Innovative Conception for Blue House Digital Exhibition Hall

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Abstract: Blue House is a Prewar Tang building in Hong Kong that holds significant historical, social, and architectural value, carrying the life memories and neighborhood warmth of the middle and lower classes of Hong Kong. However, as a still-occupied residential building, the cultural display and public dissemination of Blue House face challenges such as spatial limitations, incomplete information, and the need to protect residents' privacy. To address these issues, this paper proposes the innovative concept of creating the 'Blue House Digital Exhibition Hall,' aiming to use digital technologies (such as mixed reality (MR), 3D animation, and interactive games) to protect and promote both the tangible and intangible cultural heritage of Blue House while safeguarding residents' privacy. The exhibition hall is designed to support both online and offline experiences, overcoming spatial and temporal constraints, and enhancing immersive experiences and emotional resonance with the cultural value of Blue House. Additionally, the paper employs a SWOT analysis to evaluate the advantages and potential challenges of the digital exhibition hall in cultural dissemination and sustainable operation, emphasizing its innovative significance in revitalizing cultural heritage and promoting public engagement.

Keywords: Blue House; Digital Exhibition Hall; Interactive storytelling; Creative planning; Culture industry

1. Introduction

Blue House was built in the 1920s and took 11 years (2006–2017) to complete its revitalization project [1]. This project transformed the Blue House from a composite building that had once served as "Hua Tuo Hospital," "Hua Tuo Temple," "Jinghan Compulsory School," "Lin Zu's Martial Arts Hall," and residential housing into an art space that integrates both culture and daily life [1]. Blue House is a cultural heritage site worthy of in-depth study, not only because of its long history and unique appearance but also because it is currently the only Grade I historic building in Hong Kong that has been successfully preserved and revitalized through active participation by local residents, embodying strong Hong Kong community sentiment [2].

However, as societal demand for cultural heritage research grows, a conflict has arisen between the privacy of Blue House as a residence and the openness of its cultural space. Therefore, based on the current state of cultural management at Blue House and the maturity of digital technology, this paper proposes the conception of establishing a digital exhibition hall for Blue House to resolve this conflict. The paper details the implementation plan and uses SWOT

analysis to evaluate the feasibility and impact of this conception.

2. The value of Blue House

2.1. Historical value

Blue House was built in the 1920s, witnessing the historical changes of Hong Kong for more than a hundred years. It has experienced a period of economic take-off after the large-scale reclamation of the Wan Chai area and the influx of a large number of foreign people. At the same time, Blue House also plays a unique role in reflecting Hong Kong's urban planning and development [2].

2.2. Social value

The social value of Blue House is extremely high. It is not only one of the oldest Tang buildings in Hong Kong, but also carries the life memories of the older generation of Hong Kong people, exudes the fireworks of the "old Hong Kong," and also witnesses the neighborly feelings passed on between the working classes in difficult years. This is also the reason why Blue House is praised as a "living historical relic."

For some overseas Chinese who grew up in Tang buildings in Wan Chai but have now emigrated overseas, the traditional Tang buildings like this can be a source of homesickness for them. Such old Tang buildings in Hong Kong can bring them a solid sense of belonging [3].

2.3. Building value

Blue House is one of the few relatively complete Tang buildings in Hong Kong that retain terraces and brick walls, and wooden structures, which are very typical and representative. In terms of the use of architectural elements, Blue House not only uses the stairs of riding towers, terrazzo handrails and stairs with poinsettia tile representing Chinese elements, but also uses iron-style railings with Western characteristics, reflecting the aesthetic concept of the fusion of Chinese and Western cultures. The level of industrial construction and the scientific and technological level at that time can also be seen from the selection of building structures and materials.

3. Challenges facing the cultural narrative of Blue House

With the development and changes of society, the "human touch" between people has gradually faded, and even the owners of two neighboring households may not have much interaction. Today, some of the original residents of Blue House have moved away, and even those who have not moved away have gone their separate ways over the inheritance of generations. Therefore, in the process of development, the neighborhood warmth carried by Blue House will gradually fade, and it will be reduced from a house full of love to a mediocre old tenement building in Hong Kong.

For outsiders who want to learn about Blue House and protect it (including educators, college students, or tourists from all over the world), the current situation is not optimistic. There are two main ways to promote Blue House. One is to visit Blue House on site, and the other is to learn about it through the official website. However, if you visit without booking a guided tour, you can only learn about it by reading the information board on the wall and visiting a small "Hong Kong Story House". The "Hong Kong Story House" only has some old items donated by indigenous people and some simple cultural and creative products, and these exhibits can provide very little information to visitors. The information board also simply introduces the process of the community and residents participating in the conservation of Blue House. There is almost no introduction to the life of Hong Kong people in the past. The official website provides an entrance for guided tour reservations, but for those who are not familiar with the Blue House official website, it is not only difficult to find the reservation entrance, but the number of reservations is also very limited. Another way to learn about Blue House

is to visit the Blue House official website, but the official website only provides simple historical information. The main function of the official website is to promote leasing, cultural and commercial activities, and business cooperation. These phenomena reflect the issues of value preservation and publicity at Blue House.

4. Introduction to Blue House Digital Exhibition Hall

4.1. About Blue House Digital Exhibition Hall

Blue House Digital Exhibition Hall is a creative project to introduce the history, architecture and traditional life of Blue House in Hong Kong. It is a digital exhibition hall that integrates multiple information delivery methods such as text, pictures, music, animation and games (**Figure 1** and **Figure 2**). The Digital Exhibition Hall will be displayed with hand-drawn animation [4]. This kind of artistic style is rough and childlike, giving people a feeling that life is "plush" and not very exquisite, which is more suitable for the content of the life story.

Figure 1. Exterior animation diagram of Blue House.

Figure 2. Interior animation diagram of Blue House.

It can be visited both online and offline. Offline, Blue House Digital Exhibition Hall will be located in the "Hong Kong Story House" on the first floor of the existing Blue House. In the Hong Kong Story House, we will set up supporting 3D equipment, and visitors can use it as soon as they arrive without making an appointment. In order to allow visitors to achieve a personalized experience, we will provide visitors with one-to-one 3D glasses. After putting on the glasses, visitors will see an approximately 60-minute animation based on "The Age of Blue House Protest," through which they can understand the house layout and historical development of Blue House. After watching the cartoon, visitors can choose one or several characters at will, and interact with them to have a deeper understanding of Blue House and Hong Kong culture [9]. For example, visitors can choose an old lady in a story as an interactive object and experience the method of making orange peel candy in the form of a game. Visitors can also find the corresponding entrance through the official website to visit, and its content is exactly the same as the offline digital exhibition hall, but due to equipment limitations, online visitors can only experience 2D effects.

In addition to being placed on the "Hong Kong Story House" and the official website of Blue House, Blue House Digital Exhibition Hall can also cooperate with major museums and libraries in Hong Kong. Most museums and libraries have multimedia screening rooms, which are fully equipped to achieve 3D display. Such cooperation, on the one hand, can expand the distribution channels and allow more people to appreciate this cartoon; on the other hand, it can directly contact

the audience by providing desserts or snacks, conduct user satisfaction questionnaires, and thus adjust the animation content in a timely manner to achieve sustainable development [4].

The target audience of Blue House Digital Exhibition Hall is mainly young people who are interested in cultural heritage. Therefore, the main channels for external publicity are TikTok, RedNote, Facebook, etc [11].

4.2. Storytelling

The story created in the Blue House Digital Exhibition Hall took place in the 1980s. It starts with the childhood of Luo Wanyi, a little girl who grew up in Blue House, and takes her growth as the development context, recording her life experience of nearly 50 years (**Figure 3**). The climax of the story occurred when Blue House was put into use, and ended with the victory of Blue House Defense War. She also grew into a mature female police officer. Although Luo Wanyi has a gentle name, her personality is as carefree and unrestrained as a boy's. She likes to play police and catch thieves with other children. Although her biggest distress now is that she failed the exam and was scolded by her mother for being naughty and dirtying her clothes, her ultimate dream is to become a real female police officer and protect everyone. Including the entire process of Blue House being put into use, Luo Wanyi also participated in it as a community volunteer. This story occupies nearly half of the whole play, recreating the scene of the revitalization of Blue House at that time. In addition to the work scenes of maintaining Blue House, the film also shows the difficulty of separation of childhood friends who are about to move, the love between neighbors for the neighbor's grandmother, who has no one to rely on, and the firm feelings of guarding the big "home" of Blue House (**Figure 4**).

Figure 3. The animated character of Luo Wanyi.   **Figure 4.** The animated characters of Blue House residents.

The display of Hong Kong's intangible cultural heritage will also be interspersed in the development of the storyline, such as the ancestor worship activities of the Obon Festival, the fire dragon dance in Tai Hang during the Mid-Autumn Festival, and Cantonese opera performances on major festivals [6].

In terms of character image, it would be closer to reality to use the image of the interviewer in the original "oral history" as the protagonist of the story. Therefore, the protagonist of the story is set as Luo Wanyi, a little girl born in Blue House in 1970. In this way, according to the time of the story, she is about ten years old. On the one hand, children of this age are close to the age of the target group and are more likely to resonate at the psychological level. On the other hand, children of this age are full of vitality and have wonderful imagination. Life in their eyes can be beautified to a certain extent, bringing people a relaxed and pleasant feeling, and is more easily accepted by the audience. In addition, children living in Blue House generally live with their parents and grandparents. The memories of the elders can extend the timeline of the story horizontally, allowing the audience to see the history through the eyes of people of different ages and enrich the layers of the story. Except for Luo Wanyi, all characters are centered on her and designed around her relationship with family, neighbors, teachers, classmates, friends, and other characters. Based on the uniqueness of the characters, the audience can understand the social life of that era from more aspects, such as family environment and social class, through their experiences.

4.3. The purposes of creating the Blue House Digital Exhibition Hall

Blue House is an important cultural heritage and also a residence. The intervention of digital technology can ensure the quality of life and safety of residents while displaying the Blue House and spreading culture.

Blue House is a living historical relic that not only exists in the past and present, but will continue to develop in the future. So, a stable source of income is very important for the maintenance and operation of cultural heritage and is an important factor affecting the preservation of the body of Blue House. If Blue House Digital Exhibition Hall can be created, not only can the access fee of the digital museum be charged, but also some cultural and creative products can be further developed and sold to obtain more income [7]. This is the creation of Blue House Digital Exhibtion Hall from the perspective of profit-making.

Protecting the body of Blue House is important, but these memories and spirits are the core of cultural conservation. The most valuable assets of Blue House are the life wisdom of the older generation of Hong Kong residents, their unique memories of Hong Kong, the warmth of the neighbors, and the belief in a better life. Therefore, the purpose of creating Blue House Digital Exhibition Hall is to record these cultural customs or cultural phenomena in a dynamic form through digital technology, and present them in an interactive form to the new generation who are responsible for protecting Blue House [8].

4.4. The innovations of Blue House Digital Exhibition Hall

First, the digital exhibition hall allows visitors to experience the traditional life of the Blue House through digital technology, such as lying on a narrow bed or turning around in a crowded kitchen. There are also some unique equipment used in Hong Kong life in the last century. This equipment cannot be touched in the physical exhibition hall, but visitors can experience it to their heart's content in the digital exhibition hall. In addition, the digital exhibition hall of Blue House can also help visitors experience intangible cultural heritage projects, such as experiencing the making of tangerine peel candy, or sitting in the courtyard of Blue House to watch Cantonese opera performances [6].

Second, the innovation of Blue House Digital Exhibition Hall is also reflected in the vividness of storytelling. This digital exhibition hall will design an animation based on the cultural conservation movement from 2006 to 2017 to recreate the story of the residents living in Blue House at that time, protecting their homes [4]. After watching the animation, visitors can choose any character in the animation as a guide to explain the cultural knowledge they want to know. For example, if a visitor wants to learn about Hong Kong's traditional cuisine, he can choose a "mom" in a family as a guide to introduce him to Hong Kong's cuisine and how to make it (**Figure 5** and **Figure 6**).

Figure 5. Traditional Hong Kong Marmalade (Available at: https://vivabluehouse.hk).

Figure 6. AI-generated animation diagram of Traditional Hong Kong Marmalade.

5. Introduction to digital technologies used for creating and using the Blue House Digital Exhibition Hall

5.1. Information collection at the Blue House Digital Exhibition Hall

First, we need to collect information and materials for the Blue House Digital Exhibition Hall. This information and materials can be divided into three categories. The first category is text materials, the main sources of which are official

archives and academic websites (**Figure 7**).

The second category is humanistic materials, which can be interviewed through the "oral history" method of the original residents of Blue House, focusing on people's feelings and emotions, including people's memories of major historical events they have experienced, their feelings at the time, and their views on these events [5]. The use of the above two types of materials is to construct the storyline and shape the characters. The third category is digital image materials, which can be collected through image recording, 3D scanning and AI synthesis. For immovable cultural relics, such as the main body of Blue House and surrounding buildings, we can record their external form and internal structure through video. For movable cultural relics, such as the many old objects existing in the "Hong Kong Story House," we can collect data through 3D scanning and then transfer it to the computer. Finally, AI technology is used to synthesize the scenes and pictures required for the animation series (**Figure 8**).

Figure 7. 20th Hong Kong income cash register.

Figure 8. AI-generated animation diagram of 20th Hong Kong income cash register.

5.2. Brief Introduction to digital technologies for using the Blue House Digital Exhibition Hall

5.2.1. Introduction to digital technology

MR, the full name of Mixed Reality, evolved from the concept of "Mediated Reality" proposed by Steve Mann, a professor at the University of Toronto and the "father of smart hardware." MR technology is the product of combining physical and digital information. Mixed reality is the product of the interaction between humans, computers, and the environment. Relying on the development of computer vision, graphics processing, display technology, and input methods, it breaks the boundary between the real world and the imaginary world, and can achieve the interaction and coexistence of real objects and virtual objects in the same scene. Mixed reality technology (MR) is a further development of virtual reality technology (VR) and augmented reality technology (AR), and also has the technical advantages of virtual reality and augmented reality. As a relative combination of AR and VR, the realization space of mixed reality is transformed from the fusion of VR's virtual reality and AR's real and naked eye parts to MR digital reality. It is a new visual environment generated by the merging of the real world and the virtual world. In the visible environment formed in the visual device, physical and digital objects coexist, and users can interact with them in real time [7,8].

5.2.2. Participants' use of MR technology in Blue House Digital Exhibition Hall

The application of MR mixed reality technology mainly requires the use of head-mounted displays (MR glasses) and tactile gloves. After wearing MR glasses, participants can not only see the information about Blue House's architecture, history, cultural relics and digital animations stored in the console, but also give instructions to the MR glasses through eye movements. The MR glasses will provide participants with information about the object of attention through the focus of their eyes. The voice recognition processor and bone conduction headphones are also installed on the MR glasses, and participants can give instructions or ask questions in English, Chinese, Cantonese or any other language. Cantonese, as the official language of Hong Kong, is extremely culturally representative, so it will always appear in subtitles no matter which language the audience chooses [10]. After receiving the information given by the participants, the MR glasses will respond in multiple aspects such as vision, hearing and touch. The main function of the tactile gloves is to let participants

experience the use of traditional tools in Hong Kong's traditional culture and the intangible cultural heritage. The authenticity brought by touch can greatly enhance the experience of participants. For example, participants can experience the use of an old-fashioned cash register through the tactile gloves [7].

6. Impact and possible dialogues: SWOT Analysis Method

6.1. Strengths

The establishment of Blue House Digital Exhibition Hall not only breaks the time and space limitations of cultural relics display and cultural promotion, but more importantly, it takes into account the cultural dissemination of both tangible and intangible cultural heritage [11]. A more flexible and convenient way of cultural communication and a more vivid cultural experience can attract more people from all over the world and of different ages to learn about Blue House and the culture of Hong Kong.

Blue House Digital Exhibition Hall strengthens the emotional connection between culture and its audience through animation displays and interactive games. The story of the protagonist and her friends desperately trying to protect Blue House can evoke many visitors' emotions about childhood, hometown, and neighborhood. Such emotional resonance can greatly enhance the effect of cultural communication.

6.2. Weaknesses

The establishment of Blue House Digital Exhibition Hall requires a lot of information, advanced technology, special equipment and joint efforts from multiple fields. These conditions determine the difficulty of the establishment and subsequent maintenance of Blue House Digital Exhibition Hall.

The establishment, maintenance and information update of Blue House Digital Exhibition Hall require the participation of multiple forces, and even the realization of some technical parts requires the help of the international community and international organizations. Then the ownership of the copyright of this information and products is likely to cause controversy.

6.3. Opportunities

With the trend of the world cultural heritage becoming more and more popular, people's perception of the world cultural heritage has changed. In the past, people believed that cultural heritage was cultural monuments or buildings or crafts used by the royal family and nobles in the past. However, since the 21st century, people's attention to the protection of cultural heritage has gradually shifted to cultural heritage such as folk buildings and folk handicraft production skills. Blue House Cluster is a representative of Hong Kong's folk buildings. The establishment of this cultural digital exhibition hall is both a milestone and a model for the protection of folk tangible and intangible culture [12].

6.4. Threats

Culture is constantly moving forward, and every small factor may change the direction of cultural development. Hong Kong is an international metropolis where people from all over the world gather. At present, there are many houses in Blue House that can be rented. The creation of Blue House Digital Exhibition Hall will definitely attract more foreigners to live here, and the tenants' own cultural customs will definitely affect the cultural inheritance and development of Blue House. Therefore, the establishment of Blue House Digital Exhibition Hall will bring certain challenges to the originality and tradition of Blue House to a certain extent.

7. Conclusion

Blue House is an important cultural heritage of Hong Kong and a milestone in the successful popularization of world cultural heritage conservation. This traditional Hong Kong tenement building not only has outstanding historical, social and architectural values, but also carries many special meanings in terms of customs, memories and emotions. However, Blue House still has residential functions, and the privacy and security of residential buildings inevitably affect its cultural functions. Blue House Digital Exhibition Hall is a creative project that solves this problem well. The Exhibition Hall not only uses digital technology to present both material and intangible cultural heritage in a more complete and realistic way, but also greatly increases the interactivity and participation of participants.

However, it is undeniable that the amount of information required for the digital exhibition hall is huge, and the digital technology required is also very difficult. Therefore, the creation of this exhibition hall requires the support of all sectors of society and even the international community, and the copyright issue of the works will be more difficult to handle.

Disclosure statement

The author declares no conflict of interest.

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