

Transcending boundaries in Architecture: A Transdisciplinary inquiry into public space

Trascendiendo las fronteras en la Arquitectura: Una investigación Transdisciplinaria sobre el espacio público

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Abstract

This chapter offers a comprehensive exploration of architectural public spaces through a transdisciplinary lens, focusing on morphology, security, and daylight. In the context of urban development, these spaces play a vital role in shaping social interactions, fostering community cohesion, and enhancing the quality of life. The transdisciplinary approach adopted in this research integrates insights from environmental psychology, sustainable architecture, landscape design, architectural anthropology, spatial analysis (space syntax), perception theories, and concepts of self-security. This paper illuminates the complexities involved in the design, usability, and impact of these spaces, aiming to bridge existing knowledge gaps. It further provides practical recommendations for architects, urban planners, policymakers, and other relevant stakeholders. By merging diverse disciplinary perspectives, the paper underscores the importance of a transdisciplinary discourse in the design and utilization of architectural public spaces, contributing to a broader understanding of urban life quality and sustainability.

Architectural design, Daylight, Morphology, Security perception, Sustainable Architecture

Resumen

Este capítulo ofrece una exploración integral de los espacios públicos arquitectónicos a través de una lente transdisciplinaria, centrándose en la morfología, la seguridad y la luz del día. En el contexto del desarrollo urbano, estos espacios juegan un papel vital en la configuración de las interacciones sociales, fomentando la cohesión comunitaria y mejorando la calidad de vida. El enfoque transdisciplinario adoptado en esta investigación integra conocimientos de la psicología ambiental, la arquitectura sostenible, el diseño del paisaje, la antropología arquitectónica, el análisis espacial (syntax del espacio), las teorías de la percepción y los conceptos de seguridad personal. Este documento ilumina las complejidades involucradas en el diseño, la usabilidad y el impacto de estos espacios, con el objetivo de cerrar las brechas de conocimiento existentes. Además, proporciona recomendaciones prácticas para arquitectos, urbanistas, formuladores de políticas y otras partes interesadas relevantes. Al fusionar diversas perspectivas disciplinarias, el documento subraya la importancia de un discurso transdisciplinario en el diseño y la utilización de espacios públicos arquitectónicos, contribuyendo a una comprensión más amplia de la calidad de vida urbana y la sostenibilidad.

Antropología arquitectónica, Arquitectura sostenible, Psicología ambiental, Diseño del paisaje, Análisis espacial

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1. Introduction

Architectural public spaces, essential for the formation and reinforcement of community and cultural identities, are areas that facilitate an array of public interactions and activities (Kaklauskas *et al.*, 2021). They contribute significantly to the vibrancy and quality of urban life, and their design and functionality—encompassing morphology, security, and lighting—are integral to their usability and effectiveness (Gehl, 2020). The significance of these components becomes pronounced when seen through a transdisciplinary lens that integrates insights from environmental psychology, sustainable architecture, urban planning, landscape design, architectural anthropology, spatial analysis, perception theories, and concepts of self-security (Mayya, 2021; Lobo *et al.*, 2020; Salama, 2020).

A transdisciplinary approach is instrumental in unifying diverse disciplinary perspectives into a comprehensive framework to holistically explore the complexities of public spaces (Wahrab, 2023; Pohl *et al.*, 2021). This approach moves beyond the confines of individual disciplines, transcending them to create new syntheses (Cockburn, 2022). It's especially relevant when exploring architectural public spaces due to their multifaceted nature.

This study aims to harness the power of transdisciplinarity to delve into the interplay of morphology, security, and daylight in such spaces. The methodology of this research is primarily qualitative, incorporating extensive literature review, transdisciplinary framework development, detailed analysis of key aspects, and insightful discussions.

The inclusion of diverse disciplines like environmental psychology helps understand how humans interact with these spaces (Gifford, 2007), while sustainable architecture and landscape design provide insight into the ecological and aesthetic aspects of their design (Byrne, 2022; Kim, 2021). Architectural anthropology offers a cultural perspective (Moore, 2019; Ruiz, 2019), and spatial analysis, particularly space syntax, sheds light on the spatial configuration and its influence on social interactions (Lee *et al.*, 2023; Yao *et al.*, 2019; Hillier *et al.*, 1976).

Perception theories elucidate how individuals perceive and interpret these spaces (Lynch, 1960), and the concept of self-security informs the study of security in public spaces (Cozens, 2002; Jung, 1971). The primary aim of this research is to build a cohesive understanding of architectural public spaces, focusing on the roles and interrelationships of morphology, security, and lighting. By employing a transdisciplinary approach, we aspire to fill existing knowledge gaps and offer practical recommendations for urban planners, architects, policymakers, and other stakeholders. By exploring these facets within the broader realms of environmental psychology, sustainable architecture, landscape design, and others, the aim is to contribute to the discourse on improving the design and functionality of public spaces.

2. Methodology

Research design, approach, data collection, and rationale of the study

The research design of this study is based on a qualitative, exploratory approach that is suited to the investigation of complex phenomena and the interrelationships between various components, table 2.1. A transdisciplinary framework was used, drawing upon concepts, methods, and theories from a range of disciplines including environmental psychology, sustainable architecture, urban studies, landscape design, architectural anthropology, spatial analysis, perception theories, and security studies. This research design enables us to synthesize these diverse perspectives into a comprehensive analysis of the morphology, security, and daylighting of architectural public spaces.

A transdisciplinary approach surmounts the restrictions of individual disciplines, assimilating their unique insights into a comprehensive whole (Alba Dorado, 2022). In this investigation, such an approach prompts the amalgamation of expertise from a plethora of disciplines mentioned before, with each contributing distinct perspectives into the intricate dynamics of architectural public spaces. It's this rationale that propels the application of this method in the ongoing analysis of morphology, security, and daylighting within these spaces.

This application necessitates the integration of design principles, cultural considerations, spatial configurations, environmental factors, perceptual responses, and safety measures.

Furthermore, in conducting the data collection for this study, a comprehensive literature review was undertaken. This review facilitated the gathering of a broad range of academic and professional knowledge on the key topics. For data analysis, a thematic approach was employed. This approach identified key themes related to the morphology, security, and daylighting of public spaces as represented in case studies.

These themes were scrutinized in connection with the concepts, principles, and theories derived from the transdisciplinary framework. In addition, the decision to employ a qualitative, exploratory research design and a transdisciplinary approach was driven by their potential to provide a comprehensive and nuanced understanding of architectural public spaces. These methodologies facilitate the exploration of the multifaceted nature of these spaces and shed light on how the interplay among morphology, security, and daylighting influences their use and experience.

Components	Details
Research Design	Qualitative, exploratory approach Utilizes a transdisciplinary framework
Transdisciplinary Approach	Draws from environmental psychology, sustainable architecture, urban studies, landscape design, architectural anthropology, spatial analysis, perception theories, security studies Integrated analysis of morphology, security, and daylighting
Data Collection and Analysis	Comprehensive literature review Thematic analysis of data
Rationale	To provide comprehensive understanding of architectural public spaces To understand the multifaceted nature of these spaces

Table 1 Methodological approach of the study
Source: Elaborated by Miriam Mery-Ruiz. 2023

3. Results

3.1 Multidisciplinary, interdisciplinary or transdisciplinary? A comparative study of the approaches in understanding architectural public spaces

The study of architectural public spaces has a multifaceted nature, demanding insights from numerous fields, such as environmental psychology, sustainable architecture, landscape design, architectural anthropology, spatial analysis, and more. The role of architectural public spaces in urban environments is complex, involving the physical, social, and cultural components that are ever-changing and often interdependent. Scholars have approached these complex issues through various lenses, namely multidisciplinary, interdisciplinary, and transdisciplinary approaches.

In our journey to grasp the multifaceted nature of architectural public spaces, we find ourselves standing at the crossroads of diverse approaches. Each path offers a unique perspective, beckoning us with their distinctive insights and contributions. We embark on this comparative quest not just to choose our path, but to understand the essence of each, and how they shape our understanding of architectural public spaces.

The multidisciplinary approach can be visualized as a harmonious ensemble. It is akin to an orchestra where each musician – or discipline in this context – plays their part in an independently exquisite manner, while contributing to the overall melody (Goryunova & Lehmann, 2023). Like seasoned urban planners scrutinizing spatial configurations, environmental psychologists diving deep into human behavioral influences, and architects crafting aesthetic, technology and designs, each discipline, in its unique way, crafts an understanding of the architectural public space. The melody is rich, but each note rings distinct and independent; the individual findings may not necessarily converge or integrate figure 1.

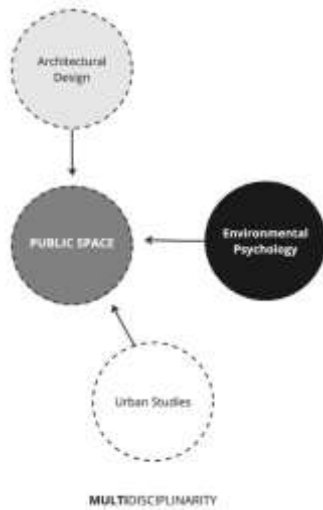


Figure 1 Multidisciplinary approach of the study problem
 Source: Elaborated by Miriam Mery-Ruiz. 2023.

Contrastingly, the interdisciplinary approach promotes a captivating dance of ideas, methods, and theories, as they intertwine and move fluidly across disciplinary boundaries. This is an intellectual waltz where new understanding emerges from the seamless fusion of disciplinary insights, creating an exciting outcome that is more than just the sum of its parts (Dwivedi *et al.*, 2022). Envision urban planners, architects, and environmental psychologists engaging in a dynamic ballet to understand how physical design influences human behavior in architectural public spaces. Their collaborative dance could give rise to innovative design principles that amplify the social, psychological, and aesthetic benefits of the space (Escobar, 2018; Newell, 2001), figure 2.

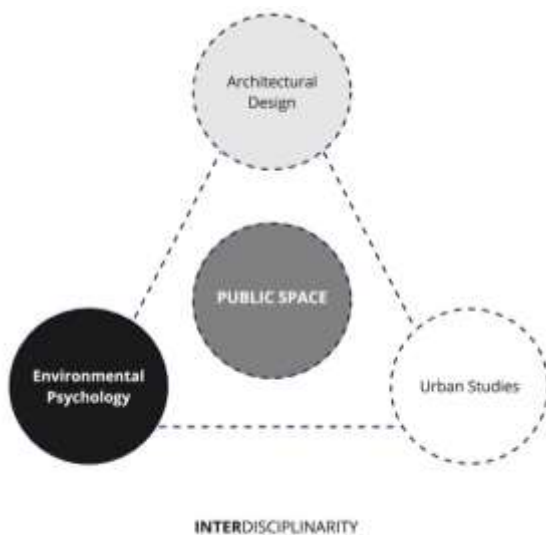


Figure 2 Interdisciplinary approach of the study problem
 Source: Elaborated by Miriam Mery-Ruiz. 2023

Transcending these integrations, the transdisciplinary approach creates a holistic tapestry of knowledge (Nicolescu, 2002). Imagine a multitude of threads - concepts, theories, and methods - from various disciplines coming together, weaving a comprehensive understanding that surpasses the scope of any single discipline. Studying architectural public spaces in this light opens the stage to not just academics, but practitioners, policymakers, and community members. Together, they create a diverse, rich tapestry that offers a nuanced understanding of public spaces (Stokols, 2006), figure 3.

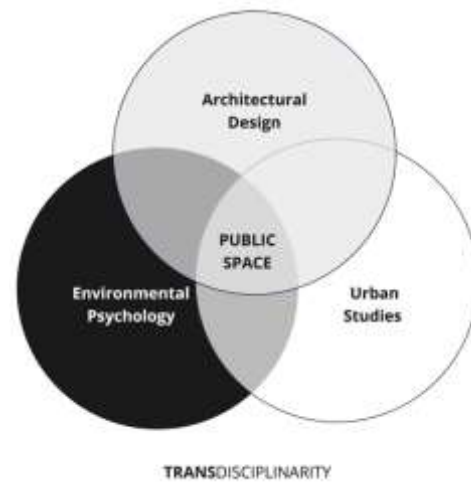


Figure 3 Transdisciplinary approach of the study problem
 Source: Elaborated by Miriam Mery-Ruiz. 2023

In the quest to decode the complexity of architectural public spaces, a transdisciplinary approach emerges as a powerful tool. It paints a comprehensive picture, capturing the intricate play of light and shadow, the meandering paths of user experience, and the towering structures of public policy and urban planning. It promises the potential for novel models and frameworks capable of grappling with the myriad challenges posed by these complex spaces (Lawrence & Després, 2004). While each approach - multidisciplinary, interdisciplinary, and transdisciplinary - offers unique perspectives and methodologies, it is the transdisciplinary approach that appears to most deftly capture the dynamic intricacies of architectural public spaces. With its capacity to weave together a broad spectrum of disciplines and perspectives, it provides a nuanced understanding that transcends and integrates. Yet, the chosen approach, be it a single note, a dance, or a tapestry, largely depends on the nature of the research questions, the context, and the resources at hand.

3.2 The importance of architectural public spaces in urban environment: transdisciplinary approach

Architectural public spaces play a fundamental role in urban environments, serving not only as physical structures but also as sites that foster community engagement and cultural expression (Bleibleh & Awad, 2020). They are arenas that facilitate diverse public interactions and activities, thereby contributing to the vibrancy of urban life (Gehl, 2014). A city's public spaces, including parks, squares, plazas, and streets, are essential components of its urban fabric. These spaces have a direct impact on the health, well-being, and quality of life of city dwellers (Whyte, 1980). They provide settings for recreation, relaxation, social gatherings, and cultural events, enriching residents' day-to-day experiences (Bansal & Bhandari, 2020). Furthermore, the design and functionality of these spaces, including their morphology, security, and lighting, play a vital role in their usability and effectiveness, figure 4.

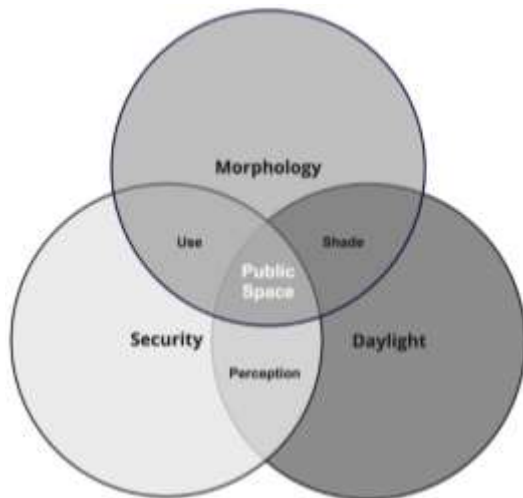


Figure 4 Influence factors of the study on design and functionality of public spaces.

Source: Elaborated by Miriam Mery-Ruiz. 2023

These factors influence how people perceive, use, and engage with these spaces (Gómez-Varo *et al.*, 2022; Jacobs, 1961). For instance, spaces that are well-lit and designed with an emphasis on user safety tend to encourage more public use, particularly after dark, contributing to a lively urban environment (Park & García, 2020). From the perspective of environmental psychology, public spaces are seen as "behavior settings" that can influence people's behavior and social interactions (Raja & Heras-Escribano, 2023; Hamedani *et al.*, 2021).

They can facilitate or inhibit certain actions, depending on their design and management (Sharifkazemi & Dezfuly, 2021). In addition, from a sustainability standpoint, public spaces also play a key role in urban environments. They provide opportunities for improving urban ecology, enhancing biodiversity, managing stormwater, and mitigating heat islands (Singh *et al.*, 2020). Landscape design principles applied to these spaces can help achieve these sustainability goals while also creating aesthetically pleasing and inviting environments for public use (Cabanek *et al.*, 2020). The importance of architectural public spaces in urban environments, thus, cannot be overstated. They significantly contribute to urban vitality, citizens' well-being, and the overall sustainability of cities.

Along, the transdisciplinary approach represents an evolution beyond traditional research methodologies. This approach moves beyond simply working between, across, and within disciplines and strives to transcend them altogether, to create a holistic framework that integrates and synthesizes knowledge (Nicolescu, 2002). This is done by developing shared concepts, theories, and methods that go beyond the scope of individual disciplines (Espino *et al.*, 2004). Transdisciplinarity is particularly relevant in tackling complex, real-world problems that cannot be adequately addressed by one discipline alone. In such instances, a transdisciplinary approach can draw on diverse perspectives to generate innovative solutions.

By transcending disciplinary boundaries, it opens up the possibility for new models and frameworks that can address the intricacies of these complex issues (Stokols, 2006). Not to mention that in the context of the study of architectural public spaces, a transdisciplinary approach can prove to be invaluable. Given the multifaceted nature of these spaces, understanding them requires insights from numerous fields, including environmental psychology, sustainable architecture, landscape design, architectural anthropology, spatial analysis, and more.

The interplay of elements such as morphology, security, and lighting in these spaces is complex and requires a comprehensive approach for its understanding (Mohareb *et al.*, 2023).

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A transdisciplinary approach can integrate these varied perspectives into a cohesive framework, thus offering a more nuanced understanding of architectural public spaces. All this, providing an understanding that these spaces and their use greatly depends on three fundamental elements: morphology, security, and lighting (natural or artificial). The interaction among these components not only shapes the physical attributes of such spaces but also molds the perceptions, actions, and experiences of the individuals interacting with them. To study morphology is to delve into the form and structure of public spaces, which is fundamental in determining how these areas are perceived and used (Hillier *et al.*, 1984).

To analyze spatial configuration, encompassing the layout, size, and shape of these spaces, is to influence pedestrian movement, accessibility, visibility, and the potential for social interactions. To create spaces that are well-connected and easily accessible is to potentially attract more users (Hillier, 1996). Similarly, to arrange and orient buildings and other physical elements within a public space can enhance or inhibit visibility, thereby influencing its use (Brantner *et al.*, 2021).

What's more, ensuring security in public spaces is a vital aspect of their use. According to Newman's defensible space theory, designing and managing physical environments can deter criminal activities and promote a sense of safety (Newman, 1972). To enable natural surveillance in public spaces, where activities can be easily observed by others, can lead to safer spaces and, consequently, increased usage (Jacobs, 1961).

Furthermore, to adopt a more inclusive and sustainable approach to security is to emphasize the importance of social, economic, and environmental factors, alongside physical design (Cozens, 2002). Taking in account that adequate light levels in public spaces holds significant power over their usage. Daylight enhances visibility, improves orientation, and instills a sense of safety. (Boyce, 2014). Despite the expansive body of research surrounding public space use, morphology, security, and daylight, there exist notable gaps in the current literature that demand further investigation.

Firstly, a large portion of existing research on public space morphology tends to focus on individual elements such as building arrangement or pedestrian pathways, such as the works of Nawawi & Shamsudin (2023), Anggraini & Wijayanti (2023), Thai *et al.* (2022), and Carvalho & Bertol (2019), among others. However, there is a lack of comprehensive studies that holistically consider the interplay between these various morphological elements and their collective impact on public space use. Regarding security, while Newman's (1972) defensible space theory and Jacob's (1961) eyes on the street concept have been widely accepted, the incorporation of socio-economic and environmental aspects into security considerations remains limited (Cozens, 2002). It calls for broader perspectives that go beyond mere physical attributes and design factors in shaping secure public spaces.

In the realm of daylight, the majority of studies focus on its application in interior spaces as the works of Espinoza Cateriano (2022), Marzouk *et al.* (2022), Nadiri *et al.* (2021), Mousavi (2021), and Tabadkani *et al.* (2021), among others. There is a clear dearth of research examining the effect of daylight on outdoor public spaces and how it influences users' perceptions, behaviors, and usage patterns. Lastly, and most importantly, a significant gap exists in the integration of these three aspects - morphology, security, and daylight - in public space studies.

Although these elements have been individually studied, few research efforts have attempted to analyze them in a cohesive and integrated manner. In addition, the exploration of these components from a transdisciplinary perspective is noticeably lacking. An understanding of these elements' interdependencies and their collective influence on public space use could offer valuable insights for enhancing the quality and effectiveness of these spaces.

3.3 The Transdisciplinary Framework: An Integration in the Study of Public Spaces

A transdisciplinary approach transcends traditional boundaries of individual disciplines, integrating and synthesizing diverse perspectives to address complex real-world problems (Hiver *et al.*, 2022).

This approach goes beyond the mere juxtaposition of different disciplinary insights that interdisciplinary and multidisciplinary approaches often represent. It necessitates a comprehensive and holistic approach, weaving together theories, methodologies, and findings from various fields into a coherent whole. In the context of this study, a transdisciplinary approach is employed to understand the interplay between morphology, security, and daylight in architectural public spaces. The disciplines of environmental psychology, urban planning, architectural anthropology, and landscape design, among others, provide valuable perspectives that are integrated and synthesized in the analysis. Environmental psychology, for instance, offers insights into how people perceive and interact with their environment (Gifford, 2014). This psychological lens helps interpret how aspects of public space morphology, security, and daylight influence individuals' behavior and usage patterns, see figure 5.



Figure 5 Transdisciplinary Framework on the Study of Public Spaces

Source: Elaborated by Miriam Mery-Ruiz, 2023

Urban planning and architectural anthropology provide a socio-cultural perspective, emphasizing how public spaces should cater to the diverse needs of the community, promote inclusivity, and contribute to the social fabric of the urban context (Crawford, 2021). Landscape design, on the other hand, offers a critical perspective on the role of daylight in enhancing the aesthetic and functional qualities of public spaces (Sorvig & Thompson, 2019). By integrating these diverse disciplinary perspectives, the transdisciplinary approach can yield a richer, more nuanced understanding of public spaces and their use. Such an approach is also more likely to generate actionable insights for improving public space design and management.

The comprehensive examination of architectural public spaces necessitates a multi- and transdisciplinary perspective, recognizing the complexity and multifaceted nature of these shared environments. Through the amalgamation of several disciplines, each contributes unique insights to further our understanding of public spaces. The role of environmental psychology is paramount in dissecting the psychological interactions between individuals and their physical surroundings (Gifford, 2014).

This discipline elucidates the ways individuals perceive, behave, and interact within public spaces. By examining human behavior in response to environmental stimuli, we can design public spaces that foster positive engagement and provide a deeper understanding of the elements that invite or deter usage. On top of that, complementing this psychological perspective, sustainable architecture contributes by emphasizing the design of energy-efficient, environmentally friendly built environments that enhance human well-being (Kibert, 2016).

In the realm of public spaces, sustainable design promotes the optimal use of daylight, contributing not only to energy efficiency but also enhancing psychological well-being through exposure to natural light. Furthermore, urban studies provide a macro view of the urban context, shedding light on socioeconomic conditions and cultural factors that can influence the usage of public spaces (Carmona, 2019; Madanipour, 2019, 1999). Understanding the dynamics of urban morphology, movement patterns, and issues of inclusivity are essential for creating public spaces that truly reflect and accommodate the needs of their urban context. Contributions from landscape design further enrich our understanding of public spaces, particularly in regard to their aesthetics and functional aspects (Sorvig & Thompson, 2018).

The effective use of greenery, water features, seating arrangements, and pathways can significantly enhance the attractiveness, comfort, and user-friendliness of these spaces. The cultural lens provided by architectural anthropology underscores the importance of cultural practices, social norms, and community values in the design and use of public spaces (Avrami *et al.*, 2019).

Recognizing the influence of cultural contexts is key to creating spaces that are not only functional but also meaningful to the communities they serve.

In addition to this, spatial analysis, particularly the methodological approach of Space Syntax, is utilized to analyze the configuration of spaces and their impact on movement, visibility, and social interactions (Hillier, 1996). These insights allow us to understand and optimize the spatial structure of public spaces to encourage positive interactions and engagement. Perception theories offer insights into how individuals perceive their surroundings and how these perceptions shape their behavior, providing a critical perspective in studying the impact of security measures and daylighting in public spaces (Fish, 2021; Gibson, 2002; Rock, 1983). Understanding perceptions helps shape public spaces into environments that are welcoming and secure.

Finally, security studies provide risk assessment and management strategies, insights into crime prevention, and principles for the design of safe environments (Cozens, 2002). These aspects are fundamental in fostering a sense of security in public spaces, enhancing their overall usability and appeal.

3.4 Morphology in Architectural Public Spaces: Analysis of Key Aspects

The morphology of architectural public spaces - their physical shape, form, and layout - is a fundamental attribute that directly impacts their functionality, usability, and aesthetic appeal. This morphological dimension, which encompasses aspects such as size, geometry, and the spatial arrangement of various elements within the space, wields a profound influence on the use and experiential qualities of these spaces.

It impacts a range of factors, including accessibility, navigability, comfort, safety, and sociability, shaping the way individuals perceive, interact with, and inhabit these shared environments (Casciani, 2020), see table 2. Accessibility, one of the key factors influenced by spatial morphology, relates to the degree of ease with which public spaces can be entered and engaged with. Those spaces that are open, prominently situated, and visually connected to their surroundings tend to invite greater use.

Conversely, spaces that are physically or perceptually isolated, or difficult to access, often deter public engagement (Askarizad, *et al.*, 2022; Yamu *et al.*, 2021; Hillier, 1996 Whyte, 1980). The internal layout of the space, the arrangement of physical elements such as seating, vegetation, pathways, and amenities, significantly shape its navigability and comfort. Well-considered designs guide user movement, encourage exploration, and provide comfortable, inviting spaces for rest and socialization.

Aspect	Influences	Discipline	Transdisciplinary Insights
Accessibility	Ease of entering and engaging with public spaces	Landscape Design	Design elements enhancing accessibility
Navigability and Comfort	Movement and relaxation within public spaces	Architectural Anthropology	Customized layouts reflecting local customs and values
Safety	Perception of safety and security	Spatial Analysis	Visibility and accessibility based on spatial configuration
Sociability	Interaction and community building	Urban Studies	Broader urban context influencing social interactions
Aesthetics and Functionality	Attraction and usability of public spaces	Landscape Design	Aesthetic principles and functional design

Table 2 Morphology of Architectural Public Spaces

Source: Elaborated by Miriam Mery-Ruiz, 2023

Safety is another fundamental aspect of public space usage influenced by morphology. Spaces that are open to view from surrounding areas, have clear sightlines, and are well-illuminated, contribute to an environment that feels safe and secure. By contrast, spaces with obscured views, hidden recesses, or inadequate lighting can elicit feelings of insecurity, discouraging use (Cozens *et al.*, 2005).

The sociability of a public space, or its ability to foster social interaction and community-building, is also inextricably tied to its morphological properties. Public spaces that include inviting places to sit, areas for play, and spaces for communal gathering encourage people to stay, interact, and engage in communal activities, thus enhancing community bonds and the liveliness of the space. To fully grasp the complex interrelationships between the morphology of public spaces and their usage, a transdisciplinary approach is required. This approach integrates diverse disciplines, each offering unique insights and perspectives. Landscape design, for instance, interprets public space morphology in terms of aesthetic and functional design principles.

The choice and arrangement of elements within the space, the selection of materials, and the incorporation of greenery and water elements, all contribute to the attractiveness and user-friendliness of the space (Sorvig & Thompson, 2018). The lens of architectural anthropology underscores the significance of cultural practices and social norms in shaping space morphology. It emphasizes that public spaces should not merely be aesthetically appealing and functional, but also culturally resonant and sensitive to local customs and values (Bartmanski, 2022).

Over and above that, spatial analysis, notably the space syntax approach, provides quantitative methods to analyze the configuration of spaces. This reveals how spatial structure influences movement patterns, visibility, and social interactions within public spaces (Hillier, 1996). The broader field of urban studies enriches our understanding by highlighting the macro-urban context of public spaces. It reminds us that the form and function of a public space are shaped by broader urban morphologies, land-use patterns, transportation networks, and socioeconomic conditions (Madanipour, 1999).

3.5 Security in Architectural Public Spaces: The Essentials

Architectural public spaces, often the beating hearts of urban environments, play a pivotal role in human life. They are stages where the daily drama of human existence unfolds, providing venues for social interaction, cultural events, and communal gatherings. Yet, underpinning the bustle and vibrancy of these spaces is an omnipresent, yet often unnoticed, actor—security (Cozens, 2002), see table 3.

Aspect	Influences	Discipline	Transdisciplinary Insights
Accessibility	Freedom of access in public spaces	Urban Planning	Creating inclusive and easy-to-access spaces
Trust	Perception of safety and well-being in spaces	Sociology	Building community trust and ensuring user safety
Freedom vs. Safety	Balance between unrestricted use and security	Architecture	Design principles that enhance safety without hampering freedom
Fear and Discomfort	Negative emotions due to mishandled security	Law Enforcement	Strategic planning to implement effective security measures
Harmonious Urban Life	Preservation of urban rhythm and vitality	Sociology	Social aspects influencing the harmony and vitality of urban spaces

Table 3 Security in Architectural Public Spaces

Source: Elaborated by Miriam Mery-Ruiz. 2023

Akin to an invisible director, security orchestrates the intricate urban performance, influencing the spatial dynamics and use patterns of these public spaces. It facilitates accessibility, ensuring that the public realm remains open and inclusive for all. It underpins a sense of trust within these spaces, reassuring users of their safety and well-being (Newman, 1972). Like an unseen puppet master, it subtly shapes and molds the behaviors and experiences of individuals interacting within these architectural settings.

However, the role of security in architectural public spaces is no mere exercise in vigilance or surveillance. Mishandled, it can cast an ominous shadow, instilling discomfort or fear, and disrupting the harmonious rhythm of urban life (Jacobs, 1961). Therefore, the challenge lies not merely in the implementation of security measures but in their careful orchestration to maintain the delicate balance between safety and freedom in our public spaces.

This nuanced and complex role of security eludes simplistic interpretations and demands a kaleidoscopic, transdisciplinary approach (Nicolescu, 2002). Envision the study of security in public spaces as a grand intellectual symphony—a symphony where the melodies of diverse disciplines harmoniously intertwine. The meticulous map of the urban planner overlaps with the insightful ethnographic notes of the sociologist. The aesthetic schematic designs of the architect find a counterpoint in the strategic plans of law enforcement officers. Each discipline contributes a unique note to the grand composition, resulting in a rich, multi-layered understanding of security in architectural public spaces (Stokols, 2006).

This symphony of knowledge, woven from disparate threads of insights, transcends the boundaries of individual disciplines. It forms a comprehensive understanding of security that encompasses the complexity and diversity of public spaces. This transdisciplinary approach paves the way for an empathetic and effective approach to creating and managing secure public spaces, a necessity in our complex urban environments (Lawrence & Després, 2004).

As we continue to shape our cities and urban environments, recognizing and appreciating the nuanced role of the invisible protagonist—security—in our architectural public spaces becomes vital. By adopting a transdisciplinary approach, we can compose a harmonious symphony that ensures our public spaces are not only vibrant and inclusive but also safe and secure.

3.6 Daylight in Architectural Public Spaces: Significance, Effects and Influence on Space Usage

Within the realm of architectural public spaces, daylight emerges as a vital conductor that choreographs the tempo of urban life. Similar to a city's heartbeat, it sets the stage for a continuum of action and tranquility. The availability and quality of daylight in these environments can profoundly affect their utility, aesthetics, and the perceived level of safety (Kaboli, 2023). Daylight's role stretches far beyond simple illumination.

It infuses a vibrancy into these spaces, subtly swaying the emotions, conduct, and perceptions of those engaging within them (Gehl & Svarre, 2013). Effectively harnessed, daylight bolsters visibility, facilitates navigation, engenders accessibility, and fosters an inclusive environment. Essentially, it fine-tunes the rhythm of urban life, cultivating spaces for social interaction, cultural occurrences, and communal assemblies.

The effects of daylight, however, are manifold and can drastically shift based on its administration. Appropriate management of daylight can boost feelings of safety and comfort, incentivizing daytime activities and nurturing a lively communal atmosphere (Jacobs, 1961). In contrast, a mismanaged daylight environment can induce unease or discomfort, potentially dissuading people from utilizing the space and perturbing the natural cadence of urban existence.

Daylight's influence on the use of space is undoubtedly significant, yet it is intricately complex and nuanced, necessitating strategic planning and design (Heschong, 2021). To comprehend the intricacies of daylight and its influence on architectural public spaces, a transdisciplinary approach is needed.

This approach summons a chorus of disciplines—urban planning, architecture, psychology, sociology, and lighting design—to bring forth their distinctive insights and perspectives (Nicolescu, 2002), see table 4.

Aspect	Influences	Discipline	Transdisciplinary Insights
Utility & Aesthetics	Quality of usage and visual appeal	Architecture	Design principles that optimize daylight utilization
Safety & Accessibility	Perceived safety and easy navigation	Urban Planning	Strategic spatial planning to maximize daylight exposure
Emotional Influence	Feelings of comfort and inclusivity	Psychology	Understanding of emotional impact of daylight on individuals
Daytime Activities	Encouragement of communal activities	Sociology	Knowledge on how daylight influences social behaviors
Strategic Daylight Management	Balance between effective daylight use and overexposure	Lighting Design	Techniques to control and manipulate daylight for desired effects

Table 4 Daylight in Architectural Public Spaces
Source: Elaborated by Miriam Mery-Ruiz. 2023

Picture an intellectual opus bathed in radiant enlightenment, where the unique tones of these diverse disciplines harmoniously resonate. The architect's aesthetic acumen intertwines with the sociologist's comprehension of human behavior, the urban planner's strategic spatial blueprints, and the daylight designer's skillset. This confluence of perspectives coalesces into a comprehensive understanding of daylight's role and influence in architectural public spaces (Stokols, 2006). This transdisciplinary beacon of enlightenment transcends the limitations of individual disciplines, offering a holistic comprehension of daylight and its implications.

The approach equips us to traverse the intricate maze of natural light, space, and human behavior, guiding us towards the creation and maintenance of more vibrant, secure, and inclusive public spaces (Lawrence & Després, 2004). As we strive to mold vibrant, inclusive urban landscapes, the integral role of daylight warrants recognition and appreciation. It is through the transdisciplinary prism that we can fully reveal the multi-dimensional nature of daylight in architectural public spaces, masterfully orchestrating a luminous symphony of urban existence.

4. Conclusion

The transdisciplinary approach, with its inherent capacity to transcend the boundaries of individual disciplines, has immense potential for unraveling the complexity of architectural public spaces. This approach uniquely facilitates a holistic understanding, recognizing the inseparability of the natural, social, and built environments that constitute our public spaces.

When applied to architectural public spaces, the transdisciplinary approach illuminates various dimensions of these spaces that are often overlooked in single-discipline studies. For instance, in the context of daylight, it uncovers its multifaceted role - not just as a physical, measurable entity influencing visibility and aesthetics, but also as an experiential, perceptual factor shaping human behavior and wellbeing. This holistic view not only deepens our understanding but also informs the design and management of public spaces in ways that align with sustainability, inclusivity, and human centrality (Stokols, 2006).

Moreover, the transdisciplinary approach fosters synergy among diverse stakeholders – including architects, urban planners, sociologists, psychologists, and community members – enabling the co-creation of knowledge and solutions. It values the lived experiences and local knowledge of community members, integrating them with academic and professional expertise to yield richer, more contextually appropriate understandings and strategies for public spaces (Lawrence & Després, 2004).

Compared to conventional disciplinary studies that examine architectural public spaces, a transdisciplinary approach provides a more complex, integrated understanding of these spaces. Existing studies often focus on specific aspects, such as the physical design, social interaction, or environmental impacts. While these studies contribute valuable insights, they often overlook the interconnections and interactions between different aspects (Nicolescu, 2002). For example, an architectural study might focus on the role of design and materials in modulating daylight in public spaces, while a sociological study might examine the social interactions facilitated by these spaces.

Separately, these studies provide valuable insights, but they fail to capture the complex interactions between design, daylight, and social behavior. A transdisciplinary study, on the other hand, would integrate these perspectives, offering a more comprehensive understanding of how design and daylight together shape social interactions and vice versa. The transdisciplinary approach can reveal new insights not evident in single-discipline studies.

For instance, by integrating architectural, sociological, psychological, and urban planning perspectives, a transdisciplinary study might reveal how the interplay of design, daylight, social norms, and planning policies influences the inclusivity and vibrancy of public spaces. As such, it holds great promise for informing the creation and management of public spaces that are not only aesthetically pleasing and functional, but also socially inclusive, psychologically enriching, and ecologically sustainable.

Despite the strides made in understanding the complexities of architectural public spaces through a transdisciplinary lens, the exploration of these vital urban fabrics is far from complete. Future research could build upon this study by examining the impact of evolving technologies and societal trends on these spaces. For instance, the role of digital technologies, such as augmented and virtual reality, in reshaping public spaces warrants further investigation.

Additionally, future studies could explore the dynamic nature of public spaces over time. How do these spaces adapt to changing demographics, cultural trends, or climatic conditions? Longitudinal studies could provide valuable insights into these dynamic processes and their implications for the design and management of architectural public spaces. Also, cross-cultural comparative studies could illuminate the diverse ways in which different societies perceive, use, and manage public spaces. Such studies could inform culturally sensitive and contextually appropriate design and planning strategies (Carmona, 2019).

For practitioners and policymakers, the study underscores the value of a transdisciplinary approach in creating and managing architectural public spaces.

Architects and urban planners are encouraged to engage with experts from other fields, such as sociology, psychology, and environmental science, as well as community members, to co-create public spaces that cater to diverse needs and aspirations. Design and planning decisions should consider not only physical and aesthetic factors, but also social, psychological, and environmental dimensions.

For instance, in harnessing daylight, considerations should extend beyond illumination levels to include factors such as visual comfort, circadian health, energy efficiency, and aesthetic appeal (Nasar, 2011). Policymakers, too, have a crucial role in fostering conditions conducive for transdisciplinary collaborations. Policies and regulations should encourage integrated design and planning practices, provide platforms for multi-stakeholder engagement, and incentivize sustainable, human-centric development.

In conclusion, this study sheds light on the immense potential of a transdisciplinary approach in understanding and shaping architectural public spaces. By transcending disciplinary boundaries, it uncovers the rich tapestry of interconnections that animate our public spaces, revealing their true character as vibrant, dynamic, and multifaceted urban organisms. Yet, the transdisciplinary approach is not just an academic endeavor.

It holds profound implications for practice, inspiring architects, planners, and policymakers to rethink traditional processes and embrace a more collaborative, holistic, and human-centric approach to urban development. It invites us all, as inhabitants of these urban spaces, to partake in the creation of cities that are not only built, but also lived, experienced, and cherished.

In the face of escalating urbanization and environmental challenges, the transdisciplinary approach offers a beacon of hope. It points towards a future where architectural public spaces serve as crucibles of sustainability, inclusivity, and wellbeing, fostering a harmonious co-existence between humans and their built environment (Gehl, 2011).

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