

Digital Museum Design Research

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Abstract: As the main place to carry precious historical cultural relics, museums play an important role in modern society. It can make the audience feel the charm of traditional cultural relics and art at close range, and can also strengthen cultural education. The continuous development of the museum business is affected by security, fire protection and other factors, resulting in obvious restrictions on most physical exhibitions. With the rapid development of computer, network, and information technology, digital technology can provide a broader art form for museum displays, meet the needs of tourists for close viewing, and also bring visitors more personalized and diversified choices.

1. Introduction

Museum exhibitions can use interactive installations, content performances, official websites, social media, digital archives, interactive games, etc., to create more diverse cultures using multi-angle and multi-level methods, and provide the public with a rich spiritual culture.^[1] Traditional museum exhibitions have the characteristics of authoritative collections, resulting in a very long distance between cultural relics and visitors. In addition to physical museums, the use of Internet technology and mobile network technology makes the museum online world and mobile space the main exhibition form. Various digital technologies and information dissemination technologies have made digital media the main way for museum exhibitions.^[2]

2. Development Trend of Digital Museum

Information technology continues to develop and mature, and more and more museums are actively exploring new technologies, cooperating with scientific researchers, and applying information technology to various fields of museum research, greatly enriching the exhibition space of the museum, and the management and operation of the museum.^[3] Significant changes have been made. In the new era, museum digital exhibitions have become the most important way to provide the public with an important way to obtain information. The way of exhibiting in future museums will also change from static display to dynamic display. The performance requires dynamic, artistic form and close communication effects. Before visitors participate in the exhibition, they should fully interpret the beauty of cultural relics. The construction of digital museums can break the static and passive communication effects of traditional museums and meet the actual needs of visitors.^[4] Digital museums can also use multimedia technology, artificial intelligence technology, and virtual technology to create multiple sensory interactions, interacting with visitors' senses of hearing, vision, touch, smell, etc., so that the audience should have a deeper experience and improve the museum's education Features.^[5]

3. The Main Method of Digital Museum Design

The construction of museums is consistent with the development of the times. After entering the information age, museum displays have richer creativity and imagination. Museum display forms and connotations should advance with the times and continue to develop and change. In the context of digitalization, the ways for visitors to exchange information have become more diverse. Using

images, text, three-dimensional environment and virtual reality, etc., can make information transmission more real and make people feel immersive.^[6]

As an advanced and intelligent computer user interface, virtual reality can provide visitors with a variety of perception and interaction methods such as vision, hearing, and touch, using virtual reality technology and computer and graphics technology artificial intelligence. Ergonomics, sensor technology, etc.^[7] create a more realistic virtual world for tourists. The expressiveness of three-dimensional space and the interactive operation of man-machine can also give people personal experience. Virtual reality technology has gradually become the most ideal display tool for digital museums.^[8]The use of virtual reality technology can also ensure that visitors interact with cultural relics at the closest distance. Intuitive and accurate evaluation of the shape, color and space of cultural relics is an advanced technology that cannot be replaced by traditional display. Virtual reality can also provide convenience for tourists to participate in the protection of cultural relics, using virtual cultural relics virtual scenes to truly meet the individual needs of tourists.^[9]

For example: VR panoramic digital museum takes public service demand as the core, and VR museum uses multi-dimensional display interactive form to realize a high degree of interaction between the public and museum collections and provide the public with ubiquitous services. Smart museums use digital, VR three-dimensional modeling, multimedia, virtual reality and other methods to build digital exhibition halls in physical museums to achieve display functions that traditional exhibitions do not have.^[10]

4. Main Advantages of Digital Museums

The display space and time of most cultural relics in traditional museums are relatively fixed, and there are obvious display restrictions. Visitors can obtain very limited information at the same time and space. Digital museums can use Internet technology to enable visitors to quickly browse relevant information about the museum anytime and anywhere, and can also store valuable information online, which greatly improves the overall value of cultural relic utilization.

Digital museums can provide visitors with real-time interaction, and all interactive behaviors can meet the individual needs of visitors. Visitors can choose different virtual environments to visit and browse at any time to give full play to their imagination. All personal behaviors will not affect others. This feature is also in line with the development needs of the times. The construction of digital museums can give visitors a more intuitive experience. The digital museum uses Internet technology and virtual reality technology to replace the traditional physical display. All information is composed of digital signals, which can ensure the accuracy and interactivity of information transmission and greatly reduce the space occupied. The use of digital collection methods can form a three-dimensional database of cultural relics, which can not only save the original data of cultural relics, but also can carry out high-precision permanent preservation of endangered cultural relics. Using virtual reality technology can accurately predict the accuracy of cultural relic restoration, select the best protection and restoration method, and greatly improve the quality of cultural relic restoration. Virtual reality technology can also accurately predict images after restoration of cultural relics, improve the methods of restoration, and improve the overall level of restoration of cultural relics.

Virtual reality technology can copy art cultural relics from multiple angles, develop the use value of cultural relics, and help extend the overall service life of cultural relics. The construction of the digital museum system can enhance the museum's own display and education functions to coordinate the use of cultural relics and resources. Scope spread, truly get rid of the restrictions of physical cultural relics, making cultural relics a heritage that all mankind can share. Virtual reality technology can simulate the remains of the ruins that have disappeared. For example, the murals of Italian churches have been damaged for many years, but virtual reality technology can restore them to their original appearance. Using image scanning technology, the murals can be restored and integrated into digital files. Visitors can walk in the "digital corridor". See different patterns with different light.

5. Influencing Trends of the Future Development of Digital Museums

5.1 The Service Concept is Mainly from Exhibits to Audiences

Traditional museums are important places for social education, and it is also possible to popularize and promote scientific knowledge. Meet the development needs of the times. In the early exhibitions of the museum, the precious cultural relics collection was valued, and the audience could only see the art treasures in the window. Digital museums can use the Internet and virtual reality technology to display cultural relics in all directions, ensuring that visitors can observe and appreciate the exhibits at close range. In addition to providing the latest cultural and cultural knowledge, it can also record the psychological reactions and mental states of visitors, enhance the audience's attitude towards cultural relics, help cultivate visitors' rational thinking, and truly make visitors the center of the exhibition.

5.2 Service Targets Range from Elite Groups to Mass Groups

With the rapid development of informatization, global Internet users have reached billions. These people from different countries and different cultural backgrounds can use Internet technology to appreciate cultural relics from all over the world, truly making museum culture a kind of popular culture. Digital museums can also break the original concept of elite culture, making digital museums truly a demand for popular culture. The construction of digital museums can also promote the rapid development of museum social education functions.^[11]

5.3 The Form of Service Changes from Do Not Touch to Welcome Participation

During the early exhibition of cultural relics in museums, there were often a large number of security systems in order to protect the cultural relics, making the distance between the cultural relics and tourists very far away. Visitors accepting strange things, if the acceptance rate of sight and hearing alone is only 25%, the information contact rate of tactile contact can reach more than 65%. It can be seen that during the exhibition of cultural relics in museums, if visitors can touch cultural relics with their hands, it will increase the acceptance rate of the audience and enhance the social education function of the museum. Many tourists do not know how to properly protect cultural relics, and most of the early museums refused to touch them. With the construction of the digital museum, virtual reality technology is used to create a real interactive scene for the audience. The audience can observe the cultural relics in all directions in 360 degrees, and can also conduct in-depth analysis of the characteristics of the cultural relics. The tactile feedback system can give feedback to the audience's various actions, knocking on the door will produce a knocking sound, and pulling the trigger will also produce sparks. The virtual situation constructed by the digital museum can greatly expand the imagination of the audience, truly drive the audience's enthusiasm for participation, and promote the change of the way of information dissemination.^[12]

6. Conclusion

In the context of rapid social and economic development, in order to exert the influence of the museum, the most important thing is to attract the interest of the audience and enable the audience to actively participate in the interaction. Digital museums can serve as educational tools. The new museum format also takes the audience as the starting point and emphasizes the sense of interaction with the audience. Traditional museums actively use new technologies and concepts to ensure that they keep pace with the times and innovate. As a disseminator of culture, the museum applies new science and technology and digital means to increase the protection of cultural relics and create a good exhibition space.

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