

The Introduction and Application of Immersive Experience by Museum Exhibition in Space Reconstruction

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Abstract. Based on the necessity of museum exhibition with introduction of immersive experience in spatial reconstruction, this paper explores the ideas and application methods of museum exhibition with introduction of immersive experience in spatial reconstruction on the basis of analyzing the value, significance and demand of museum exhibition introducing immersive experience in spatial reconstruction.

1. Introduction

From the content carrier to the cultural output, the exhibition ways of domestic museums gradually appear a diversified development trend. Compared with traditional exhibitions, there are many visitors to visit the new culture and art exhibition hall, which shows an important fact that there is no decline of people's cultural needs, rather it increases with the acceleration of the spiritual civilization. However, people's requirements for cultural presentation and acquisition have indeed undergone new changes. This change requires consideration on how to break limitation in theme, space and content for traditional museums [1], and it should be taken into consideration on how to introduce new technologies to start a new interpretation of exhibition.

2. The Inevitability of Introducing Immersive Experience into Museum Exhibition in Spatial Reconstruction

2.1. Immersive Experience Facilitates the Exhibition Hall to Integrate into the Construction of Urban Public Culture

The profound historical facts can be reproduced and restored with the help of immersive high-tech means. When designers make breakthrough in the monolithic model of traditional exhibition halls with the interesting content and theme of the exhibition hall, they will also enhance the sense of experience and perception of the exhibition hall at the same time, upgrade the space and assist the exhibition hall to complete the artistic reconstruction [2-4].

Taking Shanghai Yangpu riverside city space art fair in 2019 as an example, after starting the design with the goal of immersive experience, the biggest highlight of this exhibition is that the indoor exhibition is

transformed into "Outdoor Riverside + Indoor" exhibition. The waterfront one-storey building from the southern section of Yangpu District's riverside about 5.5 km to the Huangpu River, Shanghai International Fashion Center to the Qinhuangdao Wharf, are all expanded into the exhibition space of outdoor public artworks[5]. The audience is not only the appreciator of the content displayed, but also the participant in the expansion, extension and creation of such outdoor public art works, as well as the expander and experienter of the new urban public cultural space.

When the urban public cultural space is upgraded, art and culture can be integrated into life, so that the immersive experience will not be limited to a museum space of several hundred square meters. As the requirement of citizens in public cultural museum ZhanChen upgrades, and city culture is taken as the background to create characteristic web celebrity hall, which can help the city's low-cost brand publicity. In addition, it can show all kinds of cultural characteristics and resources of the city in a more amiable and intensive way, and promote the virtual reconstruction of the exhibition space in accordance with the way of exhibition thinking.

2.2. Immersive Experience Facilitates the Audience to Deeply Interpret the Connotation of Cultural Display

The immersive experience interprets the desire and appeal of the public behind the exhibition hall by participating in public cultural construction. In first-tier cities, immersive exhibition based experience and personalized web celebrity hall supplement each other, which can provide museum halls with immersive experience with the help of digital technology and other kinds of virtual subject and the audiences are important participants [6-8]. In the process of viewing, they serve as new elements to deliver culture and the contents and themes are presented in varied ways such as "Dark Blue",

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"Teamlab", "Mars 2035" and so on. Traditional museum halls will be upgraded into the most concentrated carries in the future in cities with the assistance of immersive experience with the arrival of experiencing economy.



Figure 1. Teamlab Immersive Experience Pavilion



Figure 2. Mars 2035 Immersive Experience Pavilion

Every exhibition hall, every museum display should present the process of public art space and culture in dynamic manner. Immersion, MR AI, AR are increasingly applied in the exhibition hall, making the cultural forms of display increasingly. With the smart data, the exhibition hall is presented with real and virtual sense and audience can get to know the details, significance, value and effects of display objects. Besides, 3D digital technology was introduced, which can reduce display cost with limitations in energy, cost, space and resources. By this way, it meets the requirements on distribution and the virtual objects are with high perceptibility. Audience can have the real impression by touching virtual objects.

3. The Idea of Immersive Experience Introduced by Museum Exhibition in Spatialreconstruction

3.1. People-oriented to Enrich the Needs of Urban Culture

According to Mihaly Csikszentmihalyi, only by maintaining a balance between the challenges and technologies in life can we filter out to the greatest extent the perceptions and feelings that are closely related to them. Only when we are highly focused and fully engaged can we move smoothly and live effectively [9]. Immersion is a scene experience that allows people to forget the real world and focus on the current situation.

People can have a more comprehensive understanding of the history of exhibits in a limited space with the help of interactive video, text, image, projection, sound, light and electricity, etc.

Based on this, at the request of the forging immersive experience, the museum should create relative dynamic exhibition space by utilizing digital interactive design, lighting control, visual equipment, etc. Proceeding from the perspective of the exhibits, such as spatial entity, the needs of audience in appreciation and concerns can be taken as the starting point, and based on the basis of the high degree of information, the relationship between human and space, people and things and people and exhibition technology should be resolved.

Fusion immersive experience museum is the exploration of natural integration of public cultural space and urban expression for urban residents. From this perspective, the museum offers visitors the panorama of smell, hearing, touch, vision interaction experience, which enables visitors to be personally on the scene. However, how to eliminate the barriers between the sites and exhibition contents and restrictions so that exchanges between arts and exhibition, the public and historical culture can be made directly will be one of the design thought. The display will not be subject to indoor space rather expanded to outdoor space. Based on this, the design of display and space reconstruction [10], segmentation will be more made with diversification. Following this trend, the content attributes of the exhibition hall also can be related to the direction of the construction of the whole city's public culture, thus becoming the most brilliant part of urban culture.

3.2. Dividing the Space Reasonably and Taking into Account the Interaction Requirements of Exhibitsand Visitors

The relationship between the visitors and the exhibition space is delicate. The exhibition hall should not regard the exhibits as the only object to attract the attention, but should pay attention to the interactive relationship between the exhibits and the visitors. Therefore, display designer should give full play to your imagination and design ability, and the layout of exhibits can show its best effects as the angle for visiting is soundly arranged, which means that exhibition line should be too long. The main venue in the exhibition should be highlighted, and close attention should be given to exhibit in the authenticity to present the exhibits with the real historical value and, at the same time, to create a linger for psychological experience among tourists.

Excellent space show experience design can provide tourists with the direction and goal for the next step, and the traditional and simple transmission of information can be transformed into exchanges and communication between visitors and information. Based on the hot broadcast of TV shows such as "Repairing relics in the palace", "National treasure", "What if national treasure talks" and other programme, it can be seen that culture is not historical exhibits or rigid topics

without warmness. It means that museum exhibition should have good interpretation of exhibits in the way the public most favored so that every piece of relic can be the carrier of history. As a result, each visiting can be used for “viral” transmission of past history.

Therefore, in the space reconstruction and display design, space partition layout can be made with concerns on both the establishment of the immersive atmosphere demands and the effect. Besides, the number of visitors and diversity should be taken into consideration as far as possible, and people can be attracted for further visiting by designing varied routes and panoramic display. The spatial illusion, interactive and hierarchical layout in a targeted, step-by- step manner will enable visitors to be emerged in the cultural atmosphere and they can have interactions with exhibits and for emotional communication.

4. Application of Immersive Experience in Museum Exhibition in Spatial Reconstruction

4.1. Integration of Science and Technology with Art, Multi-Dimensional Interactive Transmission of Information

In the era of integration of science and technology and the development of the cultural creative industry, the traditional cultural relics exhibition, simple graphic display is already difficult to meet the needs of people in multi-sensory experience and cultural relics is not rigid and simplified exhibits, rather it should be the exhibition with immersed exhibition to tell the past history. Exhibitions can only become the carrier for visitors to appreciate, the purpose of tourists is to "see" the historical background of cultural relics through the exhibits, and enjoy a sensory feast. Just as the visual feast with magnificance and fantasy molded by illusioner based on objects in the film "Legend Of The Demon Cat". Holographic projection, virtual reality, sound control, lighting and other electronic devices are the means to create immersive experience, which can be used by designers in reconstructing space. Compared with a variety of technological means, how to construct artistic beauty, display and convey multi-dimensional information should be the goal of museum exhibition and innovative design.



Figure 3. All-scene based immersive show " Legend Of The Demon Cat"



Figure 4. Immersive show of Dunhuang Magic Land in the whole scene

Therefore, it is suggested that the museum represents the development of human civilization in the form of scenes by means of the integration of art and technology. For example, in Xuzhou Han Painting Stone Discover Art Experience Museum, visitors can see the light and shadow of the ages with the staggered sound on the secluded Han painting stone, and the virtual enhanced reality, three-dimensional animation and traditional real scene reproduction are used in museum halls, making everything of the Han Dynasty within easy reach. Intelligent human-computer interaction is applied for coordination, the wind, storm and snow in suspended panoramic cinemas, VR equipment, 4D cinema can be simulated to trigger the sense of touch, smell and listening. In this thrilling illusory adventure, the exhibition is no longer an exhibit under the lonely and cold light, but a spiritual interaction with ideas, temperature, innovation and flavor.

4.2. Building a Cloud Based Virtual Exhibition from Seeing the History to Participating in the History

The goal of space reconstruction is to enable visitors to follow the rhythm of the designer's browsing in the limited exhibition space so that visitors can think, observe and stop while visiting, and effectively accept and digest the exhibition information. No matter how large the geographical space of any museum is, it has limited space when it comes to displaying the historical deposits of the exhibits. In this way, designers can try to expand the real space by means of cloud based virtual exhibition with the assistance of media interaction technology when meeting the dynamic demands of tourists of different levels for the different levels and themes of the exhibition space, so as to make up for the content that is difficult to be expressed or interpreted by the real space alone.

As the new kind of exhibition, Cloud virtual exhibition serves as the integration of social community, the mobile Internet technology, VR, AI, cloud technology, the web3D technology, which can provide digital information integration platform for the online digital display space. By the platform, designers can break limits on time and space, energy, cost and resources, so that the exhibits can be exhibited in a more detailed manner. The damaged relics can be restored by

virtual technology and the historical scenes can be represented so that the interaction between tourists and virtual figures can be made. As a result, tourists can deeply feel and participate in the history. For example, in the theme design of "ancient relics", tourists can use VR equipment to experience the scenery of the South Pacific, and experience the evolution of Austronesian by steering canoe. This kind of technology model can not only expand the coverage of exhibition activities in the museum, but also reduce the cost and improve the immersive experience more efficiently.

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