Application of Virtual Reality in the Inheritance of Peking Opera

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Abstract: *Peking opera has rich historical, artistic, and cultural values as an intangible cultural heritage. With the advent of the digital era and the increasingly close integration of digital technology and traditional culture, the study of digital communication and the transmission of intangible cultural heritage has become a new area of concern. Through the interdisciplinary dimensions of spatial production theory and virtual reality technology, this paper examines the current situation of Peking opera cultural dissemination in the digital age, the difficulties of its dissemination, and its causes. With the help of spatial theory, this paper analyses the two leading causes of the current problems in the cultural dissemination of Peking opera: the lack of functionality and the lack of emotionality. And through the attributes of virtual reality technology, its industrial development planning, and the audience's psychological and emotional aspects, new strategies for disseminating Peking Opera culture are presented.*

Keywords: *Peking opera; cultural communication; virtual reality; spatial theory*

1. Introduction

1.1 Background

The art of Peking Opera is a significant artistic treasure of the Chinese nation. It has a glorious history and contains the essence of national culture, occupying a pivotal position in traditional Chinese culture. As the most fashionable form of digital communication, virtual reality technology has become one of the essential technologies affecting people's lives. The application of virtual reality combined with cultural heritage is gradually coming into public attention, positively impacting the art industry's inheritance and development. Therefore, combining virtual reality with the communication of Peking opera enriches the means of dissemination of Peking opera, and allows more audiences to know and love Peking opera, thus effectively promoting the inheritance and protection of Peking opera.,

The "intangible" nature of Peking opera poses the threat of easy damage and disappearance. Internally, Peking Opera faces the problem of data preservation and skill inheritance, and externally, it faces the problem of mass communication. Incorporating modern technology with traditional arts is essential to spreading and developing traditional skills. Responding to the call of the 20th National Congress, which promotes cultural self-improvement and self-confidence, this paper focuses on exploring new strategies for inheriting and disseminating Peking opera based on virtual reality technology. The hope is to expand its audience and enrich traditional Chinese theatre culture. As such, this paper lists the following three issues in the transmission and inheritance of Peking opera culture:

Summarize the current situation of the dissemination of Peking Opera through the collation of information, literature, and social surveys.

Analysis of the causes of the cultural diffusion dilemma of Peking Opera with spatial production theory.

Use virtual reality's immersive and interactive nature to explore countermeasures to address the difficulties of spreading Peking Opera and explore new cultural communication strategies based on virtual reality technology and its industrial development.

1.2 Method

1) Literature analysis method: summarises the merits of the existing literature as theoretical support

and practical reference experience for this thesis.

2) Case study method: Analyze how traditional culture based on virtual reality can develop the audience market and promote cultural dissemination and inheritance through case studies.

3) Integrated research method: Draw on theoretical knowledge from various disciplines such as spatial design, aesthetics, and communication.

2. Analysis of the current situation in the dissemination of Peking opera culture

2.1 Peking Opera Communication Mode in The New Media Era

2.1.1 Mass communication gradually replaces interpersonal communication

Traditionally, Peking Opera was based on an interpersonal mode of communication, whereby the audience entered the theatre and exchanged information with the actors face-to-face. With the advancement of technology and the increasing development of mass communication, the communication channels of Peking Opera have broken through the spatial limitations of traditional theatre (Sun, 2020)[5]. Mass communication media, such as television, have gradually taken over the dominant position of interpersonal communication. The Peking opera industry has made many valuable explorations in the mass media. For example, the Peking opera film "Lan Mei Ji" combines Peking opera with cinematography and special effects.

Another example is the theatre program "Li Yuan Chun", which packages Peking Opera as a variety show. Compared to the traditional interpersonal mode of communication, mass communication is faster and broader in scope, which is more in line with the preferences of young audiences. The use of mass media to disseminate Peking opera not only broadens its forms and channels of communication but also fills an otherwise empty market of young viewers.

2.1.2 Fragmented communication

A full Peking Opera performance in traditional theatres takes about two to three hours. In the era of new media communication, the public is often concerned with shorter content, where information is quickly available. This content production and dissemination form is known as "fragmented communication" (Liang, 2018)[3]. Under the fragmented mode of communication, the complete Peking opera repertoire is condensed into short songs, typical characters, classic drama plots, and so on. Focusing on the essence of Peking opera maximizes the audience's interest and leads them to re-disseminate the traditional fragments.

2.1.3 Symbolic communication

Symbols are an essential tool in the communication effect of Peking Opera culture. Symbols of Peking Opera are formed by intermingling the work's values, the audiovisual elements, and the audience's experience. The symbolic spread of Peking Opera is reflected in the infiltration of Peking Opera elements in various life scenes. For example, the game "Arena Valor" features the same hero's clothing made from the costume of the Peking Opera "Farewell My Concubine." For example, the face of the traditional animation character Sun Wukong is based on the "hieroglyphic face" of the Peking opera (Li, 2021)[2]. Also, several popular songs incorporate Peking opera singing.

On the one hand, the culture of Peking opera provides a reference for modern art creation and enriches the connotation of contemporary culture. On the other hand, elements of Peking opera are integrated into modern artworks. This symbolic dissemination has expanded the influence of Peking opera and reinforced its representative position in traditional culture.

2.2 Dilemmas in the transmission and dissemination of Peking Opera

2.2.1 The impact of new media and the seriousness of the ageing audience

As a traditional Chinese opera, Peking Opera has a place in the hearts of older audiences, but for younger audiences, it has long been far from their lives. Before the popularity of television and film, the public's entertainment was limited to theatre performances. With the rapid spread of new media, young people are attracted to various forms of entertainment such as music, games, and films; thus, traditional theatre culture is gradually falling out of favour with young people. As a result, traditional Peking opera has been severely impacted in the age of new media, with many difficulties, such as the loss of new

generation audiences, a sluggish market, and a need for more awareness of preservation and heritage.

2.2.2 Lack of creative talent and insufficient content innovation

As the older generation of Peking Opera artists withdraws from the stage, there are fewer and fewer performers who can carry on this art. On the other hand, although critical national and provincial Peking opera troupes have built up a certain number of Peking opera performing teams, there needs to be more creative talent in scriptwriting, directing, and choreography. Creative talent directly leads to a need for more content innovation. As a result, the plays performed are mostly classical plays left over from the Ming and Qing dynasties. The content is mainly ancient folk tales, and the ideas conveyed are generally based on religious, moral concepts and Confucian moral thoughts of punishing evil and promoting good. These ideas are too far removed from the current times and need to be more innovative to resonate with audiences.

2.2.3 Lack of funding and talent

Most provincial Peking opera troupes still need a better-allocated source of income and rely on government funding to keep performances going. Also, the financing for artistic creation, equipment renewal, and talent training need revising. Even for front-line Peking Opera performers, their salaries hardly reach the average level of those of equal achievement in other artistic fields. For Peking Opera apprentices, the income is even more fundamental and can only sustain subsistence. This is in contrast to the high complexity of art skills. To achieve performance standards, Peking Opera performers must simultaneously master all aspects of the programmatic elements of singing, stance, lineage, and face painting and develop their artistic understanding and professionalism (Jiang, 2015)[1]. The industry's high demands and low income create a stark contrast that has resulted in a loss of actors and a talent shortage.

3. A spatial theory-based analysis of the causes of the inheritance dilemma in Peking Opera

3.1 Emotional absence

Henri Léchevre's theory of spatial production develops an innovative account of the concept of space. According to Lechvre's theory, space is not only a container or a dimension opposed to time but also a social product. Space contains natural, mental, and social spaces. Social Space also includes material space and spiritual space. Material space is a concept under the materialist view that the world is made up of matter, while spiritual space is a discussion of the inner world (Pan, 2020)[4]. In the context of the spread of Peking Opera, material space refers to the actual physical living space of people in contemporary society. Spiritual space represents the inner world of people in today's society. Although the public has a positive and supportive attitude towards disseminating Peking Opera, it still faces various obstacles. Exploring the contradiction between spiritual and material space and analyzing Peking Opera's lack of emotionality can aid in understanding the causes of these obstacles.

Peking Opera was born during the Qianlong period of the Qing Dynasty, stemming from the collaboration between Hui-ban artists and Han-ban artists. Through continuous fusion, it accepted vernacular tunes and performance styles, such as Kunqu and Qin cadences. The comprehensive nature of Peking opera dictates that it blends the essence of cultures from all parts of the Chinese nation and has a wide emotional connection with audiences from different regions. During the Republican period, its spread peaked at one point. Peking opera is a cultural product closely associated with Chinese culture and national identity and is an integral part of the spiritual space that made up people's past.

Foreign cultures entered China in large numbers after the reform and opening up, and values and aesthetics that differed from traditional Chinese culture began to influence people's cultural identity. At the audience level, the native Peking Opera audience is gradually ageing, and many loyal viewers have been lost. Modern young people generally have limited knowledge of Peking Opera, and most have only had superficial exposure to it, not understanding its art form and cultural connotations. At the actor level, in the past, dedicated Peking Opera artists needed to conceptualize various aspects of their roles, combining their experiences and lives to portray their characters. Today, many Peking Opera actors often learn programmatically from the templates of past masters and lack their emotional understanding of Peking Opera, which leads to mechanical and rigid stage expressions.

As a result, today, people's emotional connection to Peking Opera is superficial and needs a cultural and dynamic identity. The absence of Peking Opera in the people's spiritual world reduces the motivation to accept, disseminate, and pass on this art.

3.2 Functional absence

The social space that has passed away is the historical space, and the current existing space is the modern space. In the case of the dissemination of Peking Opera, the historical space mainly refers to the social space from the end of the Qing Dynasty to the reform and opening up. In contrast, the contemporary space mainly refers to the social space after the reform and opening up to the present. Exploring the contradictions between historical space and contemporary space and analyzing the missing functionality of Peking Opera in today's society will help to understand why it was popular in the old society but lost its popularity in today's society.

The birth and popularity of Peking opera were based on a specific historical and social context. Peking opera was born at a time when people had relatively limited options for cultural life. The form of Peking Opera performance was exciting and ornamental, and as such, it has become an excellent choice for people to relax and entertain themselves after meals. However, in today's social context, changes in the material conditions of society have influenced the spiritual needs of the masses. Peking opera has become a "refined art" for a small audience. The cultural positioning of Peking Opera made it lose its entertainment and cultural functions for the general public.

In the social space of the past, Peking Opera works showed the social life in terms of content and had a particular educational function, propagating social rationality, depicting the true feelings of human beings, and pursuing truth, goodness, and beauty. For example, in "A Legendary Pipa," Zhang Dagong shows benevolence and justice to the weak and helps the poor, guiding people for good and restraint for evil. During the war against Japan, Peking Opera artists performed "Driven to Join the Liangshan Rebels," advocating the spirit of resistance against oppression and slavery and encouraging the independence of the Chinese nation. With the development of the times and the trend towards diversified social indoctrination messages, the elements in some Peking Opera productions still reflect the social values of past eras. They need a response to the contemporary social context.

In addition, in the past era, when the market for Peking opera audiences was vast, hundreds of Peking opera schools emerged, and Peking opera celebrities competed for attention. The existence of Peking Opera classes provided an opportunity and a platform for some to make a living. However, as the market for Peking Opera audiences has shrunk significantly in modern times, the industry has gradually become less self-sufficient. It relies solely on government subsidies as its primary source of income. The contrast between the income limitations of Peking Opera performers and the time cost and difficulty of learning their craft has led to a scarcity of Peking Opera performers and their successors. In conclusion, Peking Opera was born in a specific historical space and had the function of entertainment, social indoctrination, and a professional livelihood. However, with the changes in the cultural industry and audiences' changing needs and values, Peking Opera has begun to lose its functionality.

4. Exploring new strategies for cultural communication from the combination of virtual reality and Peking opera

4.1 Reconstructing emotional space based on virtual reality features

4.1.1 Motivating audience through virtual reality immersion

At the actor's level, a reasonably vivid stage performance requires the actor to relate their practical experience to the character. Only when actors believe they are the character themselves can they show the style of the character and their unique acting charm. Because of their own lack of experience and understanding, many young actors today can only follow the programmed performance structure, which makes the final performance raw and lacking in soul. Virtual reality technology can help solve this problem by modelling to replicate immersive virtual experience scenes based on the play. The actors could immerse themselves in the simulated scenes, experience the environment, and associate the emotions of the character as if they had experienced the scenario, thus creating an emotional connection with the character and adding their thinking to the creation of the character, and then better present the stage effect.

At the audience level, in a traditional Peking Opera theatre, the audience can only sit in their seats and passively watch the performance on stage. In virtual reality, the auditorium can be designed to be part of the stage (Wang, 2018)[6]. The five senses of audience association can also be realized through sensory and interactive technologies, relying on dynamic capture and real-time feedback to stimulate various

sensory association effects and thus actively immerse the audience. In conclusion, the immersive nature of virtual reality can assist actors in integrating their understanding and emotions into the performance. Still, it can inspire the audience to participate in Peking Opera scenes actively and mobilize them to watch the work enthusiastically.

4.1.2 Enhancing audience cultural identity through virtual reality interactivity

The interactivity of virtual reality in Peking Opera includes science education and cultural experience. In interactive science education, the audience can learn about the culture of Peking opera by viewing opera artefacts. For example, in the themed event of Peking Opera Rhythm, the audience can view Peking opera-themed folk relics from the collection of Bai Dacheng, a representative inheritor of intangible cultural heritage, by rotating and zooming in on the relics for an all-around. In addition, audiences can participate in interactions through science quizzes. The fun interaction stimulates the audience's curiosity and lets them deepen their knowledge and understanding of Peking opera culture. Moreover, in the interactive cultural experience, audiences can experience various cultural essences of Peking Opera through virtual reality, such as trying on Peking Opera face masks, role-playing opera characters, and roaming through opera scenes. A hands-on experience can increase the emotional resonance between the audience and the artwork and strengthen the audience's cultural identity and affinity with Peking opera.

4.2 Reconstruct the functionality of Peking Opera based on Virtual Reality Development

4.2.1 The return of entertainment function

Peking opera culture is popular among the older and some younger generations. The elderly group, because of their high recognition and affection for Peking opera, watching Peking opera has been occupied an integral part of their entertainment since childhood. However, watching Peking opera performances has time and venue restrictions, and the physical condition of running around becomes an obstacle to their cultural and entertainment satisfaction. With the spread of mobile devices, older people are gradually beginning to embrace new technologies. The current Peking Opera performance urgently needs digital preservation and network display. Virtual reality technology serves as a way to complete the digital presentation of the Peking Opera performance. Finally, it is displayed on mobile devices so the audience can watch the performance at any time, thus breaking through the venue and time constraints and meeting the social entertainment and cultural functions.

Furthermore, the combination of virtual reality technology and Peking opera culture can increase the freshness of Peking opera performance forms. For example, in virtual reality Peking opera experience scenes, the audience can learn to sing classic fragments, interact with opera characters, try on opera masks, and experience being on stage. Through virtual reality, Peking opera symbols such as Peking opera faces, costumes, and Peking opera IPs are integrated into the lives and entertainment of the masses, enriching the entertainment function of this art.

4.2.2 The return of social indoctrination function

In the past historical space, the stories of the Peking opera repertoire aimed to promote truth, goodness, and beauty to the masses, conveying an informative message to the public. In modern space, the storytelling of Peking opera can still play a role in social education. However, the repertoire needs to reflect the times. Hence, the content of the stories needs contextualizing in the current society, and the transmission of values needs to conform to current social standards. Therefore, discarding elements of the traditional repertoire that lag behind the times and making trade-offs in the content of Peking opera is the key to reforming the content of Peking opera. In addition to its content, the Peking opera communication method should also be in line with the times. The masses' curiosity and love of virtual reality will benefit Peking opera culture spread among social groups. By integrating the Chinese nation's social thoughts and humanistic values into content creation, Peking's opera work based on virtual reality will be a promising way to promote modern values. Displaying these works in museums and other pedagogical places will enable more people to gain educational enlightenment. This will facilitate the return of its social edification function.

4.2.3 The return of professional livelihood function

As an emerging digital media technology, virtual reality has developed rapidly in recent years, and both academia and industry are actively exploring more application scenarios of virtual reality technology. The virtual reality industry-driven development of Peking opera consists of two main steps. First, the government should take the lead in promoting the participation of virtual reality experts in the

development of the Peking opera and encourage university students to conduct innovative entrepreneurial experiments around the application of virtual reality in Peking opera. Meanwhile, the government should also ensure funding, talent, and technology. The second step is to encourage existing virtual reality business entities to make attempts related to Peking opera's cultural theme and expand the consumption field by creating a virtual world cultural IP and developing cultural and creative products. Using virtual reality to introduce the cultural elements of Peking opera into the market, enliven audiences, and motivate Peking opera practitioners has positive implications for the return of the professional livelihood function of Peking opera.

5. Conclusion

In the new media age, Peking opera has broken through the spatial limitations of mass communication channels, allowing more people to learn about Peking opera culture without stepping into the theatre. Moreover, in the fragmented mode of mass communication, the complete Peking Opera repertoire is reduced to shorter lengths to maximize audience interest. In addition to the performances, Peking Opera cultural symbols such as costumes, masks, and singing techniques have been more subtly integrated into the modern lives of the general public. However, due to ageing audiences and a need for more funding and talent, Peking opera is facing unprecedented challenges in terms of dissemination. In the modern social space, Peking opera is faced with the twin dilemmas of emotional and functional absence.

The immersive and interactive nature of virtual reality can mobilize the audience's initiative to watch Peking opera works and strengthen their cultural identity and affinity with this art, thus contributing to the emotional return of Peking opera. Hence, Peking opera can attract the public and renew their interest. While the functional return of Peking opera can help the public sustain their love for this art. Enriching people's novel experiences through virtual reality technology will aid in the return of the Peking opera's cultural entertainment function. Also, creating Peking Opera content that conforms to modern values and using virtual reality to spread it at the mass level will help the return of the social indoctrination function of Peking Opera.

Additionally, the industry-driven development of Peking Opera culture is a crucial way to achieve the return of its livelihood function. The government encourages existing virtual reality entities to create work based on the theme of Peking Opera culture. Through promoting the industrial development of Peking Opera from the existing consumption ecology to expand new consumption fields. The digital media era presents both opportunities and challenges for Peking Opera culture.

This research creatively proposes the method of inheriting the culture of Peking Opera through the application of Virtual Reality, which has both practical and theoretical implications for the inheritance of Peking Opera culture. On the one hand, the use of virtual reality to explore the communication strategy of Peking Opera is not only a supplement to the current communication media and channels of Peking Opera culture but also an innovative thinking perspective for the communicators of Peking Opera culture. On the other hand, based on the immersive and interactive nature of virtual reality, it can mobilize audiences to accept Peking opera, enhance their understanding and intimacy, and help to improve the stereotype of Peking opera as "obscure and difficult to understand."

On the other hand, in the research on exploring the dissemination and inheritance of Peking Opera, most previous studies have focused on a single perspective of genre inheritance, mostly lacking a research theory system and preferring to describe reality specifically. This paper aims to investigate new ideas about Peking opera's cultural heritage through the multidisciplinary dimensions of spatial production theory and virtual reality technology, as well as to provide recent references for traditional culture's digital communication strategies.

The propagation strategy of Peking Opera based on virtual reality application involves many theories, methods and technologies. There are still limitations of this research. First, in this paper, the survey on the audience of Peking Opera is only a tiny part of the whole audience of Peking Opera, so there are still some deficiencies and room for improvement in the coverage of the survey objects and the summary of the survey conclusions. Secondly, the virtual reality application of Peking Opera needs a lot of funds and technical support. In this paper, the new strategy for disseminating Beijing Opera is based on the extension of the status quo of virtual reality applications, so the assumptions put forward are still conservative. Therefore, more professional scholars must put forward more innovative ideas in the future. More people should participate in the dissemination and transmission of traditional culture, focusing on integrating interdisciplinary and multidisciplinary research and practice and working together to promote

the integration of traditional culture with the new era.

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