

Emotional Design Elements of Virtual Exhibition -Focusing on Revolutionary Theme

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Abstract-The emotional design of virtual museum is an important factor to improve the quality of visitors. By deconstructing and recreating the theme of "Revolution Education", the designer aims to improve the emotional sensitivity and cognitive experience of visitors. The virtual red museum is a space for emotional research. It plays a variety of roles that enrich human emotions. As a comfortable space, it spreads a wide range of revolution culture for visitors. Based on Donald Norman's emotional design, this study analyzed the elements of emotional design, including The Memorial Hall of The Victims in Nanjing Massacre by Japanese Invades and The Exhibition of Evidences of Crime Committed by Unit 731 of The Japanese Imperial Army. Its unique characteristics of performance layer, behavior layer and reflection layer are stable factors that make visitors of these two public facilities have emotional resonance. In order to improve the emotional satisfaction of visitors in the "Revolution Education" theme exhibition hall, it is necessary to stimulate their interest and try various new expressions.

Keywords- emotional design; virtual museum; exhibition space

1 INTRODUCTION

The exhibition halls of revolutionary education are mainly responsible for the placement of souvenirs and ideological education in non-profit organizations. At the same time, the revolutionary exhibition hall, as a place where local culture is concentrated, also plays an important role in cultural communication. With the development of media technology, especially virtual visualization technology, virtual exhibition halls gradually come into people's view. Their unique features of high immersion and multi-channel interaction make the interactive design of virtual exhibition halls more diversified. Therefore, the relationship between the space of the exhibition and the visitors has also changed after breaking through the physical restrictions. In the design process of virtual exhibition hall, the design pays more attention to the visitors themselves. In the design of virtual exhibition space, designers need to convey abstract ideas to visitors. In this process, virtual space is the medium of transmission. The design of emotional transmission is the core of the whole design of the revolution theme virtual museum. Therefore, the main purpose of this study is to find a feasible design strategy for the Red Education Pavilion based on the emotional design theory, and focus on the "performance layer" and "reflection layer" for design research.

2 LITERATURE REVIEW

At present, the design of virtual exhibition hall has become a new design idea. A variety of virtual reality pavilions are various. Whether they can make visitors feel better emotional experience and cause emotional feedback and resonance is the key to enhance the immersion and attraction of virtual museums.

2.1 Emotional Design Theory

Based on the user's behavior characteristics in virtual space, from the perspective of Norman's emotional design theory, this paper studies the virtual museum with Revolution theme. American scholar Donald Norman proposed emotional design, which is divided into three levels, namely, visceral level, behavior level and reflective level. In the application of emotional design in virtual space, these three levels are usually used as an extension of the design direction. In the visceral level, the virtual space design often focuses on the "five senses", i.e., "form, sound, smell, taste and touch". In the virtual museum, among these five senses, the main emphasis is concentrated on "visual perception and "auditory perception". In the behavioral level, the focus is on the functional design of the virtual museum. The reflective layer focuses on the message conveyed by the virtual museum [1]. The reflective layer in the virtual space design often has two expected design goals, which are to create a narrative space.

2.2 The Lack of Research on Narrative Space

So the design at the reflective level has to revolve around these two points. The concept of narrative space is actually an extension of the theory of narrative. The term "narrative" refers to the events that occur in a specific space and time dimension, as shown in Figure 1.

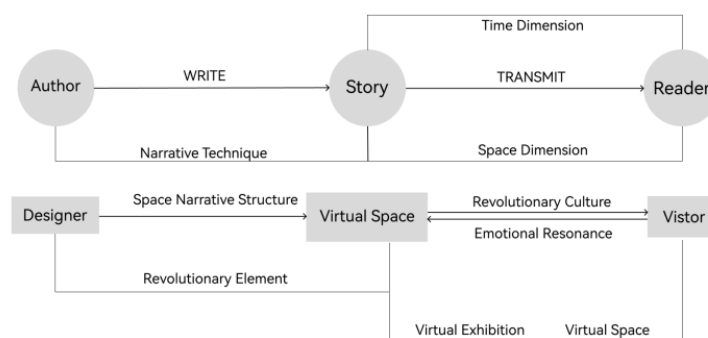


Figure 1: Narrative Logic of Literature and Space

Therefore, the design of the narrative space contains two particular dimensions, time and space. And by placing the theme "revolutionary education" in these two dimensions, a different perspective on Revolution education can be obtained. The definition of narrative in literature means that the author conveys the story to the reader through a series of narrative techniques. It is integrated into the virtual space through the deconstruction of the display content. Its display content determines the form of the space. Spatial narratives can bring better interactivity to the audience, and the visitor is an active plus passive combination in the virtual museum.

2.3 Design Status of Virtual Exhibition

Research on virtual exhibition halls in the field of augmented reality and virtual reality, K. Walczak believes that virtual reality and augmented reality technologies provide ideal display media for museums and virtual memorial space institutions^[11]. The virtual exhibition attracts different audiences, including the disabled and students of all ages, as well as the general public to access and distribute a large number of items in various places in an attractive and informative way. With regard to the scientific and educational functions of virtual museums, Loris Barbieri and Fabio Bruno believe that the virtual museum system is a very effective solution for cultural content exchange^[12]. This is due to its interesting educational methods. In fact, these attractive technical systems have proved their practicality and value in science and museums around the world, because visitors can watch digital works of art and explore reconstructed historical sites through virtual machine hosting devices.

The advantages of virtual exhibition are not only presented in visual expression but interaction. In terms of visual expression, the exhibition has developed based on the game engine and has strong expressive power in light presentation. Moreover, VR system has various types of interactions with users. New types of interactions are being developed. Therefore, by constantly studying the user experience of VR system, it is more attractive to establish the revolutionary education.

3 METHODS AND MATERIALS

The current virtual exhibition halls are lack of interactivity and users' emotional feedback. This includes two aspects: carrying platform and design ideas. Designers believe that a good user experience is based on a good platform. This principle also can be believed in the revolutionary exhibition.

In terms of carrying platforms, game engines have unique advantages over Web3D technology. The following is a comparison of the development processes of the two platforms.as shown in Figure 2.

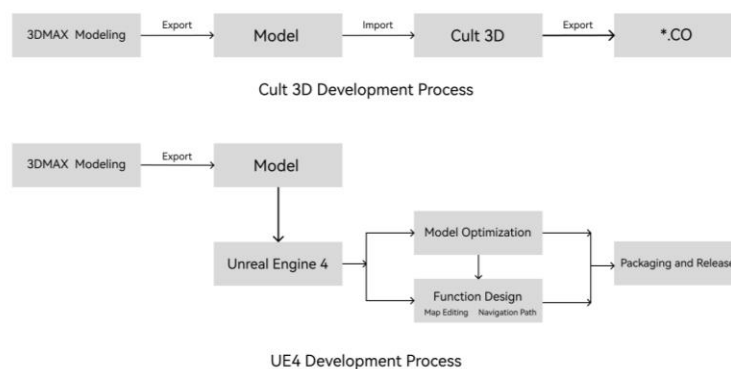


Figure 2: Development Process of These Two Paths

The technical foundation of the virtual exhibition is VRT, and the application of VRT in the network environment is WEB3D technology. The virtual exhibition hall adopts two WEB3D technologies, CULT3D and VIEWPOINT. The game engine compose these functions and make up an association. The online virtual exhibition hall designed in this way has rich display information. User's operation is more convenient. The exhibition also has good interactivity and virtual reality. The author analyzes the development process of the exhibition hall on these two platforms. This can intuitively show their respective characteristics.

In terms of establishing a good emotional experience, we conducted a survey. The study was conducted from October to November 2022. Through the research on a large number of memorial halls in China, the demand characteristics of the media revolution museum during the visit were summarized. In order to ensure the representativeness and forward-looking of the survey content, many representative and memorable spaces were selected. The investigation focuses on the composition of narrative space and the establishment of emotional experience. There is a certain correlation between emotional design method and narrative space. The different levels of emotional design can correspond to the performance methods of space narrative.as shown in Figure 3.

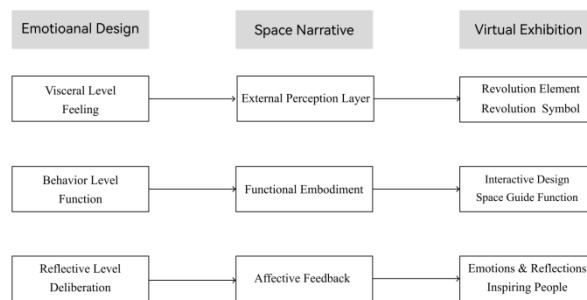


Figure 3: Correlation

The audience's understanding of "revolutionary culture" is often not deep, and simple displays are difficult to evoke emotional resonance.^[2] The audience's overwhelming participation in interactive behavior is temporary, occasional, and short-lived. A good emotional experience for visitors in a limited time is what needs attention in the design of narrative space. Emotional design shows the structure of the visitor's emotional experience in the blog exhibition space. Therefore, emotional design is a suitable design method for the design of museum narrative spaces with strong thematic purposes. This paper analyzes the emotional design elements of the Memorial Hall of The Victims in Nanjing Massacre by Japanese Invades and The Exhibition of Evidences of Crime Committed by Unit 731 of The Japanese Imperial Army as examples. Through the induction and analysis of the text content, the basic narrative space system of revolutionary is formed (Figure 4)

Layer of Emotional Design		The Requirements of Emotional Design	Expresion Approach
Visceral Level	Visual Design	Arouse curiosity	"Black box" means to expose the matter
		Mourning our ancestors	The appearance of a huge cross
		Convey The Truth of the Vietnam War	Looks like a scar on the ground
	Other Feelings	Create the atomosphere	Abandoned buildings around the venue
		Express the victim's pain	Design of the sculpture
	Create the atomosphere	Thick black material	
Behavior Layer		Construct the behavior Guidance Narrative space guides visitors	Entrance → Corridor → Roof → Export → Courtyard Experience the tourism from death to live
		Feel the revolutionary memory Establish narrative theme	Ground Floor → First Floor → Second Floor Sacrificed Hero → Heroic Deeds → Sins committed
Reflective Level		Establish emotional experiece	Let visitors see the martyr's experience
			Don't magnify the War
			Set up memorial space in the museum
		Build narrative space	Narrative mode fits the dynamic line
Design according to the order of time			

Figure 4: Emotional Design Research

4 THE APPLICATION OF LITERATURE REVIEW

4.1 Design Strategy in Visceral Level

The combination of sight and sound in the design of the instinctive layer is key to the viewer's external perception due to the reason of being in a virtual environment. The combination of sight and sound in the design of the instinctive layer is key to the viewer's external perception due to the reason of being in a virtual environment. In spatial narrative theory, especially in the field of film narrative, the combination of visual and audio can create a sense of immersion for the audience. Visual elements mainly refer to revolutionary symbols, including weapons of the revolutionary period, personal belongings of revolutionary predecessors and tokens witnessing revolutionary events, such as flags of revolutionary troops. The design of the Memorial Hall for the Nanjing Massacre Victims was based on the visual impact of the pavilion through the choice of colors and a large number of sculptures, while the 731 Exhibition Hall was designed with a special black granite material and a design area rooted. The choice of materials on the expression layer can highlight the heavy theme. Therefore, in the process of design, the designer should combine the design theme with the educational role. As the designer of "731 Crime Exhibition Hall" said, the original intention of the design is to reveal the disaster of all mankind, so it is hoped that the design will awaken thinking.

4.2 Design Strategy in Behavioral Level

The choice of materials on the expression. At the behavioral level, designers pay more attention to the user's mobility in the space. In a virtual pavilion, it is still important to plan the design of the trajectory of the visitor's actions.

In the process of studying the user behavior of a virtual pavilion, designers often explore it through four steps, ^[3] (1) Apprenticeship, (2) Practice and group membership, (3) How the movement between and across semiotic domains in virtual spaces supports a broad-based development of learning, (4) How sites of learning demand continual attention to the situated, cultural conditions of learning experiences. In the physical pavilion, interior designers often use words like "path design" to plan user behavior. In the pavilion, designers can more easily give the audience new ways to navigate.^[4] A review of one of the most comprehensive studies of learning in museums and galleries attempts to offer a framework for reflecting on the learning experience for both the institutions and visitors. In the "Revolution Education" virtual pavilion, the designer needs to create a frame for the visitors. This framework is the plan for the visitor to complete the entire visit. Although this framework is not a definitive one, the ultimate goal is to give visitors better emotional feedback while they are enlightened and educated about the content of the exhibition, as shown in Figure 4.

The designers have expressed the leading role of revolutionary elements by designing the space. Modernization and innovation are made on the basis of the original revolutionary elements, which are closer to the perspective of modern visitors. ^[5] Behavior layer is mainly reflected in the interactivity of expression and diversified ways of feeling. Because the most essential characteristic of new media art is interaction and experience. The audience can fully immerse themselves in the exhibition space and communicate with the works and the space emotionally.

The behavioral layer of the virtual pavilion is designed to play to its technical strengths. Online games have unique experience in planning user behavior. Museums containing a large number of artworks have rarely appeared in previous games. Animal Crossing's museum uses this approach of collecting to get users to act. There are parallels between this virtual pavilion and the game. And when players can contribute to the world itself, they become more like themed cities in which players bring their own fantasies to bear on the environments^[6]. The trajectory of the player's actions in the game is available as a reference for visitors in the virtual pavilion, i.e. guided activities with a purpose. Light becomes the moving line.

4.3 Design Strategy in Reflective Level

Exhibition is the expression of thinking, interpretation of culture or stand. Museum exhibition is not only a simple space art, but also endowed with high public value and social significance. As mentioned earlier, in reflective emotional design, the most important thing is to create a good emotional experience and create a narrative space for the audience. In the process of narrative space creation, the designer can be more called a storyteller. Designer plans the virtual space perception and association. In the semiotic aesthete Susanne Langer's book "Feeling and Form", he emphasizes that "each artistic medium has its own characteristics and is suitable for expressing a certain type of human experience: family, space, ethics, race, memory, destiny, etc. "In the virtual pavilion, the designer had to define the theme for this "revolution education" and design on the basis of this theme. For the Spain Pavilion at the Expo, the designers chose "Origins," "City," and "Children" to present the national image of Spain. Through this narrative

and comprehensive theme, the image of a country is presented. In many pavilions displaying the human culture of the city, themes such as "a day", "a night" and "a year" are often found. This is the creation of spatial narrative in the dimension of time.

5 SUGGESTIONS

Until now, virtual exhibition design has proven to greatly simplify the exhibition production process^[8]. The authors' analysis of the emotional design elements of the virtual exhibition is as follows.

First of all, in the external visceral layer, designers should use visual elements with unique style and special tactile elements. Although these cannot be felt by touch in the virtual pavilion, the choice of materials is important in the perception. In terms of sound, designers can use it as a complementary aspect. Sound can be divided into ambient sound and human sound. Ambient sound can enhance visitors' environmental immersion, while human sound can evoke more empathy. In a revolutionary pavilion in an alpine region, the designer can incorporate the feeling of the cold wind howling in it. In revolutionary pavilions in alpine regions, designers can incorporate cold winds, snowflakes and ice. In Yad Vashem, the Israel's official office memorial to the victims of the Holocaust, the designers deliberately arranged an ethereal voice that constantly calls out the names of the Jews murdered by the Nazis.

Second, at the behavioral experience level, futurist Adam Greenfield has said, "Translate design into behavior". The design in behavior is focused on two points, immersion and emotional communication. The first is the interaction between people and venues. The venue should not be completely passive in the process of planning user behavior, but should give visitors a space where they can choose. The second is human interaction. Interaction between visitors and visitors is easy to achieve offline, but in an online environment, an interactive planning can be formed, as shown in Figure 4. In Figure 5, I have improved the presentation of the existing virtual pavilion. Visitors can see not only some information about natural sciences, but also some comments from visitors. The size of the comments shows the audience activity.

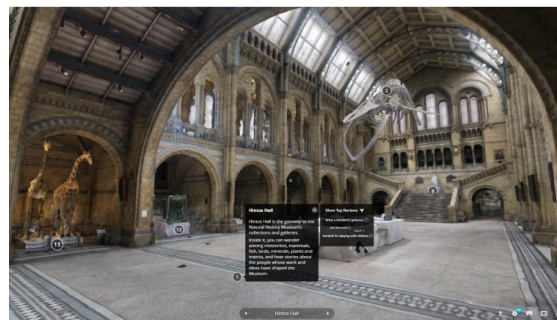


Figure 5: Interaction Interface

In reflection level, the process of education could be presented. Education must be conservative; it must preserve this newness and introduce it as a new thing into an old world. Therefore, the virtual hall can be reflected in two separate areas, the extension of education and the completion

of the spatial narrative.

6 CONCLUSIONS

6.1 Promotion Project

We use revolutionary elements as clues to tie together the story of the revolution. About the individual, about the collective, the viewer is integrated into the work. A good immersion experience will mobilize emotions, create certain associations, and even open the heart. Online exhibition could effectively explore such "life-like" characters.^[9] This research developed a design strategy that establishes a customized "character-user" dialogue while guiding the user through the virtual exhibition. The core of this project is to attract attention. Therefore, it is more significant to promote the experience.

6.1.1 Updating Network Information Technology

The use of game engines makes the exhibition more complex. In terms of materials, the game engine can use more materials, which means that the visual effects have a richer level. Not only that, the game based approach makes it easier for participants to be guided in their actions. Therefore, especially in terms of visual expression and behavior planning, the creators of the revolutionary virtual exhibition hall have more space.

6.1.2 Improve the Audience's Attention

In many exhibitions, audiences have experienced varying degrees of mental wandering. In this process, the audience is the creators of exhibition work, not the passive recipients of meaning. The design of narrative space could help audience to adapt to the exhibition environment. So in order to navigate the people, virtual indicators can be placed into the virtual space. These indicators has various form of expression. Designer can adjust the method in terms of theme.

6.2 The Progress of Revolutionary Education Method

To build an overall framework with five main elements, including content deepening, method developing, carrying innovation, environmental optimization and technology integration^[13]. The designers are eager to utilize the virtual exhibition to solve these problems. The game engine can make the carrying method more innovative. The virtual space is a major promotion compared with the traditional Web. Game machine creation expands the methods of interaction and social interaction. The trend of the application of revolutionary cultural resources in education is no longer linear and individual. It gradually develops in four aspects: networking, socialization, practicality and characterization. This is the greatest value of virtual display in the field of practice.

6.3 Innovation of Cultural Communication

By introducing this revolutionary exhibition system, this paper analyze the emotional design elements of revolution and summarize the indispensable steps for virtual exhibition designers, which is composed of three layer. This research will help government and community pay more attention on the development of virtual infrastructure including the virtual museum and

exhibition, so as to let more youth realize the meaning of revolution and red memory. These research about correlation between the virtual exhibition and emotional design can be further studied in further research. In my opinion, the cultural communication can be separated by two way, one is the historical education, the other is the environment visualization. This historical education means the revolutionary culture can disseminated the intellectual information from top to below. Museum education, usually improperly translated as information or intelligence, is one of the construction of thought system. On the other hand, with the development of media technology, 3D visualization is the most appropriate method to show what the red revolution happened in the past and how the martyr become

Acknowledgments. This work was financially supported by the Harbin Institute of Technology (Shenzhen) graduate course mixed teaching mode reform project: "mixed teaching mode reform of 'design thinking and innovation' Course". (Project No.:HA11000008)

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