

Urban Park Landscape Design Based on Correlation-Coupling Theory

Jinzhu Zhang¹, Linjuan Zheng^{2*}

¹ Fuzhou Yinghua Vocational College, Fuzhou, China

² Quanzhou Institute of Information Engineering, Quanzhou, China

Email Address

843630304@qq.com (Jinzhu Zhang)

*Correspondence: 1084193004@qq.com

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Abstract:

With the deepening process of urbanization, urban parks, as public spaces, play an irreplaceable role in enhancing the lives of urban residents. People's demands for the ecology, landscape, and functionality of parks are continuously increasing. Landscape designs focused primarily on leisure and greening can no longer fully meet these demands. In this context, the Correlation-Coupling Theory offers a new perspective for urban park landscape design. By introducing this theory into the design process, relevant components of the landscape design can be integrated in a coupled manner, leading to more comprehensive design methods and procedures. This involves systematically analyzing the coupling elements within the park space and exploring coupling strategies for the interrelation and interaction between the park space and its surrounding areas, based on three key threads: physical, psychological, and behavioral.

Keywords:

Urban Park, Correlation-Coupling Theory, Landscape Design

1. Correlation-Coupling Theory and Urban Parks

As a typology of recreational space, urban parks serve both ecological and leisure functions, constituting an indispensable component of urban development. Visitors to parks increasingly seek the dual enrichment of functional fulfillment and emotional experience, thereby imposing elevated requirements upon urban park landscape design. This study introduces the Correlation-Coupling Theory into the domain of urban parks, adopting a correlation-coupling perspective to examine landscape design, with the aim of establishing a coupled relationship between the park and its surrounding environment. The "Correlation-Coupling Theory" comprises three integral components: coupling elements, coupling threads, and coupling strategies. Corresponding to the coupling elements within this theoretical framework are the fundamental elements of park landscape design. These coupling elements encompass both physical environmental factors and socio-cultural environmental factors. The coupling threads refer to the patterns of interaction among these coupling elements, delineating how the design components should be structured and exert influence upon the park landscape design. The formulation of coupling strategies addresses the

methodology for creating a multifariously coupled park space, thereby constituting a comprehensive park landscape system.(Figure 1)

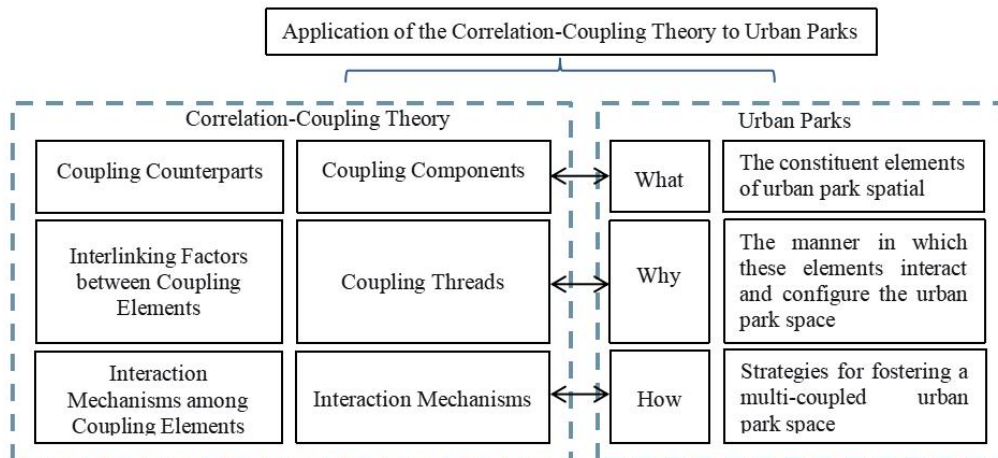


Figure 1. A Representation of Embedding Correlation-Coupling Theory in Urban Parks.

2. The Interpretation Model of Correlation-Coupling Theory in Urban Park Landscape Design

In his work “Modern Urban Design Theory and Methodology,” Professor Wang Jianguo employs the Correlation-Coupling Theory to analyze urban design, developing an analytical framework of “relational threads–domain surfaces.” Based on "material, psychological, and behavioral threads," he established a comprehensive correlation-coupling design methodology, offering a relatively complete interpretation of the elemental system underlying urban design methods and spatial composition. Therefore, the coupling strategies for park landscape design in this study will be developed around this framework. By identifying and synthesizing the coupling elements into three cohesive threads, these threads will then be interconnected to construct an integrated correlation-coupling system, ultimately forming a park space that harmoniously integrates ecology, connectivity, and activity. (Figure 2)

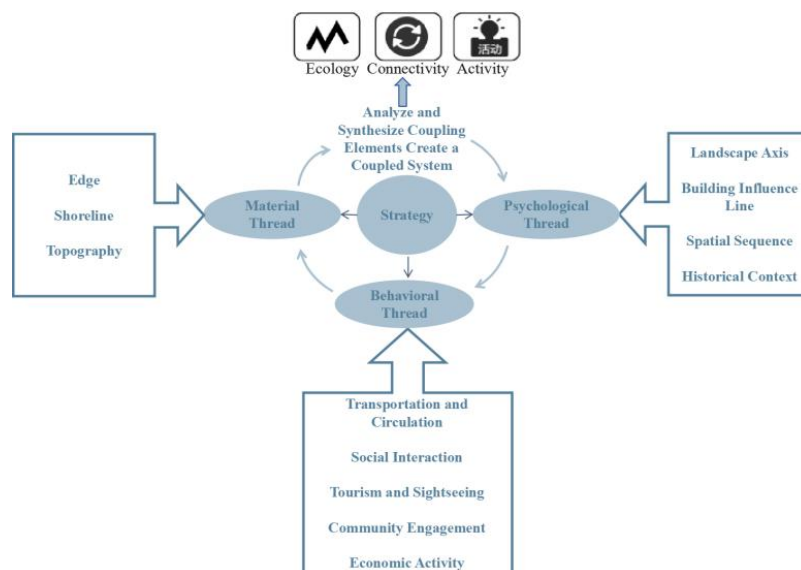


Figure 2. Schematic Diagram of the Global Spatial Correlation-Coupling Model.

2.1. Material Thread Coupling Mode

The Material Thread is influenced by physical environmental elements such as climate, hydrology, ecology, and topography. The design serves not only humans but also organisms like plants, birds, and fish. By integrating the restorative capacity of nature-based design, greater space is ceded to nature for self-renewal. Preserving natural landforms, ecology, hydrology, function, and structure to the greatest extent possible allows for the establishment of ecological slope protection, habitats, and wetlands, forming distinctive ecological landscape communities. Furthermore, these ecological advantages can be leveraged for activities such as bird watching and fishing, granting nature more space and allowing it to play a more significant role. (Figure 3)

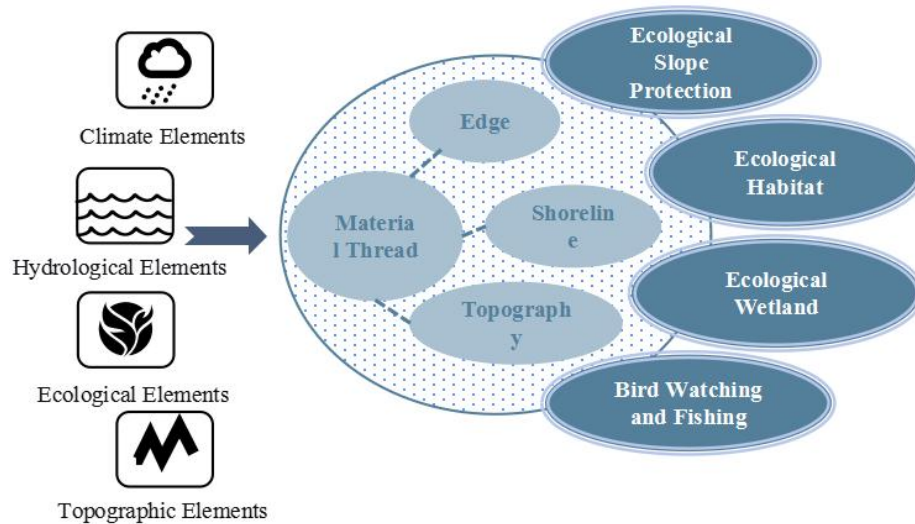


Figure 3. Material Thread Coupling Analysis Diagram.

2.2. Psychological Thread Coupling Mode

The Psychological Thread is shaped by socio-cultural environmental elements such as sightlines, surrounding architecture, urban culture, and contextual heritage. These influencing factors facilitate the creation of spaces including viewing platforms, observation towers, scenic walkways, cultural and art centers, and educational hubs. This approach results in public open spaces that integrate cultural exhibition, humanistic art, and international exchange functions, ultimately forming vital spatial venues for both citizen recreation and the projection of the city's image. (Figure 4)

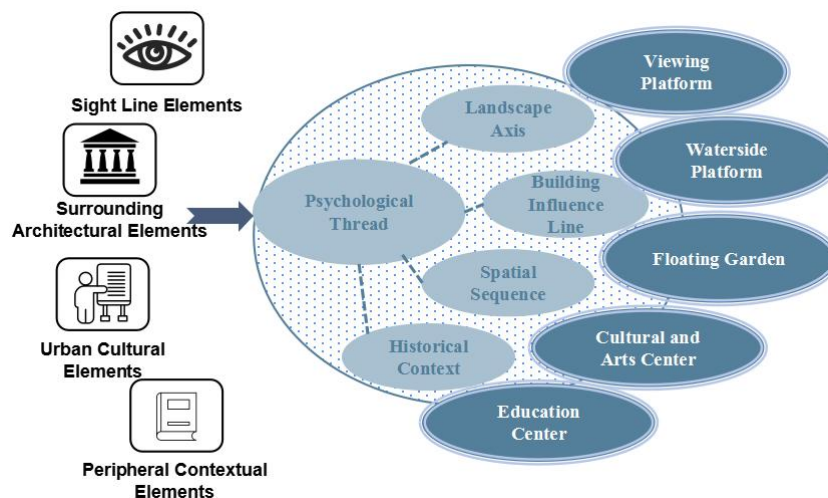


Figure 4. Psychological Thread Coupling Analysis Diagram.

2.3. Behavioral Thread Coupling Mode

The Behavioral Thread is co-shaped by a combination of physical and socio-cultural environmental elements, such as transportation, human flow, economic activity, peripheral tourism, and policy frameworks. By enhancing transportation accessibility and developing spaces for sports and play, leisure green spaces, commercial dining, outdoor activity plazas, and weekend markets, the functionality and interactivity of the park are significantly augmented. This approach positions the park as a pivotal hub connecting with its surroundings, fostering a dynamic urban public space. Through the maximal publicization of the park area, it serves to revitalize the appeal of culture and daily life. (Figure 5)

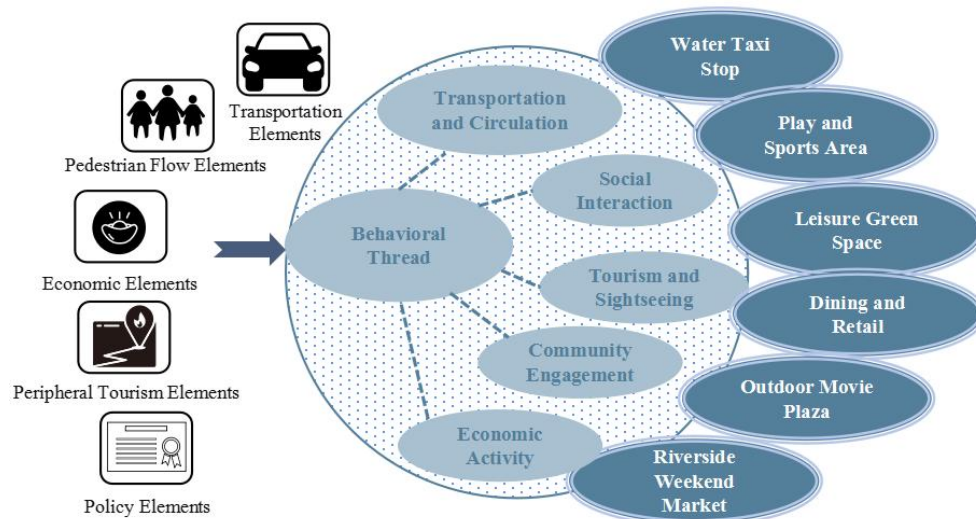


Figure 5. Behavioral Thread Coupling Analysis Diagram.

3. Fundamental Principles of Correlation-Coupling for Urban Park Landscape Design

3.1. Emphasizing Holism and Adhering to the Principle of Integrated Planning

By distilling the spatial characteristics and cultural features along the area, internal spaces are integrated and harmonized with the urban landscape. Connections are established with surrounding spatial nodes to form a coupled framework. Elements such as rivers, adjacent buildings, landscapes, and other nodes are linked together, enabling each node not only to realize its own value but also to correlate and couple with other urban elements. Furthermore, spatial nodes establish visual connections and, together with the park landscape belt, create a dual-axis coexisting structure.

3.2. Emphasizing Cultural Identity and Strengthening the Principle of Historical Continuity

In the process of design practice, it is essential to base the work on the fundamental premise of inheriting and perpetuating the original landscape characteristics. By respecting these features and their developmental logic, the design should meet contemporary needs while establishing correlation and harmony with traditional aesthetics. With cultural heritage as the foundation, historical spaces should be preserved, and historical architectural resources should be strategically deployed, embedding historical and cultural elements into daily life. On this basis, distinctive functions and new elements can be introduced to foster a sense of place identity. By

integrating urban tourism and leveraging ecological advantages, a park landscape suitable for public leisure, recreation, and cultural experiences can be created. Rooted in local culture and history, this approach aims to shape waterfront spaces that reflect the local way of life.

3.3. Emphasizing Functionality and Enhancing Node Vitality

Targeted coordination of the characteristics and existing conditions of various landscape components is essential. During the design process, due consideration should be given to the features and roles of landscape elements while also focusing on the park's long-term development. The fundamental purpose of landscape enhancement lies in providing a better quality of life for surrounding residents and park visitors. Therefore, the design process must address the practical needs of the public and correlate various factors to synchronize park conservation and development. By selecting key spatial nodes as focal points, the scope of vitality can be expanded. Through identifying synergies between spatial continuity and development, activity plazas and open spaces can be established, injecting new life into the area. The landscape design integrates diverse riverside experiences with a mosaic of distinctive destination attractions into a cohesive whole, narrating a complete spatial journey. This approach enhances public engagement and elevates spatial vitality.

4. Correlation-Coupling Strategies for Urban Park Landscape Design

4.1. Material Thread Strategy

The Material Thread focuses on designing for the ecological character of the park. By analyzing hydrological, climatic, ecological, and topographic elements, the surrounding context of the park is thoroughly understood. Utilizing the internal correlation-coupling elements of the park, diverse plant communities are introduced and harmonized to create layered landscapes. Through the interaction of coupling threads, varied scenic experiences are formed. By interrelating natural resources and spatial resources, the construction, protection, and management of the park serve as an opportunity to enhance its ecological environment. In the future, the park will belong not only to humans but also to species such as fish, birds, and other flora and fauna.

4.2. Psychological Thread Strategy

The Psychological Thread focuses on designing for park connectivity and establishing a relational system with the surrounding context. The sequencing of spaces should be realized through the integration of color, materials, and furnishings, utilizing local materials to achieve coherence in the exterior spatial texture of architecture. In terms of historical context, tapping into the contextual advantages around the park enhances the intrinsic connections between sites and links them to the city's cultural essence. This can involve introducing art exhibition centers and creating cultural-educational spaces to facilitate cultural and artistic exchange activities. Regarding visual corridors and architectural sightlines, the park's ecological advantages are leveraged to create open vistas, linking architectural and landscape views to foster a sense of place belonging. In spatial sequencing design, flexible and targeted approaches are adopted based on functional requirements and spatial structures, resulting in a layered spatial landscape.

4.3. Behavioral Thread Strategy

The Behavioral Thread focuses on designing for human flow and activity within the park. In terms of transportation and circulation, it is essential to incorporate surrounding elements into the design. For instance, if the park is adjacent to a river, external connectivity can be enhanced by establishing water taxi stops, linking the park to its surroundings and integrating water-based routes. This not only enriches the park's pathway system but also adds distinctive spatial character. The spatial distribution of nearby residential areas, scenic spots, schools, and the movement patterns of people must also be taken into consideration. In the areas of social interaction, tourism, public engagement, and economic activity, facilities such as event lawns, interactive play spaces, outdoor music venues, open-air movie squares, riverside weekend markets, and dining and retail zones can be developed. By offering seasonal events and both daytime and evening activities, these spaces help diversify local industries and expand sources of economic revenue. This approach strengthens connections with surrounding communities while generating tangible economic benefits.

5. Conclusions

With the intensive development of cities, public spaces have become increasingly limited and precious. This paper focuses on urban parks—a vital form of public space—as the object of study. From the perspective of correlation-coupling, it integrates theory and practice to explore and investigate urban park landscape design. Applying correlational and coupling thinking to park landscape design enables better coordination between elements and systems, establishes connections among multiple spatial elements, and emphasizes the relationships between them. Thereby, it effectively interlinks various coupling elements within the park space, revitalizes the space, enhances its utilization rate, and forms an organic system. This study aims to provide practical and useful references for urban park landscape design, offering a solid theoretical foundation and innovative ideas for its development.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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