenarios, it can reduce the energy consumption and resource waste of space operation. At the same time, by applying ecological design concepts, it can convey environmental protection values and use cultural creative

spaces as a carrier to promote public ecological cognition and behavioral changes, promoting the coordinated development of the cultural industry and ecological protection, and facilitating the realization of the "carbon neutrality" goal and the implementation of the sustainable development concept.

3 Overview of Ecological Design and Cultural Creative Spaces

3.1 Overview of Ecological Design

Ecological design emphasizes the sustainable utilization of resources by adopting environmentally friendly materials, energy-saving technologies, and recycling designs, etc. At the same time, it focuses on the integration of nature and humanity to create a healthy and comfortable living environment. Ecological design is not only an important practice to address environmental crises, but also a key way to promote the transformation of the design industry towards a green, low-carbon, and sustainable direction.

3.2 Basic Principles of Ecological Cultural and Creative Space Design

3.2.1 The Principle of Resource Conservation.

In design practice, how to achieve the intensive utilization of materials and energy and reduce waste emissions through scientific and innovative design strategies is the core issue of sustainable design. Taking product packaging design as an example, by innovatively deconstructing and reconstructing the packaging structure, while ensuring the functions of product protection and transportation, we can simplify redundant materials, optimize the spatial layout, and reduce unnecessary material usage, thereby achieving the goal of reduction. At the same time, it can also lower the energy consumption during production and transportation, and reduce waste generation at the source.

3.2.2 The Principle of Recycling.

In response to the urgent need for sustainable development in modern society, exploring ways to enhance the reusability of design objects has become an important issue. Taking architectural design as an example, through innovative practices, resource recycling and space activation can be achieved: old building materials can be renovated and upgraded to be integrated into new construction projects; flexible and variable space designs can also enable buildings to easily adapt to various functional demands such as office, commerce, and residence, thereby effectively extending the lifespan of the buildings.

3.2.3 The Principle of Recycling and Reusing.

Focusing on the entire product lifecycle management, it is crucial to explore the recycling paths of design materials and components during the waste disposal stage. Taking electronic product design as an example, through innovative structural design and technical optimization, a modular system that is easy to disassemble and classify can be constructed, reducing the complexity of the recycling process; at the same time, combined with material compatibility design, the recycling efficiency of components such as metals and plastics can be improved, ensuring that resources can be efficiently reprocessed, forming a "use - recycle - regenerate" closed-loop chain, achieving the dual goals of environmental protection and sustainable utilization of resources.

3.3 Ecological Principles

The main principles of ecology include material cycling, energy flow, and information transmission. Matter circulates between the biological and non-biological environments, such as the carbon and nitrogen cycles; energy flows unidirectionally along the food chain, decreasing progressively at each level; information transmission includes physical, chemical, and behavioral information, which is beneficial for the reproduction of biological populations and the stability of the ecosystem. An ecosystem consists of a biological community and a non-biological environment. The biological community includes biological elements such as plants, animals, and micro-organisms, while the non-biological environment includes sunlight, air, water, and soil. Its structure includes species composition and nutritional structure, such as forming complex nutritional relationships through food chains and food webs.

3.4 The Concept of Cultural and Creative Spaces

The cultural and creative space is a new type of spatial form centered on cultural creativity, integrating various elements such as art, technology, and business. Through creative design and functional integration, it transforms cultural resources into tangible and experiential physical scenes. In terms of form, cultural and creative spaces include various types such as museums, art galleries, creative parks, theme bookstores, and immersive experience centers; in terms of function, it not only undertakes the mission of cultural inheritance and innovation, but also meets the public's demand for spiritual cultural consumption. Through spatial narration and cultural expression, cultural and creative spaces not only provide users with unique experience value, but also become an important carrier for promoting cultural industry development and facilitating cultural dissemination.

3.5 Cultural and Aesthetic Characteristics of Cultural and Creative Spaces

The cultural and creative space integrates cultural heritage and aesthetic innovation. Culturally, it emphasizes regional characteristics and the integration of diverse cul-

tures, conveying its essence through interactive experiences; aesthetically, it focuses on artistic creativity and the combination of nature and human culture, creating a unique atmosphere through distinctive installations and eco-friendly materials, while providing personalized designs to meet users' emotional needs, achieving the unity of cultural value and aesthetic experience.

4 Principles and Application Dimensions of Ecological Design in the Creation of Cultural and Creative Spaces

4.1 Basic Principles for the Establishment of Ecological Cultural and Creative Spaces

4.1.1 Principles of Sustainable Art.

Transform the concept of environmental protection into artistic expression. Prioritize the use of recyclable and degradable materials for decoration and facility design, such as recycled plastic handicrafts and furniture made from recycled wood. At the same time, integrate regional ecological cultural characteristics, combine intangible cultural heritage techniques or local animal and plant elements, to create artistic installations that have both ecological value and cultural recognition. Make "sustainability" the core label of the aesthetic appeal of the space. Sustainability is the key to the development of cultural and creative spaces. It focuses on the protection and utilization of cultural heritage, achieving sustainability in terms of economy, society and environment. From an academic perspective, the construction and development of cultural and creative spaces will provide strong support for the prosperity of the cultural industry and the enhancement of a city's soft power[3].

4.1.2 Principle of Functional Aesthetics.

Breaking the rigid sense of traditional spatial layout, through smooth flow planning and open functional zoning, we achieve a spatial experience of "changing scenes as you move". For instance, using low walls, green plants or art display stands to naturally separate areas, integrating cultural and creative display, interactive experiences and other functional zones with ecological scenes. This not only meets practical needs but also endows the space with narrative and exploration appeal, achieving a high degree of unity between functionality and aesthetics.

4.1.3 The Principle of Color Rhythm.

Based on natural chromatography, low-saturation colors such as earth tones, grassy green, and sky blue are selected to create a soothing and unified visual atmosphere. At the same time, through the layering of colors and changes in light and shadow, the rhythm and three-dimensionality of the space are enhanced, avoiding visual fatigue caused by chaotic colors and achieving a visual balance in ecological aesthetics.

4.1.4 The Principle of Public Nature.

In the establishment of ecological cultural spaces, the principle of publicness focuses on creating multi-dimensional connections between humans and nature, as well as between humans and society. It emphasizes promoting the socialization of environmental protection concepts through spatial design. The principle of publicness should be centered on public participation, and a platform for sharing environmental knowledge should be established, such as setting up interactive exhibition areas and organizing ecological-themed community activities, to stimulate public attention to environmental protection issues. At the same time, local environmental protection culture and sustainable practice cases should be integrated into the space, making it a public carrier for transmitting ecological values, promoting the formation of a consensus on green lifestyles, and achieving the transformation of environmental protection concepts from individual cognition to social action, thereby helping to build a modern environmental protection ecological system with full public participation. The design standards should be determined based on the differences in regions and actual nature. Blindly raising the standards and overly pursuing artistic effects will lead to waste of funds. Also, standards should not be lowered for certain purposes, as this would affect the outcome. What's most important is that, with the same cost, a good artistic effect can be achieved through ingenious structural design[4].

4.2 Application of Ecological Design Concepts in the Creation of Cultural and Creative Spaces

4.2.1 Optimization of Natural Lighting and Ventilation.

When designing the layout of the cultural and creative space, the orientation of the building is fully considered to ensure that the interior can receive the maximum amount of natural light. For example, the main display areas, work zones, etc. are set in locations with good lighting conditions to reduce reliance on artificial lighting during the day, which not only saves energy but also creates a comfortable and natural visual environment. At the same time, the ventilation paths of the space are reasonably planned, such as setting ventilation outlets and air ducts, using the principles of thermal pressure and wind pressure to promote natural air circulation, maintaining fresh indoor air and reducing the frequency of using air conditioning systems, and reducing energy consumption and equipment operation costs. For some newly built cultural and creative parks, the buildings often adopt an open layout, with spacious atriums and transparent glass facades, which allow sunlight to penetrate into every corner of the building interior and achieve a good ventilation and convection effect.

4.2.2 Function Mix and Flexible Layout.

Break away from the traditional single-function zoning model and integrate various functions related to cultural and creative industries, such as creation, display, communication, and sales, into one space. For instance, in a cultural and creative space, set up an area that serves as both a gallery and a studio. Artists can create while show-

casing their works, facilitating interaction and communication with the audience, thereby enhancing the vitality and interest of the space.

4.2.3 Prioritization of Renewable Materials.

Renewable materials not only have a wide range of sources and strong sustainability, but also possess the characteristics of low carbon and environmental friendliness. They have broad application prospects in the construction field[5]. Taking the innovative application of ecological materials as an example, bamboo, due to its rapid regenerative nature, has become a highly promising green building material, suitable for the structural construction or decorative details of cultural and creative spaces. In terms of soft furnishing material selection, using natural fibers such as organic cotton and hemp to make decorative fabrics like curtains and carpets can not only avoid the harmful substance volatilization caused by synthetic materials, but also effectively improve the indoor air quality, creating a healthy and environmentally friendly space experience for users, and achieving a dual improvement in ecological benefits and usage comfort.

5 Conclusion

In the era when the concept of global sustainable development has taken root in people's minds, the deep integration of ecological design and cultural creative spaces is not only an innovative practice in the field of design, but also a concrete expression of social responsibility and cultural inheritance consciousness. Through the selection of renewable and low-energy environmental-friendly materials and the combination of natural lighting, ventilation system optimization and other technical means, ecological design significantly reduces the environmental load of cultural creative spaces, achieving the harmonious coexistence of architecture and nature. At the same time, the ecological design concept breaks the limitations of traditional space design and combines regional culture, natural ecology and artistic creativity, making cultural creative spaces a three-dimensional carrier that carries cultural memories and evokes emotional resonance. From the functional perspective, the ecological layout and interactive design of the space enhance the comfort of users' experience, meeting the urgent needs of contemporary people for healthy, natural and culturally rich public spaces. From the cultural perspective, the ecological design builds a bridge for cultural inheritance and innovation in cultural creative spaces, allowing traditional elements to rejuvenate in the sustainable design context.

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