On digital interactive design method of red culture communication

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Abstract: Digital technology provides a new way and way for the dissemination of red cultural resources. With the support of digital technology, the design of cultural transmission related carriers is becoming more and more important. However, there are relatively few researches on the construction of red culture communication system by digital interaction design. Therefore, this study aims to explore the digital interaction design method of red culture communication by combining Maslow's hierarchical needs theory. According to Maslow's hierarchical needs theory, this paper summarizes three general digital interaction design methods for cultural communication carriers, including the compliance principle of sensory interaction, the fluency principle of action interaction and the pleasure principle of emotional interaction, so as to enhance users' sense of participation and experience, and further promote the inheritance and development of red culture.

Keywords: Digital interaction, interaction design, requirements

1 Introduction

Digital technology has endowed red cultural resources with new ways and means of dissemination [1]. In November 2020, the Ministry of Culture and Tourism put forward an important initiative to promote the digitalization of excellent cultural resources. Through the application of digital technology, excellent cultural resources are combined in new forms and elements, providing policy guidance for digital technology to empower red cultural resources [2]. Specifically, by collecting, integrating and digitally transforming red resources such as documents, pictures, documentaries and sounds, and using digital technologies such as virtual reality, big data and artificial intelligence as carriers, the integration of red culture and digital technology is promoted. Some researchers are already exploring the application of digital technology to the dissemination of red cultural resources. For example, Tie Zhong et al. (2021) [3] focused on Shanghai's red cultural information resources and organically integrated red cultural

information resources with urban heritage through data fusion, knowledge fusion and data innovative design. Digital knowledge innovation can help solve the problem of data heterogeneity and promote the preservation of urban memory of buildings, Spaces and places in the city. In addition, interactive and experiential narrative expression can also help to show the scene, plot, space-time characteristics of urban memory, and promote the retention of urban memory.

The origins of interaction design can be traced back to human-machine interface design in computer science. In the early days, the main goal of interaction design was to solve the problem of cognitive impairment faced by people when using electronic products [4]. Since the functions and principles of electronic products are usually very abstract for ordinary users, the purpose of interaction design is to make it easier for users to understand and operate these products by designing user-friendly interfaces and interaction methods. In other words, an important part of interaction design is to incorporate human cognitive

and behavioral factors into the design process. With the support of digital technology, the design of cultural transmission related carriers is also becoming more and more important. However, there are relatively few researches on the use of digital interaction design to construct red culture communication system. Therefore, this study will combine Maslow's hierarchical needs theory to explore the digital interaction design method of red culture transmission. According to Maslow's hierarchical needs theory, human needs can be divided into five levels: physiological needs, safety needs, social needs, respect needs and self-actualization needs. Based on this theory, this study will explore how to meet the needs of red culture communication through digital interaction design. Through the exploration of this study, it is expected to summarize the general methods for the digital interaction of red culture communication from the perspective of design. This will help improve the effect of red culture communication, enhance user participation and experience, and promote the inheritance and development of red culture.

2. Brief introduction of Maslow's hierarchical needs theory

Maslow's hierarchy of needs theory divides human needs into five specific levels: physiological needs, safety needs, social needs, respect needs and self-actualization needs, and the five needs are arranged in a pyramid from low to high. This theory provides a framework for researchers to explore the realization relationship of people's needs at different levels and the behavioral incentive mechanism. In the relevant research, the following points are put forward: First, when multiple needs cannot be effectively satisfied, low level needs are more urgent and important than high level needs; Secondly, when the needs of a certain level are satisfied, people's needs will gradually develop to a higher level; Third, there is an interdependent relationship between different levels of needs. People may show different levels of needs in the same period, but when multiple needs exist at the same time, only one kind of demand will dominate, thus directly affecting people's demand behavior and choice [5]. Maslow's hierarchy of needs theory reveals the law of human psychology and behavior, and emphasizes that human needs are a process of gradual development from low level to high level. By understanding this theory, we can better understand and explain human motivation and behavior, thus providing guidance and inspiration for cultural communication digital interaction design.

3. Induction of digital interactive design methods for cultural transmission carriers

According to Maslow's hierarchical needs theory,

combined with interaction design methods, this paper summarizes three general methods of digital interaction design for cultural communication carriers: the compliance principle of sensory interaction, the fluency principle of action interaction and the pleasure principle of emotional interaction.

3.1 The compliance principle of sensory interaction

Multimodal sensory interaction refers to the multiple channels through which organisms receive information by virtue of their sensory organs and experiences, including human modes of vision, hearing, touch, taste and smell. The concept of multimodality is to integrate multiple sensory modes to achieve a more comprehensive perceptual experience. Specifically, multi-modal interaction refers to the communication between people and computers through various ways such as voice, body language, information media and environment, in order to simulate and restore the interaction between people. With multi-modal interaction, people can make full use of various sensory channels for information exchange and understanding, and enhance the fidelity and effect of interactive experience. In addition, multimodal sensory interaction can also enhance the emotional resonance of cultural transmission. Through the integrated application of multiple sensory channels, a more immersive interactive environment can be created, enabling users to better experience the emotions and artistic conception conveyed by cultural products. For example, in the virtual reality environment, through the integrated use of visual, auditory and tactile sensory channels, users can feel the truth and beauty of cultural scenes. Therefore, in the digital interaction design of cultural communication, it is necessary to combine and mobilize the participation of multiple senses to enrich interactive forms, so as to attract more users to experience related cultural products.

3.2 Fluency principle of action interaction

Action interaction refers to the way that users interact with systems or interfaces through actual actions. Compared with the traditional interface operation, action interaction pays more attention to the user's body movements and dynamic expression, and emphasizes behavior-based interaction. In action interaction, users can interact with the system through gestures, postures, movements, or physical operations, rather than using traditional input devices such as keyboards, mice, or touch screens. The main goal of mobile interaction is to provide a more intuitive, natural and immersive user experience that enables users to interact with the system in a more natural way. Sharp et al. (2023) [6] summarized five types of user interaction with the system, namely command interaction, dialogue interaction, operation interaction,

exploration interaction and response interaction. First, instruction interaction refers to the user issuing instructions to the system. This can be done in a variety of ways, including typing commands, selecting menu options in a window environment or on a multi-touch screen, verbally giving instructions, gesturing, pressing buttons, or using a combination of function keys. Second, conversational interaction refers to the user having a conversation with the system. They can communicate verbally through the interface, or interact with the system in text or voice by typing questions. Third, operational interaction means that users interact by manipulating objects in virtual or physical space, such as opening, holding, closing, and placing. Users can take advantage of their familiar knowledge of interacting with objects. Fourth, exploratory interaction is when the user moves through a virtual environment or physical space. Finally, responsive interaction is when the system initiates the interaction and the user chooses whether or not to respond. The choice of these interactions depends on the needs of the user and the requirements of the particular environment. By understanding and applying these interactions, designers can create interactive interfaces and experiences that better match user expectations and needs. Therefore, in the process of digital interaction design for cultural communication, it is necessary to consider the smooth, natural and relaxed interaction level of users when they experience relevant cultural products, so as to better carry out cultural communication.

3.3 Pleasure principle of emotional interaction

When people interact with systems or interfaces, emotional expression and perception are also involved. It emphasizes the active participation of the user's emotions and the system's understanding and response to the emotions. The goal of affective interaction is to create an interactive environment that enables users to freely express, share, and perceive emotions, thereby creating a more human and meaningful interactive experience. In emotional interaction, users can express their emotions in a variety of ways, such as facial expressions and body language. At the same time, the system or interface can sense and interpret these emotional signals to better understand the user's emotional state. The system can also respond to the user's emotions through voice, graphics, audio and other ways to establish emotional connection and interaction. The goal of emotional interaction is to improve the quality of the user experience and interaction. By fully considering the emotional needs of users and the system's ability to understand and respond to emotions, more in-depth and meaningful human-computer interaction can be established.

4 Conclusion

Through the induction of digital interaction design methods for cultural transmission carriers, designers can design various forms of interaction from the perspective of multi-modal sensory interaction, and fully mobilize users' sight, hearing, smell, touch and taste to realize interaction. At the same time, in the action interaction, designers can refer to the type of action interaction summary, so as to enrich the types and forms of human-computer interaction. Finally, interaction design also needs to consider users' emotional needs and emotional changes, so that users can try to express, share and perceive their emotions in the interactive environment of red culture, so as to improve the quality of interaction and realize the value of digital interaction technology in cultural communication.

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