

Research on the Design of the Red Culture Digital Exhibition Hall Based on Metaverse

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Abstract

Today, Metaverse as the latest digital technology and digital media, have not possessed by existing digital technology technical advantages, at the same time, the red culture as the unique national culture spirit in China, is a blend of the excellent traditional culture of the Chinese nation, is deeply rooted in the blood of the Chinese people, the red culture exhibition hall is also the red culture main propaganda education position. At the same time the technical features of Metaverse can be better and the integration of red culture digital pavilions, bring the audience a better experience and experience, this paper aims to analysis the technical features of Metaverse and its combined with red culture exhibition hall the path of the research, summed up Metaverse in the red culture digital Exhibition design application and advantages.

Keywords: Metaverse, Chinese red culture, Chinese red culture digital exhibition, exhibition design, the user experience

1. Introduction

1.1 Background of Chinese Red Culture and Its Exhibition

As a unique national cultural spirit of China, the spirit of Chinese red culture (Hereinafter referred to as the red culture) is inherited from the combination of Marxism and China's reality during the revolutionary War, and integrates the excellent traditional culture of the Chinese nation. It inspires generations of Chinese people to forge ahead and make continuous efforts, and is deeply rooted in the blood of Chinese people. The Publicity Department of the Central Committee of the Communist Party of China proposes to strengthen the construction of patriotism education base. The red culture exhibition hall is the main place to carry out the study and education of the red culture, which plays an indispensable role and value in promoting the spirit of red culture. The red culture theme exhibition hall uses modern media means to innovate the form of red culture communication is also an indispensable part of telling the Chinese story well.

1.2 The Present Situation of Integrating Digital Means Into Red Theme

The media forms of human society have experienced from the original animal transmission media to print media communication to digital cable transmission, wireless digital mobile communication form until today. the evolution of media forms directly lead to change in the way of human life and extend to all walks of life, communication Expert Marshall McLuhan, said: "the media is the basic driving force of the development of the society, It is also a symbol to distinguish different social forms. The emergence and application of each new media announces that we have entered a new era." In terms of exhibition design, the original exhibition hall served as a communication medium to convey information to undifferentiated audiences through the exhibition of objective works. The audience passively accepts the visual or auditory symbols transmitted by the exhibitor, and there is little research on whether the audience can internalize them and form a unique artistic aesthetic experience. After the advent of the digital era, digital technology and digital media are constantly involved and applied to exhibition design, creating a more immersive experience scene for the audience. For example, in the National Pavilion of China at The Shanghai World Expo, a dynamic digital version of Riverside Scene at Qingming Festival was displayed through a giant screen projection system, reproducing the prosperity and natural scenery of bianjing city during the Northern Song Dynasty, bringing visual and sensory shock to the audience. Another example is the Palace Museum, which uses virtual reality technology to show the magnificent

architectural scene of the Forbidden City during the Kangxi and Qianlong Dynasties. For example, in the "three mountains five gardens culture tour -- Old Summer Palace 40 landscape culture exhibition" exhibition The National Library of China Collections Museum restored the architectural complex of The Old Summer Palace and showed the grand and spectacular scene of the Old Summer Palace..... through phantom imaging holographic digital technology The collision and interweaving of traditional thematic art and digital media forms, such as this, bring more immersive viewing experience to the audience, break through the traditional and rigid exhibition forms, and mobilize the audience's various senses to enjoy the narrative scene of the exhibition, forming a unique aesthetic feeling.

However, under the background trend of the integration of digital means and classical theme exhibition design, the red culture theme digital achievements are mostly represented by the image narrative technique of micro-documentary in the exhibition. and in today's multivariate numerical aggregation of artistic creation into exhibition design context, should be synchronized with The Times, The red culture theme exhibition is combined with the digital form exhibition in a wider latitude to tell a good Chinese story and give users a more immersive experience.

1.3 The Introduction of Metaverse

The concept of Metaverse can be traced back to the publication of *Avalanche*, a novel written by American science fiction master Neal Stephenson in 1992. In the novel, a man with an Internet avatar travels through the online world parallel to the real world. As can be seen, At that time, people had a certain desire to create a digital world comparable to reality. In the ten years after 2003, the birth of "second life" game, you can call it the embryonic form of the Metaverse, in this game, the user can virtual character created by manipulating the individual social, shopping, such as the real world, construction, business, and there is no such thing as an task in the game and conflict, the player entirely carried out in accordance with the personal willingness to action; Second Life has proved that digital worlds can be created and exist. It is true that second Life, as a two-dimensional game, does not provide players with a multidimensional experience, and due to the development of technology, the concept of Metaverse has experienced a long cooling-off period. Until 2021, with the improvement of 5G technology, the popularity of mobile terminals, the maturity of block chain technology, and the rise of motion-sensing devices and VR applications, the ultimate media form of Metaverse officially comes into the public's view. Therefore, 2021 is also called the first year of the Metaverse.

Today, Metaverse is defined as a new digital media and social form based on the integration of a variety of technologies. From the birth of Metaverse, there have been numerous scenarios and industry layouts focusing on them. For example, Roblox in the game industry is called "the first Metaverse". Some scholars also pay attention to the application of Metaverse in the field of education , There are also in-depth discussions on user behavior and experience from the perspective of Metaverse, and scholars gradually pay attention to the advent of Metaverse has played a crucial role in the overall development of human beings, this comes from Metaverse there is Therefore, based on the current development trend, Metaverse will have a huge impact on the existing production system and way of life, reconstruct the original situation of technological integration of reality, and make the objective reality of the atomic world into the digital world.

2. The Importance of Metaverse Application in the Red Culture Exhibition

With the further development of digital technology, applying a variety of media, the traditional theme of multiple digital technology exhibition has not in the minority, especially in the real scenario, the museum through photography, installation art, virtual reality, body feeling will originally to dynamic and static, one dimensional diffusion exhibition development multi-sensory exhibition, build immersion, the situation of the experience for the audience. The word "immersion" was once mentioned in the book "Rules of Design", which is explained by the convenient mindflow theory. "Immersion" means that users can get satisfaction and pleasure in the situation created by the designer, and even forget the existence of the real world. But the scene entrance based on digital exhibition design is still mostly offline museums, art galleries, etc. Most of the exhibition design integrated with digital media is based on the optimization of the audience's audio-visual senses, which is difficult to achieve a real sense of immersion. Due to the shackles of geographical space, offline museum's communication effect is also difficult to achieve a broader coverage. Metaverse developed by VR technology, motion sensing equipment, block chain technology and 5G construction provides an innovative and integrated path for the classic theme exhibition design in the digital era.

In addition, with the application of Brain-computer interface technology, users can control the sense of touch of body through their mind and enter the digital red culture exhibition hall built in Metaverse through the interface. Users can shuttle through the exhibition hall without leaving home, breaking the shackles of regional space. At

the same time, the bi-directional transmission function of brain-computer interface, Users can freely interact with digital exhibits, digital devices in a unified space, and even users who are watching the exhibition together, and bring more real multi-sensory experience through brain signal transmission to the senses. Moreover, based on the support of block chain technology at the bottom of Metaverse, in a decentralized context, users can choose interaction objects more freely and form a wider range of non-linear interactions, which maximally ensures users' sense of reality and embodiment during exhibition experience. Therefore, the arrival of Metaverse will achieve a truly immersive online red-themed cultural exhibition parallel to the real world exhibition.

3. The Feasibility and Concrete Way of the Integration of the Metaverse and the Red Culture Exhibition

3.1 Integration Analysis of Technical Support and the Red Exhibition Hall of the Metaverse

The build of Metaverse is to integrate a variety of technology, performance out centralized humanity characteristics, the first is based on 5G or 6G communication network construction and development, make Metaverse in a new digital field, ensure the collaborative operation and real-time rendering of the terminal more fluency, the user experience in the digital pavilion based on the Metaverse is more immersive. The second is the empowerment of block chain technology. Due to the decentralized, traceable and immutable characteristics of block chain technology, automatic authentication of user identity can be realized and cannot be copied, so that users can conduct nonlinear interaction in the virtual exhibition hall and realize consumption behavior through virtual tokens. And for the pavilion construction, the realization of online resource storage, connection, trading and management of the ecosystem. In the allocation of resources and data processing, based on the artificial intelligence technology and big data, in terms of "speak good Chinese story", can realize automatic matching information output form, analyze the user behavior, matching the corresponding exhibition information and sensory experience, form the resource configuration optimization has upgrade the user experience. In the aspect of interaction, the user through the brain-machine interface and body sensing device, after entering the virtual red culture theme pavilion, through behavior, touch, audio and visual senses, myoelectricity, such as multi-channel way, truly achieve user embodied immersion experience. And to interact with the exhibits more pluralistic, compared to offline is relatively rare and precious exhibits couldn't happen intimate interaction problem. It is resolved online, and users can freely socialize with other end users within the pavilion.

3.2 Based on User Experience Feedback, Metaverse Can Improve the Quality of the Red Culture Exhibitions

Metaverse based on big data technology, artificial intelligence technology, eye movement, motion perception of energized, Metaverse red culture theme pavilion is built based on full digital information. A series of user behaviors after entering the Metaverse pavilion scenario can be regarded as behavioral touch-points and collected through block chain and big data technology. Donald a. Norman think user experience can be divided into cost layer, behavior layer and reflection layer. And Metaverse exhibition design based on display in the form of A design to stimulate the instinct of the user layer, triggering behavior and reflection layer, it is dominated by instinct layer, behavior layer and the reflection layer, or for the penetration and comprehension of the red culture has important influence. Therefore, there is a significant synergistic effect in the feedback data collection of the exhibition design of Metaverse, which further improves the optimization of user experience and the quality of the exhibition design, and finally forms a closed loop between the collection of user experience feedback and the optimization of the red culture exhibition design of Metaverse. For example, when users visit the red theme pavilion of the Metaverse, they can collect behavioral data, emotional feedback information of eye movement and interactive behavior information, sort out the information to optimize the interactive path of the exhibition, and because the digital processing mode of the Metaverse is more efficient, it can upgrade the experience of the next user entering the exhibition scene. Finally, users' participation and experience of the exhibition will be deepened to achieve cultural resonance.

3.3 Theoretical Research on the Design and Application of the Red Culture Theme Exhibition Hall in Metaverse

Currently offline red theme culture exhibition design mainly divided into narrative pattern, appearance design and auxiliary exhibits three sides facing exhibition design such as overall planning. But based on Metaverse, red cultural theme pavilions could integrate the characteristics of Metaverse such as immersion, multi-dimensional interaction and resource allocation mode, according to the specific design for organic fusion line.

First of all, in the narrative mode, offline exhibition design is divided into static narrative based on picture scroll, sculpture and text, and dynamic narrative based on documentary and sound and light scenes. In Metaverse, because real people can through the brain-machine interface, VR and somatosensory devices and digital image into the pavilion, which means that the pavilion in Metaverse, and the digital image produces the senses of stimulating, according to the French philosopher, merlot ponti, perceptual phenomenon theory, feeling after the perception and indivisible, Therefore, users form conscious feelings after receiving perceptual stimuli, which are

then transformed into experiences. Therefore, in terms of presentation design, it focuses on stimulating user perception and forming immersive experience, so as to achieve peak effect of experience. "Yi Zhan Hua Xia" red culture theme exhibition, for example, such as the seventieth anniversary of National Day floats "epoch-making" sculpture (figure 1), in Metaverse red culture exhibition hall, repetition can be through the form of digital modeling. While retaining the texture and section features of the original sculpture, the national flag at the rear uses dynamic design technology to form the effect of flying national flag. And in front of the characters in the float showing the location of the masses of users can reserve interactive display space, the number of users and the image can be achieved like to participate in the scene, float parade, sculpture and other characters in design floats when set voice interaction model, for its users through speech communication, each sculpture image would be the story they represent, In Metaverse, it spreads to users through anthropomorphic interpersonal communication, so that users can form the experience mode of multi-sensory interaction and implant deeper cultural understanding. In addition to the design in exhibition dynamic narrative mode, the traditional offline dynamic narration exhibits unable to interact with users, only to the user's audio-visual feeling cause stimulation. But subject to offline exhibition venues, equipment limited, user experience has decreased to some extent. In Metaverse, red culture theme pavilions, when screening such exhibits, It greatly promotes the freedom of users to interact with it, and exhibition designers can also add interaction nodes here. In red culture theme documentary film creation, for example, can be the integration of VR movies and interactive video elements, form a film with users to create, participate in mode, the film narrative theme from the creator to the viewer, along with the creator and the viewer's boundaries. In addition, in Metaverse, because the user is the embodiment of the digital image, broke the reality and the framework of digital, was not the real need user manual interaction, which leads to a double track of interactions and outcomes as a result. In Metaverse, interactive documentaries can be created from the user's narrative perspective, and users are deeply involved in the documentary, and the narrative rhythm and narrative results can be subtly changed according to the user's behavior.



Figure 1. The 70th Anniversary of the Founding of the float sculpture

The second is the appearance design of the red culture theme pavilion of Metaverse. Appearance design aims to reflect the theme of the exhibition, aesthetic, artistic conception and the value orientation of the important carrier, in Metaverse, because users and exhibition access scenario is the pavilion, therefore, in the form of the pavilion design can add red color, the national flag in the modeling of the scene, light and other elements, which can foil atmosphere. And on this basis, relevant films are shown on the virtual background wall, and the film stories are switched with users' viewing sequence and actions, so as to combine the film stories with exhibits, reveal the relevant cultural connotations of each exhibit, and form a deep interaction between users and exhibits.

Finally, in terms of auxiliary exhibits design, offline exhibits are mainly cultural relics, documentary photos and paintings, which are relatively single in form. In the Metaverse, the forms can be innovated by digital technology while retaining the contents. For example, some cultural relics restored by digital technology or documentary photos restored by digital technology cannot completely tell the real events of history to users. However, in Metaverse, historical event restoration scenes can be built, and users can enter the historical event scenes represented by the exhibits by interacting with them. For example, the photos of the Founding Ceremony can be entered into the virtual scene of the founding Ceremony through the gesture interaction with digital photos through 3D modeling technology and interactive recognition system, so that users can truly enter the scene of exhibits and form psychological experience.

4. Discussion

Although the underlying support technology of the current Metaverse is not fully developed. It is not hard for us

to believe that the emergence of Metaverse will constantly change all the traditional industries and be predictable in the reconstruction of exhibition design. Embodied immersive experience will also break the shackles of time and space in the traditional atomic world and change the original concept of experience and cognition. We are in the midst of this transformation. In the context of promoting red culture and telling Chinese stories, the design of red theme digital Exhibition should seize the opportunity of The Times, actively embrace new technology and new media, improve user experience, spread the red spirit, and create a spiritual base with Chinese red culture gene in Metaverse.

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