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The Construction of the Cultural Growth Space of Digital Museums under the Perspective of Spatio-temporal Art

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Abstract: *This paper takes digital museums as the research object, explores the limitations of current digital museums, and discusses the multidimensional characteristics of time, space and emotion contained in spatio-temporal art with the guidance of spatio-temporal theory, and uses multidimensional dynamic "sense" to build the cultural growth space of digital museums. From the perception of details to stimulate emotions, generate associations, and achieve cultural understanding. From the growth of personal presence to break the boundaries, to achieve emotional empathy. From the experience of emotions, role transformation and alternating collision, seek a new synergistic balance point in the contradiction, and derive a new cultural emotional experience. We hope to provide some reference for the creation of digital museum space nowadays.*

Keywords: *Time and space; Digital museum; Cultural growth*

1. Current situation at home and abroad

Digital museums first started in 1990 with the "American Memory" project launched by the Library of Congress, which proposed to use digital technology to digitize and store the library's collections of documents, manuscripts, photographs, recordings, images, etc., and edit and produce thematic works in series, and then emerged in Europe and Asia one after another. As a new form of museum in the current historical stage of information art, digital museum is mainly developed with digital technologies such as network technology, information technology, database technology, virtual reality technology and interactive technology, and is to break the limitations of time, place and space to establish a comprehensive system that provides scientific research, cultural exchange, training and education services, and has the three basic characteristics of digitization of cultural relics specimen resources, information dissemination network and publicization of viewing and browsing.[5]

From the current status of research on the construction of digital museum cultural experience space, most of them focus on the research of digital technology, especially the research on virtual restoration technology, virtual reality technology, and interactive technology is particularly prominent at present. For example, the typical project Multimodia Multi-user Dungeon (MMMUD) System, which provides a shared virtual environment and a digital museum built on the virtual environment, when the user uses the system, a user avatar called the player is created in the virtual environment, and the user can roam the virtual environment by controlling the player; In the Virtual Museum of Chinese Nationalities' digital museum, virtual reality and interactive technology are used to give visitors the ability to interact with virtual guides and other visitors; Another example is the cultural protection project cooperated by China's Palace Museum and IBM - Beyond Time and Space Forbidden City, this virtual Forbidden City project is China's first project to use network new media technology to display cultural projects, which mainly uses cultural relics restoration technology and 3D modeling technology virtual technology to perfectly display the architecture and cultural relics of the Forbidden City. In addition, in order to increase the experience of the audience, the project team also used virtual reality technology to create a realistic tour environment, to a certain extent for the preservation and dissemination of the Forbidden City culture has made an important contribution. In recent years, and with the development of interactive technology continues to mature, digital entertainment technology has gradually become the new wave of digital museum cultural experience space construction, to a certain extent to enhance the function of space cultural display and spatial narrative.[1]

Throughout the development status of digital museums, it is undeniable that this digital technology as the starting point for research does create more possibilities for the construction of digital museum

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cultural experience space. However, the current development trend shows that digital museums are becoming more and more spatially oriented to experience technology and entertainment. Most of the participants focus on the sensory immersion brought by digital technology, and simply pursue the sensory stimulation for the purpose, often ignoring the cultural attributes carried by digital museums. The essence of digital museums is to cultural dissemination and education services for the fundamental purpose of virtual space experience place. Therefore, in the construction of digital museum cultural experience space driven by digital technology today, how to build a new research perspective to avoid digital museums deviating from the correct development trajectory, and to guide the experiencers to spontaneously understand and disseminate culture in depth has become a new challenge for the development of digital museums today.[2]

2. Definition of the construction of cultural growth space in digital museums

Cultural growth means that while spreading culture, it can continuously and spontaneously allow the experiencers to perceive, and at the same time, it can combine with the experience of the experiencers themselves to stimulate the understanding and interpretation of the experience to achieve a sense of cultural identity and cultural regeneration. From the development status of digital museums at home and abroad, it can be seen that the current construction space of digital museums has great limitations on cultural growth and development, that is, most of them tend to one-sidedly use advanced digital technology to build digital museum cultural experience space, resulting in the digital museum becoming increasingly transformed into a virtual space place based on experiential entertainment technology, which gradually leads to the museum space tends to be an experience place that emphasizes science and technology and entertainment, deviating from the essence of cultural dissemination that museum space should undertake. This has caused the phenomenon of the growth of museum culture. Therefore, as a matter of urgency, we should first define the essence of the digital museum space, and delimit the digital museum cultural growth space in the construction of "cultural understanding - cultural acceptance - cultural derivation", in order to achieve the dynamic continuation of culture (Figure 1). Digital technology is only a way and a means to spread culture and experience culture, but the ultimate goal after the experience should be to make culture grow dynamically and implant into the hearts of the experience.[3]

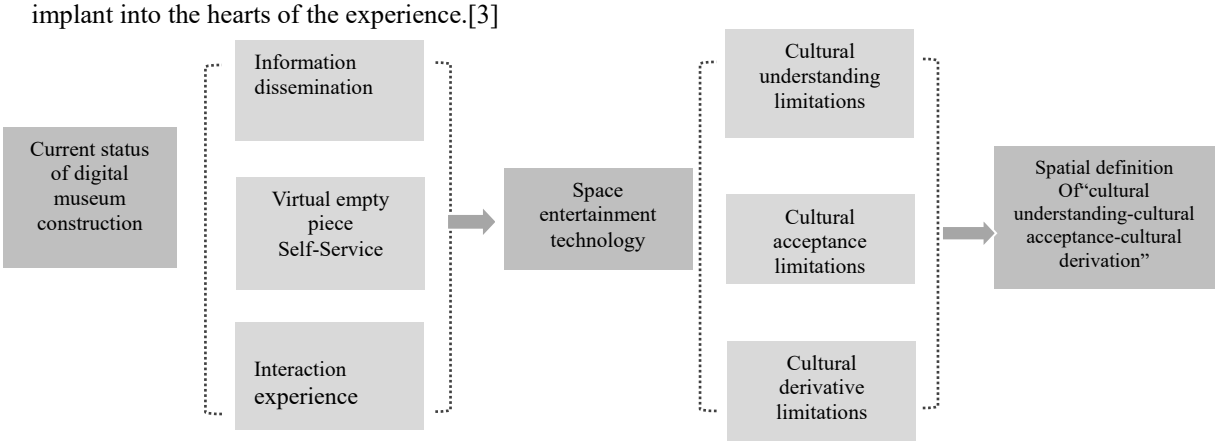

Figure 1: Current status of digital museum construction

3. Intervention in spatio-temporal theory and construction of theoretical basis

Spatio-temporal theory was initially applied in the field of physics, and gradually extended to the analysis of narrative text structure, market system to, tourism field and architectural space field. Modern physics believes that time and space are not independent and absolute, but interrelated and variable, and the change of either side contains the change of the other. In 1775, the German philosopher Kant first introduced the concept of evolution and history into the process of time passage and space change in a scientific way. Spatio-temporal art, focusing on the three levels of space, time and emotion, delves into the multidimensional characteristics of spatio-temporal art. In the process of movement and change, many spatio-temporal factors are independent and interact with each other, constantly changing their own structure to adapt to other factors and the environment. And the independent factors will constantly receive induced information from other factors during the movement process, and constantly integrate, change and adapt in the uncertain movement process.

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Therefore, spatio-temporal art has time, space and emotion at the same time, and it has multidimensional characteristics such as ambiguity, integration, turnover and induction (as in Figure 2). In the cultural growth space of the digital museum, people, interactive media, and fragmented cultural forms have been constructed into a complete space, with people as the main body of experiencers, interactive media as the carrier and form of communication, and fragmented culture as the object of communication. In the process of mutual influence between subject and object, space-time art provides sufficient theoretical basis for the construction of digital museum cultural growth space.[6]

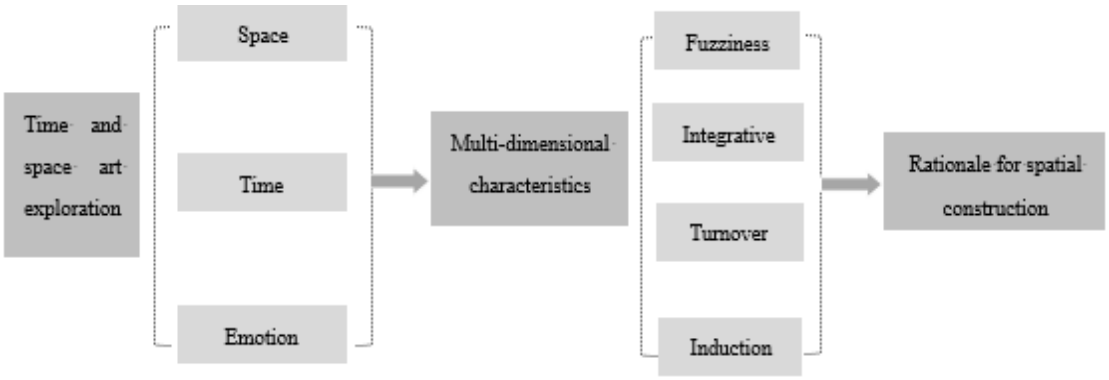

Figure 2: Time and space art exploration

4. Using multi-dimensional dynamic "sense" to build a digital museum cultural growth space

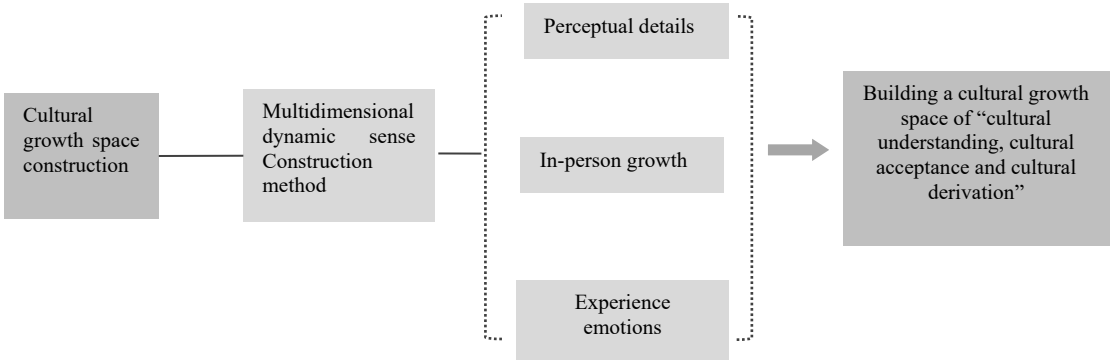

Figure 3: Cultural growth space construction

Based on the analysis of the multidimensional characteristics of spatio-temporal art, we use multidimensional dynamic "sense" to build a "cultural understanding-cultural acceptance-cultural derivation" digital museum cultural growth space that can be formed spontaneously by combining advanced digital interactive technologies from three levels: perceiving details, experiencing growth and experiencing emotions. The digital museum cultural growth space of "cultural understanding-cultural acceptance-cultural derivation" (Figure 3 and Figure 4).

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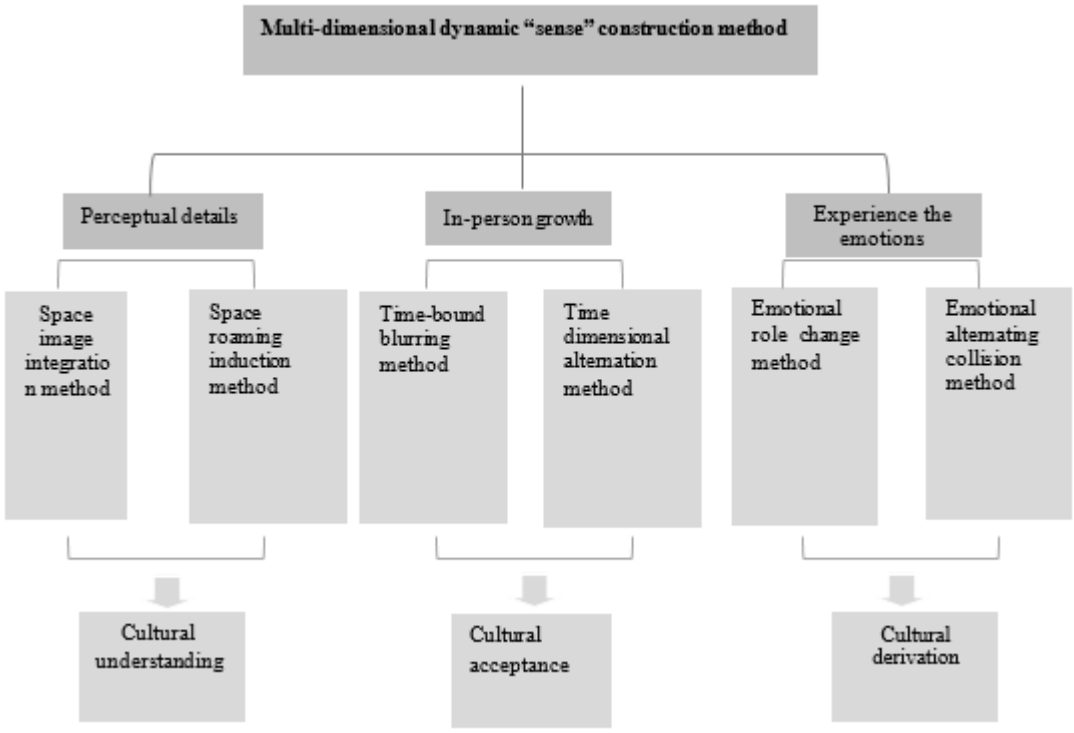

Figure 4: Multi-dimensional dynamic "sense" construction method

4.1 Perceptual details, using spatial image integration and induction to achieve cultural understanding

As the perceptual subject in the digital museum space, people have many subjective factors, so in the creation of the cultural growth space of the digital museum, it is necessary to set a specific cultural form with a specific regional environment and a specific regional population as the background. As a perceived object, culture has a certain degree of objectivity, and at the same time has a certain subjectivity in the process of subject experience, and its objectivity is mainly reflected in the regional style in the regional environment, regional elements, regional climate, regional craftsmanship and other material elements. Its subjectivity is mainly reflected in the emotional ideological elements such as customs, etiquette, and growth memories in the regional environment. The essence of cultural growth space is defined as culture is a movable and growing space. Only by organically integrating and connecting these cultural fragmented forms, using the spatial image narrative integration, stimulating the internal cultural memory of the experiencer, and inducing the sublimation of memory and emotion through continuous perception, can we continuously and deeply understand the cultural attributes in space. As a static object, culture itself needs to be designed through multiple perceptions such as facial features and touch, so that the experiencer can perceive cultural memory in fragmentation. For example, the call of cicadas can evoke memories of summer forest trails, the ethereal sound of valleys and cows can evoke childhood memories of herding cattle in the mountains, rough and soft textures and clattering sounds can evoke memories of playing in the grass, and so on. Different regions have a variety of unique memories that belong to that region. In the digital museum experience space, these perceptual details can be combined with interactive technology as a carrier of interactive experience, so that the digital museum can add a lot of warm cultural and emotional memories to the entertainment experience of trendy technology. The spatial image narrative integration is through the creation and construction of various perceptual details, these fragmented warm memories are orderly connected to form a complete cultural memory image, this memory image is mainly reflected in the continuous series of spontaneous emotions of the experiencer in the entire space experience, layer by layer to stimulate emotions, induce associations, and obtain multi-dimensional space perception information and cultural memory in three-dimensional space experience, which is one or more memory images formed by ideological tandem, and a deeper understanding of the culture endowed by the space.[7]

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4.2 Growing up in person, using the blurring of time boundaries and dimensional change to achieve cultural acceptance

As the perceiving subject in the digital museum space, people have different understanding of the physical culture due to their family environment, upbringing and knowledge learning, which leads to the corresponding difference in the degree of information acceptance. The experience in the digital museum space should not only be a personal experience, but also should be inclusive of more people, such as: children, teenagers, youth, elderly, disadvantaged groups, etc. They can experience different backgrounds of culture. Because of different life experiences, in-person growth is the best virtual means. The blurring of time boundaries and the method of dimensional turnover can effectively break the differentiated boundaries of gender, age, education, family, etc. ideologically. The blurring of temporal boundaries means breaking the real boundaries of time, space and place through the creation of technological interaction and emotional space, so that the experiencer can enter the virtual but emotionally real space experience out of his or her original identity, and perceive the growth environment, growth experience or cultural memory of others from a multi-dimensional perspective. In the digital museum space, the cultural memory information carried by different characteristics of time, space and place can be experienced in multiple dimensions through the interactive means of technology combined with the creation of video narrative space, which can break the boundaries of time, space and place to travel through different times and perceive culture from multiple dimensions, even across gender and family of origin. On the basis of this cultural perception, experiencers can go further to use their own consciousness to personally experience those experiences involved in different people, time, space and place that are not experienced by them in the real world. Therefore, the experience of growing up in person can be based on the experiencer's own undergoing, experiencing different things of growing up and perceiving cultures that were once difficult for him or her to accept. In this way, we can break the boundaries and experience them differently to achieve emotional resonance.[8]

4.3 Experiencing emotions, using emotional role changes and alternating collisions to achieve cultural derivation

Emotion is the most absent and significant part of the digital museum space, while we cross space and time, the change of emotional role enriches the emotion outside the experiencer itself. Based on the characteristics of space-time theory, in the process of alternate collision between the two, the experiencer's own ideology will constantly find a new dynamic balance point in the contradictory space and derive new emotions and cultural cognition. In the virtual multidimensional time, the digital museum experiencer can experience the emotional and cultural experiences contained in different times, spaces and places. The contradictory side is mainly reflected in the phenomenon that is not quite in line with one's original ideology, including the cognitive aspects of things, culture, rituals and ethics. The synergistic aspect is mainly reflected in the fact that while experiencing different times, spaces and places, the contradictory aspect constantly drives the experiencer to switch emotional roles, forming the phenomenon of "two selves", one is the emotional feedback generated by the "watching self" and the other is the "virtual experience". While the two consciousnesses are constantly struggling with each other, they are constantly shifting in concert to achieve the most harmonious state of cultural emotional experience, which is often marked by the emergence of new cultural emotions. Therefore, the use of emotional role transformation and alternate collision can enable the experience of digital museums to understand the culture, while constantly seeking a new synergistic balance in emotional ideology, so as to achieve the cultural derivation of digital museum space.[4]

5. Conclusion

In the face of the current limitations of digital museums, the author uses a multi-dimensional dynamic "sense" construction method to achieve cultural understanding, cultural acceptance and cultural derivation in the digital museum space. Sensory details can stimulate emotions, generate associations and achieve cultural understanding. Growing up in person can break the boundaries, shift the experience, and achieve emotional resonance. Experiencing emotions, role shifts and alternate collisions can seek new synergistic balance in contradictions and derive new cultural and emotional experiences. When the digital museum space is not only limited to the experience of interactive technology, but focuses on the means of communication of cultural understanding, cultural acceptance, and cultural derivation through interactive technology, the digital museum space will truly return to the essence of museum cultural communication.

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