

Research on the Development Direction of Landscape Architecture from the Perspective of Fairness and Justice and Health Justice

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ABSTRACT

The outbreak of COVID-19 has caused an indelible impact on the city and the public. From a global perspective, fairness and justice and health justice have become the theme of the times, but also the current focus of landscape architecture. In China, the response mode of public health and epidemic prevention is mainly based on the community as a unit for health isolation. Park green space plays a great role in improving public health, epidemic prevention and control, and blocking the spread of virus. Based on the above background, this paper puts forward the development direction framework of landscape architecture under the theme of fairness, justice and health justice: including three levels, improving the supply of green space at the planning level, and constructing a multi-level and full-coverage urban green space system planning and evaluation mechanism. At the level of the transformation of the research scale, we focus on the community scale, pay attention to the relationship between green space and human health in the epidemic environment, and emphasize the planning and optimization of green infrastructure in the community life circle. At the level of public health, it enriches the compound functions of public health and health services of community green space, derives the function of sanitation and epidemic prevention of green space and provides temporary emergency places for medical and health isolation and treatment of insufficient space. enhance the community to have a certain degree of redundancy and resilience in dealing with uncertain unknown risks.

KEYWORDS

Landscape architecture discipline development; fairness and justice; health justice; hot topics; public health events

1 Introduction

The rapid global spread of COVID-19 has posed a serious threat to human health, social stability, and economic development, directly altering people's work and lifestyles [1]. Simultaneously, the outbreak of this public health emergency has severely impacted urban healthcare systems. At its peak, the global cumulative number of reported COVID-19 cases reached 647,972,911, with total deaths amounting to 6,642,832. These figures have had an indelible impact on urban development and the mental and physical health of the population, prompting cities to primarily adopt social distancing measures to curb the virus's transmission. During the pandemic, there has been a growing demand for outdoor green space activities. Numerous scientific studies consistently indicate that engagement in activities and experiences within natural environments is beneficial to

public health. This has been recommended as a countermeasure to mitigate the negative psychological effects of COVID-19 isolation [2]. Urban parks and green spaces appear in various forms throughout urban areas and represent a vital component of public space. Their health mechanisms play a significant role in facilitating orderly urban development and in improving and regulating public mental and physical recovery in response to public health emergencies [3-5]. Additionally, they provide comprehensive ecosystem services and a diverse array of recreational spaces [6]. The negative impacts associated with the outbreak of public health emergencies are likely to persist in the long term. Consequently, there is heightened public concern regarding the equitable access to accessible green spaces and issues related to health equity that address both mental and physical well-being.

2 Framework for Hot Topics in the Development of Landscape Architecture from the Perspectives of Fairness and Health Justice

As we enter the post-pandemic era, fairness and health justice have emerged as central themes of contemporary development. Particularly in the wake of large-scale public health crises, the public's desire for green open spaces has become a focal point in the advancement and research of the landscape architecture discipline. As an interdisciplinary field, landscape architecture has historically concentrated on theoretical studies and practical applications related to the history of landscape architecture, near-natural urban landscaping, urban green space system planning, and landscape transformation [7-9], and has accumulated a substantial body of theory and practice. In recent years, with the improvement of urban residents' living standards, there has been a shift from basic material needs to a higher pursuit of urban social welfare. This shift is particularly pronounced in the post-pandemic context, where research on the aspects of fairness and health justice related to green spaces is noticeably insufficient. The pandemic has reaffirmed the value of parks and green spaces as essential components of daily life [1]. Research within the landscape architecture discipline is increasingly focusing on questions such as: What benefits can urban parks and green spaces provide to the public? How can satisfaction with these spaces be enhanced [10]? Moreover, in light of current public health concerns, how can equitable and just spatial allocation of park green spaces be achieved [11]? These questions are becoming key directions for future reflection and further practice in the development of landscape architecture.

Therefore, exploring the potential hot topics and development directions of landscape architecture from the perspectives of fairness and health justice can be categorized into three levels:

(1) Integrating green space planning at the city-district-county level with multi-layered and comprehensive land space composition, focusing on the coupling of urban spatial functions and structural elements with parks and green spaces. This involves addressing the justice of rational green resource planning and multidimensional evaluation indicators, while emphasizing interdisciplinary collaboration in green space planning and management to reflect equity and synergy in urban green space governance;

(2) At the research scale, there is an increasing focus on the relationship between human health and green spaces, particularly regarding the optimization of green space planning within residential areas;

(3) Further enriching the discussion on the multifunctional roles of parks and green spaces during public health emergencies and the transformation of spatial scenarios, highlighting the role of green spaces in health isolation and community medical interventions. This aims to provide direction for the research and practice of landscape architecture development under the lenses of fairness and health justice .

3 Development Directions at the Discipline Planning Level

3.1 Multi-Level Green Space System Planning Framework and Multi-Dimensional Evaluation Under the Guidance of Fairness and Justice

Parks and green spaces play a multifaceted role in urban structure, showcasing various human transformations and combinations of different species. As early as 2014, scholars foresaw the challenges of urban green spaces, public health, and environmental justice, posing the question of how to make cities "green enough" [12]. Research on green space planning has made significant progress, with experts and government agencies conducting extensive studies on the characteristics and planning of green infrastructure in most cities. For instance, during the COVID-19 crisis, Ireland relaxed its policy of restricting residents' access to green spaces within a 2 km radius to a 5 km range. However, not every neighborhood has accessible green spaces within these limits. Urban green space planning is not merely about expanding existing areas; it involves a public planning approach with a strong social dimension. This entails integrating green spaces of varying sizes and scales into urban land use planning and proposing a series of effective and highly compatible strategies to address the complex issues and challenges posed by the uneven distribution of green spaces [13, 14]. Related topics include the disparities in green space planning between urban and rural areas, urban risks, public health, and environmental equity.

Traditionally, urban green space planning has often overlooked the connections between urban and rural areas. The uneven distribution of green space resources has led to inequities in green space planning. Therefore, it is crucial to propose methodological approaches for planning at three spatial levels: the city, urban district, and neighborhood. This shift moves green space planning from a "passive" to an "active" integration within rigid urban and rural infrastructure development [15]. This approach helps to balance the disparities in green space resources across different levels and avoids the fragmentation of essential ecological services. Additionally, green space planning should be integrated into land-use planning [16], synchronizing with municipal and county land-use strategies. By aligning regional plans with shared goals, it couples urban functional spaces and structural frameworks, creating a comprehensive green space planning system that is rich in hierarchy and extensive in coverage, thereby ensuring both the ecological integrity of urban green spaces and regional green equity.

Efficient integration of green space planning with the determination and implementation of indicators can significantly reflect the fairness of park green spaces accessible to all residents in a region, as well as the environmental justice needed to address unknown urban risks. Traditional planning evaluation systems primarily focus on three main indicators: per capita green space area, green space coverage, and green space ratio. Current research shows a consensus that the evaluation of green space planning is evolving from a single-dimensional to a multi-dimensional framework and from two-dimensional to three-dimensional approaches. The evaluation system is no longer limited to the accessibility of green space or a simplistic assessment of the effective supply of park configurations; instead, it now integrates into the broader context of land spatial planning. This involves a multi-faceted approach that incorporates resource and environmental carrying capacity, park scale and population density, carbon sequestration and oxygen release, per capita park and open space area, and park quality as constraining indicators to implement green space planning. This emphasizes regional equity, environmental justice, and social justice at both large and small scales, effectively addressing the imbalance in the quantity and quality of park green spaces [17].

In summary, the field of landscape architecture is progressively moving toward a multidimensional approach to equity and justice in planning. Green space planning engages with various levels of land spatial planning to integrate green resource management and link urban

spatial structures and functional space planning. This integration aims to achieve equitable spatial layouts for green spaces and address social and environmental justice in terms of climate resilience and public health, while also incorporating specific land spatial planning indicators for evaluation.

3.2 Multidisciplinary Collaborative Management of Green Space Planning and Operations

A multilayered and comprehensive green space system plan addresses the uneven distribution of green resources across different areas. However, at smaller scales, strategies such as filling small vacant spaces with greenery to integrate into community life hold social significance. Nonetheless, these approaches also introduce management challenges. Once the quantity of green space meets standards, issues of park quality emerge, which are closely linked to operational management. The success or failure of green space management directly affects the interests of various stakeholders, including the urban public. The field of landscape architecture encourages interdisciplinary and cross-departmental collaboration to clarify the issues surrounding the construction, operation, and management of parks and green spaces. It aims to establish clear control objectives based on relevant regulations and create standards and decision-making mechanisms for green space planning and management that transition from quantity to quality, relying on a platform for data resource sharing and interoperability[18].

At the same time, ensuring high-quality development of park green space through effective operational management can lead to significant financial expenditures. The field of landscape architecture must continue to explore operational management pathways for parks that are suited to China's national context, such as enhancing the diversity and depth of participation among planning and management entities[19]. Tactical urbanism advocates for the establishment of diverse collaborative organizations to foster innovative relationships, implementing long-term operational management mechanisms for regional green spaces. By introducing high-quality activities, these strategies can enhance the attractiveness of green spaces and increase public engagement, significantly boosting regional vibrancy. Given China's vast territory, there remains substantial potential for development in this area[20, 21]. The involvement of multidisciplinary, departmental, and third-party organizations in collaborative operational management, while ensuring the rational planning and effective allocation of green space resources, will position green space planning and management as one of the key exploration directions for the discipline of landscape architecture in China.

4 Shift in Hot Topics at the Research Scale

4.1 Relationship Between Park Green Spaces and Human Health

The varying degrees of accessibility to park green spaces lead to different health benefits for individuals. A scientific study conducted in Denmark on the relationship between green space perception and human health revealed significant differences in health status and health-related quality of life between respondents living more than 1 km from park green spaces and those living less than 300 m away. Additionally, the COVID-19 pandemic heightened feelings of anxiety and panic among residents due to social isolation and societal pressures [22]; about 20% of individuals exhibited noticeable signs of anxiety or depression. In Australia, a survey indicated that approximately 36% of residents increased their use of green spaces, while 45% of those who previously did not visit green areas began to do so. Studies by both domestic and international scholars have conducted comparative experiments observing outdoor walking experiences in built

versus natural environments, revealing that green spaces can alleviate the negative impacts of stress and life events on health[23-25]. However, past research has often overly relied on cross-sectional studies, primarily discussing the relationship between people and green spaces in terms of normalized indices such as green space area, size, and vegetation coverage[26]. This focus on accessibility and availability can represent green space's influence but does not effectively account for all factors affecting human health. This reliance has led to uncertainties and singularity in findings.

Human health is a reflection of individual lifestyle habits and the living environment. Assessing the relationship between green spaces and human health based on three-dimensional visibility and perception of green spaces is significantly meaningful[27]. Increasing exposure to green environments and green space ratios can enhance residents' psychological perceptions of these areas, thereby reconstructing the connection between individuals and natural green spaces to promote physical and mental comfort. Future research and development within the landscape architecture field can further explore the complex relationships and potential pathways between these elements, delving deeper into innovative models and metrics to support their conclusions[28].

4.2 The Optimization of Green Space Systems in Community Living Areas for Human-Centered Health Justice

In the post-pandemic era, research on community living circles is set to become a focal point of study, guiding the direction of landscape architecture towards a shift from individual health needs to a broader focus on overall community health levels[29]. The concept of community living circles was first proposed in Japan as a basic spatial unit oriented toward residents' daily activities. The outbreak of COVID-19 disrupted interactions with public spaces, with community green spaces being the closest link to the community, serving as key carriers of public resources and convenient recreational services within the living circle.

The essence of the rational allocation and optimization of community green space resources lies in enhancing residents' quality of life and embodying human-centered health justice within the community[30].

Under the travel restriction policies during the pandemic, it became challenging for people to access comprehensive parks for recreational activities, while community green spaces provided residents with opportunities to access open areas. In defining the boundaries of community living circles, a 15-minute walk is often used as a benchmark for green space layout planning, while a 5-minute zone is needed to meet residents' more frequent demands for green space access.

This raises the question of how to increase the community green space ratio within the constraints of urban land scarcity while effectively sharing community functions with other land uses. Optimizing the community green space planning system involves more than simply adjusting the location, size, and type of green spaces; it also requires addressing how these green spaces connect with community facilities and foster new ways of living that shape daily community landscapes.

The theory of park urbanism provides a solid theoretical foundation for optimizing the community green space system, integrating park concepts into community functional zones, enriching plant community configurations, and considering pedestrian accessibility to construct a slow-moving greenway system throughout the community. Additionally, it emphasizes embedding community activities that encourage residents to engage deeply, thereby forming an optimized community green space system that embodies green power justice and human-centered health justice.

5 Hot Topics in Public Health

5.1 Transformations of Diverse and Multifunctional Green Space Scenarios

Davoudi proposed applying a resilience perspective to planning, examining how social systems respond to a range of crises or shocks, including uncertainties related to economic and environmental risks[31]. He introduced the hypotheses of 'returning to normal' and 'adaptive transformation.' The COVID-19 pandemic disrupted urban healthcare systems, placing unprecedented pressure on medical care and health isolation, with its negative impacts likely to persist. This crisis has prompted reflections within landscape architecture regarding public health: "In light of this public health event, how should green space planning respond? How can we make our urban communities more resilient?"

During the peak of the pandemic, the shortage of medical spaces forced the consideration of using 'non-healthcare buildings' as temporary hospitals to meet the increasing demand for patient care[32]. Landscape architecture also raises important questions regarding 'temporary medical spaces': How can we effectively utilize community green spaces and their variability and adaptability in responding to environmental disasters and epidemic outbreaks[33]? Under the normalization of epidemic prevention, there is a greater emphasis on diverse and multifunctional green space health services, exploring the potential mechanisms and pathways that link green spaces to public health. Community green spaces can be seen as resilient tools for future strategies. The health benefits of these spaces allow the public to engage in recreational activities during the pandemic while maintaining safe distances, satisfying social needs in outdoor environments with lower infection risks. Due to these characteristics, green spaces can provide temporary accommodations for the medical isolation and treatment space shortages that arise during outbreaks, as well as serve as emergency supply sites. This facilitates a transformation of green space functions from basic recreation to 'resilient hospitals' for healthcare isolation and treatment, alleviating the pressure on local hospitals. In fact, COVID-19 presents an opportunity to rethink and address these issues by expanding the health services of green spaces in diverse and multifunctional ways, as well as exploring the potential of other public spaces, thereby achieving flexible transformations of green space functions and enhancing community resilience in the face of uncertain risks.

5.2 Health Isolation and Gridded Community Healthcare Interventions

During the ongoing pandemic, health isolation and gridded community healthcare interventions are essential for promoting public health justice in communities, benefiting the public at multiple levels. Historically, community parks and green spaces held no dominant position within community units, but the outbreak of COVID-19 has fundamentally altered public perceptions of these spaces. In public health emergencies, green spaces can transform into temporary sites for medical treatment and health isolation, leveraging their benefits for physical and mental recovery. These spaces not only accommodate routine care for downgraded COVID-19 patients but also provide medical isolation for close contacts of confirmed cases. Compared to public healthcare buildings, being in a green environment is more conducive to medical treatment and overall recovery[34].

This also relates to the planning and operational management of small to medium-sized green spaces, where communities are divided into 50×50 meter grids with a 15-minute radius [35, 36]. Even smaller units can be configured to help prevent the emergence of other comorbidities related to COVID-19 outbreaks, thereby achieving a gridded healthcare intervention mechanism. Additionally, healthcare institutions monitor population health and intervention needs, indicating

the potential for the landscape architecture discipline to engage in the public health field and seek deep collaboration with relevant agencies and professionals. This collaboration could yield research data to inform more professional and authoritative intervention measures, capturing potential public health hazards, and ensuring operability beyond the intervention period.

6 Discussion

As we enter the post-pandemic era, topics of 'equity and justice' and 'health justice' will continue to be focal points for the future development of landscape architecture. From a planning perspective, it is essential to move beyond traditional planning paradigms and engage in land spatial planning, constructing a multi-level green space planning system based on common goals and multi-dimensional evaluations. This should be integrated with various levels of land spatial planning to consolidate green space resources and avoid 'unjust planning' practices arising from disparities in green space resources between regions. Additionally, refined green space management aligned with planning can incur significant financial expenditures. How can the landscape architecture discipline collaborate with multiple stakeholders to explore a green space management approach that fits China's context? Another critical area for exploration is the complex relationship between human health and the benefits of green spaces. Human health is influenced by various factors, and studies relying solely on cross-sectional data often only indicate the positive effects of green spaces without directly linking these indicators to human health outcomes. There is still a need for deeper exploration and validation of the metrics related to health justice.

In the future, the discipline will focus more on community scales, emphasizing the optimization of human-centered health-oriented green space systems within community living circles. This includes examining the integration of green spaces with community service facilities and developing theories around new types of daily community landscapes. Under the influence of COVID-19, landscape architecture must consider its role in public health, leveraging the diverse and comprehensive benefits of green spaces while highlighting their functional transformations during public health emergencies. This adaptability is crucial in alleviating pressures on medical resources and isolation spaces.

Moving forward, in the face of significant public health events like SARS and COVID-19, there is a need to prioritize green spaces as tools for health isolation and for constructing gridded community healthcare interventions. Enhancing community resilience and redundancy in responding to uncertain risks is essential. This represents a formal entry of landscape architecture into the public health field, seeking deep interdisciplinary collaboration supported by scientific, authoritative, and rational data to capture potential public threats and provide more equitable and human-centered health intervention strategies.

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