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Analysis of the Innovative Mode of Digital Creation for Museum Cultural Communication in the Digital Era—Based on the Perspective of Sense of Cultural Commonality

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Abstract. In recent years, the cultural communication of museums is experiencing a paradigm shift from physical to virtual, from one-way output to immersive interaction. Digital cultural and creative products, as their core carriers, have restructured the perception and dissemination paths of cultural experiences through technologies such as augmented reality (AR) and virtual reality (VR). Based on the theory of sense of cultural commonality, this paper explores the influence mechanism of digital creativity on the cultural communication of museums. It is found that through augmented reality, virtual reality and other technologies, digital cultural creations provide consumers with a deep sense of immersion and good user experience through online immersive spaces and non-linear narratives, which is highly compatible with the mechanism of sense of cultural commonality. At the same time, in addition to enhancing consumers' cultural sensibility and cultural understanding, digital creativity also provides museums with the double effect of dynamic protection of cultural relics and global cultural dissemination.

Keywords: Digital era, digital creativity, sense of cultural communion, museums

1. Introduction

Under the sweeping wave of digitization, museums are experiencing an unprecedented revolution in cultural communication paradigm. As one of the main carriers of museum cultural communication, museum cultural creation has also transformed from traditional tangible products to intangible and immersive products, digital cultural creativity. With the help of digital communication technology, digital cultural and creative products realize the virtual interaction, visualization, and dissemination of digital content through augmented reality, virtual reality, and other devices [1]. However, the success of digital cultural and creative products depends not only on their technical content, but also on whether they can provide consumers with a deep sense of immersion and good consumption or use experience. This phenomenon has the same mechanism as the *sense of cultural commonality* proposed by Zhang Zheng based on the mechanism of consumer feelings in immersive cultural experience [2]. Therefore, this paper attempts to analyze the relationship between excellent museum digital cultural creativity and *sense of cultural commonality* through literature research method and case study method, and then explore two core issues: first, analyze the innovative mode of digital

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cultural creativity on museum cultural communication based on the theory of *sense of cultural commonality*. First, to analyze the innovative mode of digital cultural creativity on museum culture based on the theory of *sense of cultural commonality*. Secondly, we will explore the possibility of outreaching the theory of *sense of cultural commonality* in the field of innovative communication in museums.

2. Literature review

2.1. Digital cultural creation in museums

In the early digital cultural and blogging mode, the research mainly focused on the digital infrastructure of the museum, and the museum's cultural creation mainly physical development. Chen Lu scholars pointed out that this stage of museum digitization is limited by the dual challenges of technology implementation and cultural transformation, and stays more at the level of cultural relics data storage, and creative products are mainly physical peripherals, such as stationery, jewelry, etc., with an emphasis on the pragmatization of cultural symbols. For example, in the late 1990s, the National Palace Museum used film cameras to digitally store images of cultural relics and establish a database of cultural relics, which is regarded as an early attempt to digitize Chinese museums [3].

In the past decade, with the promotion of policies such as *the State Council's guiding opinion on actively promoting the Internet + action* and *the 13th Five-Year Plan for National Strategic Emerging Industries*, the focus of research has shifted to how digital technology can empower the development and dissemination of cultural creations. Through the application of AR, VR, blockchain and other technologies, the form of digital cultural creation has become more diversified, such as digital collections, virtual exhibition halls, interactive games and so on. Wu Yan scholars also made a more detailed categorization of museum cultural relics digital cultural creativity according to the content, namely, *digital cultural relics, digital experience products, digital economic products* [4].

In the past two years, the research focus has emphasized the deep integration of digital cultural creativity with the living conservation of cultural relics and how to create immersive digital cultural creativity scenarios for users. Zhang Zheng proposed the *four-quadrant model of immersion to* analyze the cultural logic of immersion from the perspective of the interaction between the body and the space, emphasizing that the technology needs to serve the fusion of body perception and spatial contextualization rather than purely pursuing sensory stimulation [5]. Ziyan Ai and other scholars have taken Dunhuang cultural heritage as an example and revealed that, based on user behavioral data, the video game is the most effective way to create an immersive digital cultural and creative scene for users. Ziyan Ai and other scholars take Dunhuang cultural heritage as an example, and based on user behavioral data, reveal that video game elements, concert elements, and interactive experiences are common components of the product, and that these attractions successfully stimulate the interest of users and motivate them to gain a deeper understanding of the cultural knowledge embedded therein, providing empirical contributions to the development and research of digital cultural creativity [6].

From the above literature review, it can be seen that the development of digital cultural creativity in museums has gone through the process from infrastructure to technological empowerment, and then to the deep integration of immersive experience and living conservation. However, the current research mostly focuses on the application of technology and user experience, and there is insufficient exploration of the deep impact mechanism of cultural communication.

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2.2. Sense of cultural commonality

The concept of *sense of communion* originated from the Stoic school in ancient Rome, and was initially defined as a kind of integration center of sensory experience, in which visual, auditory, olfactory, gustatory, tactile, and other perceptual information are brought together, and becomes the cognitive basis for the generation of knowledge, fantasy, and dreams [7]. During this period, various schools of thought had different definitions of *sense of communion*.

It was not until Kant redefined the *sense of communion* in the Critique of Judgment that it was regarded as an aesthetic unity of a priori emotions and intellectual concepts, connecting sensibility, rationality, and the individual and the public, and laying down its central position in aesthetic activities. Based on Kant's theory of *sense of communion*, Zhang Zheng proposed the new concept of *sense of Cultural Commonality*, which is used to explain the consumer perception mechanism in immersive cultural experiences. It is based on immersive scenes and de-standardized narratives, enabling cultural consumers to experience sensory freedom and pleasure and emotional resonance. Then, cultural experiences are accomplished through judgment, imagination and identity [2].

Since its inception, the concept of *sense of communion* has been explored by many schools of thought, but most of them are limited to basic theories such as philosophy, and have not yet been expanded to broader application fields such as cultural communication. Even though Zhang Zheng proposed the concept of *sense of Cultural Commonality* in 2023 to explore the mechanism of immersive consumption experience, it is currently focused on the interpretation of the theory itself, but lacks the mechanism of analyzing the actual impact of cultural communication in museums through the theory. Therefore, this paper attempts to use the theory of *sense of cultural commonality* as an entry point to deeply analyze the transformation of the path and innovation mode of museum cultural communication empowered by digital creativity, so as to provide new perspectives and theoretical support for the study of museum cultural communication, and to enrich the theoretical system related to the integration of museum cultural communication and digital creativity.

3. Analysis of museum digital creative innovation modes under the theory of sense of cultural commonality

3.1. Spatial dimension - creation of immersive space and non-linear narrative

Under the traditional museum model, whether it is viewing exhibitions or buying cultural and creative products, it is all carried out in the physical space offline. Until the popularization of digital technologies such as VR and AR and the rise of the concept of meta-universe, the spatial reconstruction of museum culture brought about by cultural creativity has entered a new stage.

In 2023, Tencent and Dunhuang Research Institute jointly created the Dunhuang Digital Cave of Sutras, which has become a new form of digital cultural creation. Its digital photo scanning, three-dimensional modeling and game engine technology to millimeter-level precision 1:1 reproduction of the Mogao Grottoes Cangjing Cave physical space details, while replicating the Cangjing Cave and its historical scene of more than 60,000 volumes of precious relics in the room collection a century ago. Users can enter the Dunhuang scenic area by simply clicking, realizing immersive and one's quiet viewing of cultural relics. From the perspective of scene theory, in this cultural scene constructed by digital cultural creativity that is very similar to the real cultural and museum environment, material culture as well as intangible culture can reach a zero-distance interaction with the user in the virtual space, which not only eliminates the distance between the real cultural and museum environment and the tourists, but also synergistically creates a kind of spatial symbolic

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presentation, which subconsciously conveys a kind of cultural value concept, and then continues to inspire and Promote the experience and consumption behavior of tourists [8].

At the same time, the *Digital Cave of Sutras* draws on the game mechanism, the ups and downs of the Cave of Scriptures historical events into a free exploration of the "cultural perception unit", users can take *return to the yi army yafu wine broken calendar* as a clue, through the role-playing game form of independent choice of traversing the path, in-depth participation in the cave excavation, sealing the hidden scrolls, reappear in the world, cultural relics dispersed to the reunion of the whole course. This mechanism breaks the linear logic of the traditional museum narrative that relies on the curator's design, and gives the user the *scriptwriting right* through the non-linear narrative mode, creating a personalized game experience, and becoming an important carrier of the *sense of cultural commonality*.

3.2. Cognitive dimension - the subject's cognitive and experiential concerns

Based on the shaping of online immersive space, digital cultural creativity allows users to realize immersive experience in purposelessness, and this immersive experience brings both from the senses and beyond the senses, forming the free pleasure of the senses. When users experience the form of intuition, the immersive experience then directly affects the body of the participants, stimulating the outbreak of emotional experience beyond the intuitive feelings, and then enhance their perception and feedback capabilities, and amplify the body and thinking inertia, resulting in emotional resonance.

In 2018, the Palace Museum launched its first interactive game puzzle book - *Mystery Palace · Ruyi Linliang Picture Book*. Through a three-dimensional interactive design of *product (physical book and App) - ground - reader*, it reconstructed the cultural perception in the common sense of culture - that is, through sensory freedom and pleasure and emotional resonance and resonance. Transform traditional culture from a knowledge object into a perceivable life experience. In the online APP setting, it is not the traditional listing of cultural relics or historical data, but the immersive translation of visual symbols that reconstructs the logic of cultural perception. When the APP is opened, the adventure scene with the main character as the background unfolds in front of the player like a beautiful scroll, and the player can make choices in the game to influence the plot and even decide the fate of the main character. In *Mystery Palace2*, the props have been better designed, users need to put together the cardboard into a paper model of a Qing Dynasty building, and then use the light source to project the hidden clues. This process is not only a puzzle solving, but also a synergy between manual participation and light and shadow puzzle solving, which transforms *Qing Dynasty architecture* from a technical term into an experienceable cultural gene, and the combination of the tactile experience of the physical book and the APP's visual and tactile virtual interaction realizes the multi-sensory instant pleasure between the subject and the object of the user [9].

When the user carries the puzzle book into the field of the Forbidden City, the space itself becomes the carrier of the cultural narrative. The Forbidden City has set up specialized NPCs to participate in the users' offline puzzle solving, deepening the immersive experience between the physical scene of the Forbidden City and the audience. When readers touch the cultural symbols of the Forbidden City through multi-sensory channels such as tactile and spatial cognition, physical cognition and thinking inertia are continuously amplified, which triggers a leap in perception and feedback ability. This deep interaction ultimately transcends the superficial cultural consumption and forms emotional resonance based on cultural commonality.

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4. Possibility of the outer edge of the theory of sense of cultural commonality

In the traditional *sense of cultural commonality*, consumers complete the cultural experience through judgment, imagination and identity, and the subject position and personal feelings are truly highlighted. However, under the experiential consumption of digital creativity, digital creativity as an object is based on the creative development of museum cultural relics or cultural IP, which has a strong cultural value in itself [10]. Therefore, when analyzing the sense of commonality between the subject and object of digital cultural creation in museums, the immersive experience not only makes the subject's cultural sensibility and comprehension enhanced, but also promotes the dissemination of the object's cultural value, and realizes the subject and object's *sense of commonality* in its role, which can be manifested in the dynamic protection of cultural relics and the global dissemination of the museum's culture. The specific effect on the object can be expressed in the dynamic protection of cultural relics and the global dissemination of museum culture.

For example, Dunhuang Digital Cave of Sutras, which through the virtualization of the Cave of Sutras, in order to achieve the interaction of tourists online immersive space at the same time, but also reduces the physical contact of tourists offline for the cultural relics, extends the life of cultural relics, and promotes the dynamic protection of cultural relics. Here, users are both experiencers and participants in cultural reproduction, forming a closed loop of dynamic protection. Meanwhile, in November 2023, the international version of the Digital Cave of Sutras has also been released, bringing a new cultural experience to overseas users, allowing more foreigners to recognize and come into contact with Dunhuang culture, and contributing to the global dissemination of Dunhuang Mogao Grottoes and even Chinese culture.

5. Discussion

At the practical level, *sense of cultural commonality* provides a synergistic framework of space-narrative-subject for the transformation of museum cultural creativity, and promotes the digital transformation of museum cultural communication. At the theoretical level, this study expands the interpretation dimension of *sense of cultural commonality* in the digital era, and forms a new interpretation of sense of cultural commonality in the field of digital cultural creation. It can be seen that through immersive space and non-linear narrative, digital cultural creativity significantly enhances the immersion and interactivity of cultural communication, strengthens the audience's sense of immersion and emotional resonance, and shapes a positive cultural experience. At the same time, the theory of sense of cultural commonality has a large extension space in the field of innovative communication in museums, which can be expanded to the dynamic protection of museum cultural relics and globalization of communication and other directions.

Based on the theory of *sense of cultural commonality* and the practical experience of digital creativity of Dunhuang Cave of Sutras and the Forbidden City Digital Decipherment Book, the future digital creativity of museums should be to promote the development of immersion, interactivity and globalization of cultural dissemination as the core and deepen the innovation from the following paths: firstly, through the technological empowerment to build a supersensory cultural space. The immersive nature of the existing digital cultural creation is the creation of online virtual space, and the creation of offline physical space for listening and visualization. In the future, we can combine tactile, olfactory and spatial audio technologies to break through the single immersive experience mode dominated by vision and hearing, and create an immersive space with *all senses*. Secondly, through the form of user co-creation, we can realize the transformation of users from consumers or experiencers to planners or designers. Through the development of low-threshold

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creation tools, users are allowed to participate in the design of virtual exhibitions and the creation of cultural relics stories, or through the community to collect users' ideas about the museum's cultural and creative stories, forming a deeper *sense of cultural commonality*. Finally, to further improve the global dissemination of culture, from local narratives to the globalization of cultural empathy network. Taking the Dunhuang Digital Cave of Sutras as an example, it is possible to team up global users to solve puzzles and collaborate to complete cultural relics protection tasks, so as to enhance the interactivity of global users and realize cultural identity.

6. Conclusion

Based on the theory of *sense of cultural commonality*, this study focuses on digital cultural and creative products in the museum cultural and creative industry. Taking two typical digital economy cultural and creative products, namely the Digital Caves of the Mogao Caves in Dunhuang and the *Mystery Palace* series of puzzle books of the Palace Museum, as cases, it analyzes the innovative models of digital cultural and creative products for museum cultural dissemination in the digital age. The study finds that the mechanism of digital cultural creativity has similarities with the sense of cultural commonality. Relying on the technological empowerment of augmented reality and virtual reality, digital cultural creativity realizes in-depth cultural immersion and high-quality interactive experience on the user's side by constructing immersive spaces and non-linear narrative frameworks. The study further finds that such practices not only significantly enhance the audience's cultural perception and interpretation ability, but also realize dynamic restoration at the level of cultural heritage preservation, and break through geographical boundaries to build a globalized cultural dialogue system in the communication dimension.

This study provides a more valuable reference for the future cultural and museum industry to carry out cultural and creative development and living protection of cultural relics. However, due to the diverse types of the current museum digital cultural and creative industries, which also include virtual exhibition halls, digital collections, digital cultural relics, etc. This study has some limitations as it takes into account the digital economic products as the newest form of digital cultural and creative industries in the selection of cases, and does not attempt to theoretically combine other digital cultural and creative cases. In future research, it is recommended to expand the scope of cases and strengthen the analysis of different types of digital cultural and creative products in order to understand and apply the theory of *sense of cultural commonality* more comprehensively.

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