



Research on Functional Composite and Interactive Experience Design in Museum Public Space - Take the Shenzhen Art Museum (New Venue) as a Case Study

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Abstract. Under the combined effect of cultural and economic diversification, the museum is no longer a building based on collection and exhibition functions, but a complicated place that integrates academic, leisure, entertainment, catering, and service. In the current era, the public space of museums, as the most open and dynamic area within museums, is constantly evolving and showing a trend towards of functional compound and diversified experience. This study delves into the design strategies of functional composite and interactive experience within public spaces in museums, using the Shenzhen art museum (New Venue) as a case study. The research subject should be discussed from the macro to the micro perspective, focusing on three key aspects: urban context, museum architecture and visitor experiences. This study offers significant insights for museum designers and researchers to enhance the functional versatility and experiential diversity of museum public space.

Keywords: Compound Functional, Interactive Experience, Museum Public Space, the Shenzhen Art Museum (New Venue).

1 Introduction

Contemporary public museums are seen as spaces for social and cultural purposes due to political and economic change. [1]. Under this trend, the development of many museums began to think about the relationship between architecture and the city, operation, function and visitor experience. The public space, being the most flexible and open areas within museums, play a vital role in both expanding the social functions of museums and enriching internal functions and experience.

The Shenzhen Art Museum (New Venue), as a new urban cultural landmark in Shenzhen, is projected to be designed as a 24-hour public block, thereby bringing greater value to the surrounding community. Under this goal, the Shenzhen Art Museum (New Venue) encompasses a substantial indoor and outdoor multi-functional public space, serving as a benchmark for the integration of comprehensive functionality and interactive experience design in museum public space.

This article focuses on the construction of functional composite and interactive experience design strategies of museum public space. It explores the museum's design strategies of the public space from three perspectives: integration with the city, diverse functional configurations, and the diverse interactive experiences. These three significant aspects are based on the three aspects of the city, architecture, and visitor experience from the macro to the micro level. And then, the public space of the Shenzhen Art Museum (New Venue) is used as an empirical study to verify the feasibility of the theoretical research. The theoretical basis and design strategies of the three levels are complementary and interconnected, and each cannot exist independently.

2 Background

2.1 The emergence and evolution of museum functional composite design

The principal function of early museums primarily revolved around collection, which was not accessible to the general public. Therefore, the museum of this period did not possess public space in the modern sense, and the entire building consisted of a walkway connecting the collection rooms.

After the 1960s, the museum has further established its vision as an educational institution and social service agency. At this point, the function of the museum has evolved from object-centred to education-centred.

Under the influence of cultural and economic diversification, since the 1980s, museums have become complex places with social, academic, consumer, entertainment, and service functions. The functional composite design is the result of the characteristics of the museum during this period. [2].

2.2 Trends in museum interactive experience

With the continuous development of science and technology and the increasingly diversified needs of visitors, the design of museums has progressively emphasized the interaction and experience between visitors and the museum space. The digitization of museums represents a significant development in the realm of interactive experiences. In addition to leveraging advanced information technology to offer visitors a personalized experience, the design of the public space accentuates social interaction and engagement, transforming the audience from passive observers to proactive participants. Museum spaces provide visitors with the opportunity to interact with others or the space itself, thereby enhancing the overall exhibition and interactive experience.

2.3 The evolution of museum public space

The term "Museum public space" refers to the space of non-exhibition, including atria, courtyards, entrances and resting spaces. As mentioned above, the original museum building had no public space in the modern sense. Since the 1970s, museums have been actively engaged in the development of public educational spaces, creating culturally

and socially meaningful space, and endeavoring to minimize the sense of alienation from the public. [3]. Nowadays, the intensive development of contemporary cities has progressively emphasized the integration and flexibility of architecture. This trend has also influenced museum. Consequently, the museum public space has become a complex space that accommodates social interaction, entertainment, leisure and learning.

3 Construction of functional compound design strategy of museum public space

With the increasing influence of the complex trend on museums intensifies and audience expectations continue to rise, museums must optimize their functions and experiences to cater to the material and spiritual demands of their audience. Function and experience often complement each other. The diversification of functions transforms the public space into an efficient hub, broadening the audience base and attracting a larger number of visitors. The experience is based on people's feelings, creating multi-directional communication and interaction, so that the audience can obtain unforgettable knowledge and experience. Therefore, this section discusses the three levels of city, museum architecture, and visitor experience, following three aspects: integration of the public space with the city, diverse functional configurations of the public space, and the diverse interactive experiences in the public space. (Fig. 1).

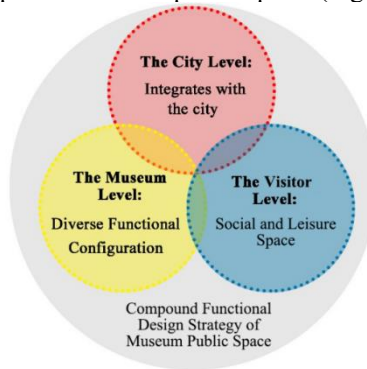


Fig. 1. Three perspectives of this paper [self-painted]

3.1 Integration with the city

As a public institution open to the public, the museum is an essential part of the urban public space system. When visitors enter the museum from the urban space, if the spatial experience changes dramatically, it will greatly reduce the audience's interest in visiting the exhibition. The utilization of public space as a transitional element between the urban environment and the museum interior space can significantly enhance the audience's experience, seamlessly integrating these two realms. On the other hand, as comprehensive urban entities, contemporary museums not only fulfill their own func-

tions but also provide public activities, organize various cultural events, and offer dining and leisure facilities for the surrounding community. Based on the above background, the following three design strategies are proposed to realize the combination of museum public space and city.

3.1.1 Connect the urban pedestrian system.

Linking museum public spaces with urban pedestrian systems allows for greater integration and accessibility. As a huge public building, the museum design incorporates a pedestrian pathway to facilitate citizen access and integration with the broader urban walking network. This consideration ensures convenience for the populace. Additionally, incorporating museum public spaces into the urban pedestrian network enhances the visibility and exposure of museums, attracting more visitors and fostering a sense of community engagement with the cultural institution.

3.1.2 Combine with the surrounding.

On the one hand, the museum can establish an integrated system by incorporating outdoor public spaces and surrounding cultural buildings, collaboratively developing an urban greening axis. Through a symbiotic relationship with the architecture, it can become an integral part of the city's context.

On the other hand, museums can use external public spaces to host a variety of interactive and participatory activities, such as outdoor exhibitions, art installations, outdoor performances, etc. [4]. These activities attract the active participation of tourists and local residents, making the museum a center for cultural exchange and social activities among diverse individuals.

In addition, make outdoor public spaces into comfortable leisure and social places, such as open-air cafes, leisure gardens or seating areas, to provide visitors with a space to relax and socialize.

3.1.3 Visual openness.

The transparent perception of public spaces can generate a sense of spaciousness and interactivity, offering visitors a more relaxed and unrestricted experience. Therefore, the public space of the museum can be designed as a large sunshade square, which not only serves as a platform for audiences to display the city's view but also provides an ideal venue for large-scale urban events.

3.2 Diverse functional configuration

To cope with the composite trend and the impact of the economic crisis on museum budgets, museums began to develop as social and market-oriented spaces. The composite functional design of the museum public space contributes to enhancing the sustainability of the museum by introducing commercial and academic activities. [5]. To fulfill the need for functional diversification in museum public spaces, three design strategies are proposed.

3.2.1 Creation of versatile and flexible public space.

In architecture, the elasticity of space refers to the ability of space to adjust freely to meet changing needs. The museum public space, by replacing stringent separative boundaries with a vague boundary, maximizes spatial utilization and caters to a diverse range of requirements. Incorporate flexible partition systems and movable furniture to facilitate adaptability to varying user heights, requirements, and activity types.

3.2.2 Full-time participatory considerations.

Full-time participation in the museum refers to the multi-functional use of space through time diversion, that is, the intensification of time. Many museums are closed at night, and even if they are open one night a week, they are very deserted. In this background, several museum public spaces are used for public service during the day, and at night, they become rental venues for social events such as banquets and cocktail parties.

3.2.3 Integrated with traffic space.

A well-designed public space has the potential to facilitate audience navigation, ultimately enhancing their touring experience by offering a seamless and enjoyable journey. By regulating scale, the atrium, walkways, and stairs can evolve into an effective public communicative space, effectively eliminating the need for traditional traffic areas within the museum. Through the guidance system of the foyer space, the route of viewing the exhibition becomes diversified to meet the needs of different audiences.

3.3 Diverse interactive experience

In an age when material needs are continuously met, the rise in spiritual needs makes 'experience' an essential behavior in public life. The utilization of interactive methods in museum public spaces can effectively captivate visitors' attention, and enhance their engagement, thereby fostering a deeper understanding of museum culture and knowledge among the audience. [6]. The following array of public space design strategies aims to amplify the audience's interactive experience.

3.3.1 Emotional interaction design.

Through the orchestration of elements such as spatial layout, chromatic composition, material selection, and illumination, the public spaces of a museum can foster an environment that elicits emotional responses from visitors. In such an environment, the audience is more likely to be influenced by the emotional atmosphere, thereby generating emotional experiences and resonance pertaining to the exhibits and culture. In addition, emotionally oriented storytelling can be displayed through images and videos in the public space, immersing audiences in an emotional experience and prompting them to engage in critical thinking and exploration of the exhibits.

3.3.2 Behavioral interaction design.

Museum public space can enhance the audience's entertainment experience by providing interactive experience through virtual reality technology, gamification elements and other technologies, etc. In the design of the space environment of the museum, the display of exhibits has got rid of the limitation of the exhibition space in the past. The museum public spaces such as foyers, atriums, corridors and lounge areas can display exhibits, which helps to give visitors a coherent and complete experience of the exhibition. The public space of the museum may also be utilized for the arrangement of organize workshops, group games and other forms of activities. Through these interactive activities, participants can engage in emotional dialogues with fellow attendees, exchanging their emotions, ideas, and experiences.

4 An empirical study on the functional composite and interactive experience design of the Shenzhen Art Museum (New Venue)

4.1 Situation Analysis of the Shenzhen Art Museum (New Venue)

The Shenzhen Art Museum (New Venue) represents a novel cultural icon for the city, opened on November 6, 2023. Located within a key development site in Longhua District of Shenzhen, surrounded by dense residential and office space. Therefore, the core objective of the project is to create a public platform and hub for cultural exchange, which will further stimulate the cultural vitality of the regional public space in the future.

4.2 Design Strategies of the Shenzhen Art Museum (New Venue)

4.2.1 Design strategies of integration with the city.

In the master plan, the Shenzhen Art Museum (New Venue) and the Shenzhen Library (North Hall) are located on the same site, which is located on the main axis of the city, forming a cultural and art center. The designer astutely created the public plaza within the central axis, facilitating a seamless transition between the urban environment and the museum space, concurrently fostering a connection with the adjacent library. This outdoor public space establishes a prominent cultural exchange platform and hub. It can be used for large-scale public events, further enhancing the museum's connection to the surrounding community. (Fig. 2).

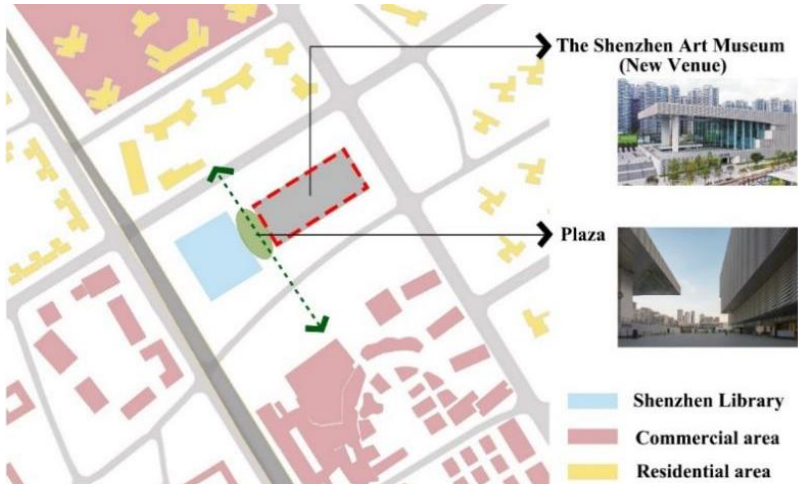


Fig. 2. Site analysis of the Shenzhen Art Museum (New Venue) [self-painted]

The ground floor of the museum serves as a public space bridging the city and the cultural and artistic transition. It encompasses a semi-outdoor courtyard, a ticket office, and an urban street that traverses the building. This reserved urban street allows easy access, transforming this large scale public building into an accessible and friendly neighborhood that maintains a 24/7 availability. (Fig. 3).

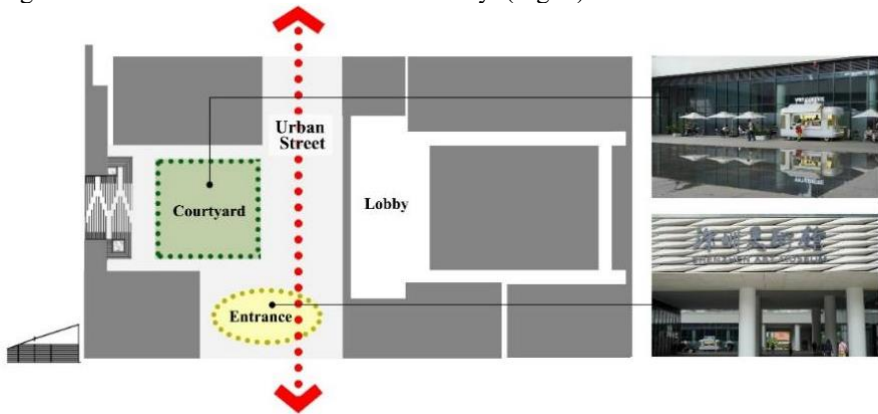


Fig. 3. Analysis of the ground floor outdoor public space [self-painted]

4.2.2 Design strategies of diverse functional configuration.

The Shenzhen Art Museum (New Venue) is not only a professional art institution but also a vibrant urban leisure space, offering residents a cultural venue with an artistic ambiance. The venue encompasses numerous indoor public space, such as an art library, bookstore, gift store, art experience area, volunteer service area, and catering. (Fig. 4).

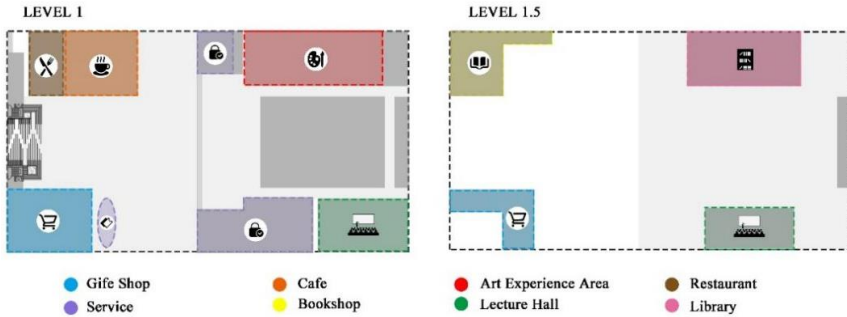


Fig. 4. Public spaces distribution map of the Shenzhen art museum (New Venue) [self-painted]

The museum's versatile public spaces are mainly set on the ground floor and the 1.5 level. Around the semi-outdoor courtyard, characterized by leisure-oriented public space, offers audiences diverse functions such as communication, dining and shopping. The interior central lobby is surrounded by academic-related public spaces, including art experience workshops, art libraries, lecture halls, and so forth. The two public space areas are interconnected, yet they do not interfere with each other.

The museum has designed a variety of different routes for visitors to view the exhibition, with the central lobby as the main guide. The retreat area in the atrium offers a break space for each floor's exhibition hall.

The concept of the design adopts an open and flexible exhibition scheme. Apart from the fixed location of the auditorium, all the exhibition spaces flow towards each other and can be separated at any time by various temporary buildings. There is a large sculpture square on the second floor of the museum, which is suitability for hosting large-scale sculpture exhibitions and installation exhibitions. The sculpture plaza constitutes an all-weather semi-outdoor space that enables art activities to be carried out even when the museum is closed.

4.2.3 Design strategies of diverse interactive experience.

The Shenzhen Art Museum (New Venue) follows the principle of integrity throughout the visit path. A large number of public spaces are also cleverly integrated into the exhibition of sculpture works, achieving the integrity and coherence of the exhibition route. Regardless of whether they are tourists or scholars, visitors can anticipate a diverse and comprehensive experience.

The museum specifically tailored an art experience workshop, offering audiences a unique opportunity to actively engage and immerse themselves in the artistic experience. By engaging in workshop activities, visitors can foster a more profound comprehension and appreciation of the messages and narratives conveyed by the exhibits.

With the advent of the digital age, the popularization of Virtual Reality (VR) and other technological advancements is providing an array of new possibilities for interactive communication in the development of museum space environments. In the design of museum public spaces, the integration of architectural entities and virtual digital technology creates an immersive environment for audiences.

5 Conclusion

This research is based on the two perspectives of functional composite and interactive experience to discuss the design strategy of museum public space, from the three aspects of integration with the city, diverse functional configuration and diverse interactive experience. Then take the Shenzhen Art Museum (New Venue) as an example, the feasibility and innovation of these design strategies are verified.

First of all, this research highlights the significance of integrating museum public spaces with the urban environment. As a part of the urban space, museums should consider contributing to the city and the community. Second, the research highlights the importance of functional diversity. The multi-functional design strategy is proposed to transform the museum into a community center, aggregating diverse cultural, educational, and social activities, thereby enhancing the vitality and appeal of the public space. Finally, the research underscores the critical role of diversity in experience. A museum serves not only as a venue for the exhibition of cultural artefacts and artistic creations, but also as a platform that facilitates a comprehensive interactive experience for its audience.

In sum, This study presents a comprehensive design strategy for the development of museum public spaces, offering significant theoretical guidance for future museum design.

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