Research on AR cultural and creative design of Yangming Culture under the background of the integration of culture and technology

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Abstract: The integration of science and technology and culture is a general trend in today's society, which provides more ways for cultural exchange and interaction and promotes social development. This study analyzes the application value of AR technology in the design of cultural and creative products, and reconstructs the process of AR cultural and creative products through the double drill model, and designs Yangming cultural products based on AR technology. It can be seen from the research that AR technology is gradually integrated with culture, which can bring new breakthroughs in the transmission, preservation, creation and consumption of culture. This has played a better role in the dissemination and protection of other traditional Chinese culture and even intangible cultural heritage, further broadening the design space of cultural and creative products, and making new breakthroughs in the integration of science and technology and culture.

Key words: AR technology; Yangming Culture: cultural and creative products

Introduction:

Since the 21st century, AR technology, as an important means of digital innovation, has brought new breakthroughs in the way culture is transmitted, preserved, created and consumed. Through digital technology, people can more easily cross regional and cultural differences to achieve cultural exchange and interaction. The Guiding Opinions on Promoting the Deep Integration of Culture and Science and Technology issued by the Ministry of Science and Technology and other six departments in August 2019 clearly put forward the need to strengthen the research and development of key technologies with common cultural features, improve the construction of a cultural and scientific innovation system, and accelerate the industrialization and promotion of cultural and scientific achievements. In May 2022, the General Office of the CPC Central Committee and The General Office of the State Council issued the Opinions on Promoting the Implementation of the National Cultural Digitalization Strategy, which clearly proposed to implement the national cultural digitalization strategy, open up digital resources, enrich contemporary expression, and realize the universal sharing and panoramic presentation of the digital achievements of Chinese culture. Taking Yangming Culture as an example, this paper discusses how to apply cultural elements to AR technology under the background of the integration of culture and science and technology, realize the integration of physical products and digital technology, and take products as the entrance to culture to explore the design path of AR technology in cultural inheritance.

1. The application status of augmented reality technology in the field of cultural and creative design

(1) Development history of augmented reality technology

At present, augmented reality technology (AR) is developing rapidly. AR technology can superimpose virtual information into the real environment, creating a virtual-real interleaved experience environment, so that users' perception can surpass reality.

Google launched a wearable smart glasses "Google Glass" based on AR technology in 2012, Nintendo launched a mobile game "Pokemon Go" using AR technology in 2016, Apple launched a new AR hair platform ARKit in 2017, as of 2022, ARKit has been updated to the sixth generation, one of the latest features is to provide AR experiences in specific locations. META's CEO Zuckerberg mentioned in 2019 that AR would be a social platform. Not just social media, but a social layer that will be integrated into our interactions in the real world.

As technology evolves, AR can be used to display details such as audiovisual feedback and digital interfaces, and it is possible to be used for a number of other activities. For example, in 2021, NetDragon, a Chinese educational technology company, launched AR Campus, an AR education application; In 2023, South Korean startup Cellico will begin mass production of a macular vision correction AR glasses called Arges in the first quarter.

In the future, AR technology will be combined with artificial intelligence so that users can get more personalized and intelligent services and experiences. In addition, more AR technology will be integrated into every corner of people's lives with technologies such as 3D holography, Internet of Things, and artificial intelligence.

(2) Application status of AR technology in cultural and creative products

In recent years, scholars at home and abroad have been trying to combine AR technology with cultural and creative design for development and application research. For example, in China, Hu Wenyu (2020) summarized the digital display and communication strategy of cultural heritage based on augmented reality and the principles of museum interactive experience, and carried out the design practice around the cultural resources of Shandong Museum; Liang Xiangmei (2021) carried out the practice of cultural symbol extraction and digital fusion cultural and creative product design application of Kaiping Diaolou based on AR augmented reality technology.

In foreign countries, France's Louvre launched an AR application named "Monument Tracker AR Louvre" in 2020, allowing users to view virtual works of art in the Louvre through mobile phones; And an online exhibition created by designer Sebastian in 2021. Erazuriz and artist Xander Ekblad developed a platform called "All Show" where buyers can preview experiences through AR technology at home.

At present, AR technology has been applied to some extent in the fields of intangible cultural communication, museum interaction and digital fusion, but relatively little research has been done on the intangible cultural heritage of people, such as Yangming culture. The design of the existing Yangming cultural and creative products is monotonous, lacking innovation and differentiation, and the traditional cultural and creative products often only reflect the designers' subjective understanding of a certain culture, ignoring the interaction between users and culture. The cultural and creative products based on AR technology are mostly presented digitally, which is difficult to achieve deep cultural identity and value transmission. Therefore, more research and exploration are needed to combine AR technology with cultural and creative products to achieve deeper and authentic user experience and cultural exchange. This paper takes Yangming Culture as an example to discuss the application and innovation of AR technology in the character type cultural and creative design, so as to convey the cultural value behind the cultural and creative products more vividly and effectively, and realize the interactive experience between users and culture.

2.the application value of AR in the design and development of cultural and creative products

(1) AR technology broadens the connotation expression of cultural and creative design

As a cultural carrier, cultural and creative products carry the important mission of inheriting cultural knowledge. AR technology can combine traditional physical cultural and creative products with digital content, break the single form of traditional cultural and creative products, and make them have a richer and more vivid form of presentation. For example, the Palace Museum Calendar for 2020 integrates the Forbidden City, an ancient wooden building complex in China, and more than 500 years of historical stories of the imperial court into the calendar. However, users can only observe the flat picture of the Forbidden City, and it is difficult to truly feel the spectacular and shocking architecture of the Forbidden City. Through AR technology, we can tour the Palace in the virtual world.

AR technology can present cultural information in various forms such as images and videos, and can also combine digital cultural content with realistic scenes to create a more three-dimensional and rich cultural experience. Therefore, the application of AR technology broadens the connotation expression of cultural and creative design, so that cultural content can be conveyed and presented in a more rich, vivid and intuitive way.

(2) AR technology is a bridge for the integration of culture and products

Traditional physical cultural and creative products can only convey culture through form, color and function, but the cultural carrying capacity is limited and the transmission method is single. Ar-based cultural and creative products broaden the information dimension and superimpose digital information channels for products, enabling users to understand culture more intuitively and increasing the freedom and expressiveness of telling stories. AR breaks through the limitations of traditional cultural and creative products, and can share the cultural elements behind cultural and creative products with others anytime and anywhere.

Taking museums as an example, traditional visitors need to be physically present, while museum AR cultural creation enables users to visit museums online through digital cultural content. AR technology superimposes digital content on physical products, and users can enter the world of digital content by scanning or viewing the physical product, including cultural information, history, stories and other digital media. AR technology transforms physical products into cultural portals, providing a way to link cultures anytime and anywhere, allowing users to deeply understand and experience culture. AR is seen as a bridge for the integration of culture and products.

3. Application design cases of Yangming cultural and creative products based on AR technology

At present, there are many product case studies based on AR technology, but there are few studies on the extraction of character design elements and the construction of AR cultural and creative design process. This paper takes Yangming Culture as an example, combined with the theory of double drill model, carries out the research on the design method of character literary and creative design, and reconstructs the AR cultural and creative design process.

(1) Yangming AR cultural and creative design double diamond model

The "Double Diamond Model" is a Design method proposed by the British Design Council in 2005, the core idea of which is to correctly identify problems and find clear solutions in design projects. This kind of model can effectively help designers get rid of unnecessary limitations.

The two-drill model is a linear development process step that needs to be switched at different stages throughout the design process to arrive at the optimal solution for the final solution. In the AR cultural and creative double drill model, not only increased the use of AR technology and traditional cultural and creative design methods of research, but also with the traditional AR cultural and creative simple narrative display animation differences, integration of interactive elements, give full play to the advantages of AR technology combination of virtual and real, through the interactive way to convey the concept and spirit of traditional culture to users.

In this paper, AR cultural and creative design and development of Wang Yangming culture are carried out under the framework of the double diamond model, and AR technology, traditional cultural and creative design methods, and Wang Yangming cultural gene bank are integrated and analyzed, the design theme is determined, the opportunity is found, and the design content is finally defined - the combination of AR technology and cultural and creative products.

(2) "True three immortal" Yangming AR cultural and creative design

The non-material culture of characters is full of stories, and the material symbols are relatively few. Wang Yangming's cultural contributions mainly focus on spirit and theory, and there is no symbolized concrete cultural heritage. After a comprehensive investigation of Wang Yangming's life story, philosophy of mind and folk stories, combined with the values and aesthetic taste of the current society,

and excavated Yangming cultural elements related to modern people, the final decision was based on Wang Yangming's evaluation of "true three immortal", combined with the three most famous deeds in his life -- Dragon Field Enlightenment, Chen Hao Rebellion and Tianquan Enlightenment. Corresponding to "morality, meritorious service and speech" respectively. In this way, Wang Yangming's spiritual thoughts and values can be conveyed to modern people, stimulate their cultural interest, and promote the spread and development of Yangming culture.

In multiple rounds of prototype design, proof and optimization, and the debugging of AR technology platform, we got a stage result: "True three immortal AR pen set", mainly composed of three neutral pens representing "Lide", "meritorious" and "Liyan".
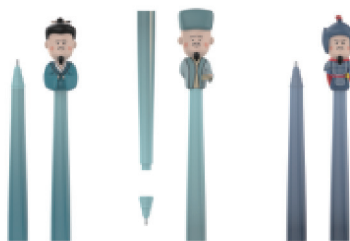

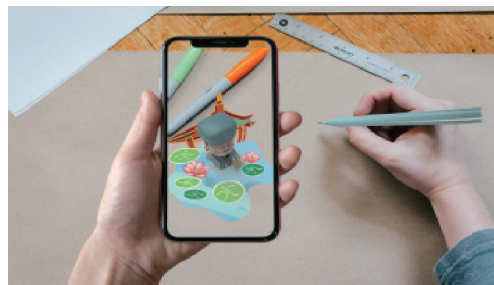
| Figure 1 "Lide", "Ligong", "Liyan" neutral pen | Figure 2 mobile phone scanning screen |

The pen (FIG. 1), as the main body of the physical product, is the entrance to the digital cultural content. According to the three allusions of "Dragon Field Enlightenment", "Tianquan Proof" and "Chen Hao Rebellion", the IP image of Wang Yangming corresponding to the three scenes is designed as the pen cover. By scanning the pen cover images of "Lide", "Ligong" and "Liyan" on the mobile phone, the corresponding scene model and animation video display can be realized, with the effect of model scaling, rotation and video playback and suspension. (As shown in Figure 2)

Epilogue

In the context of the integration of technology and culture, academia and the business community are exploring the combination of augmented reality (AR) technology with cultural and creative design, which can integrate reality and virtual world, break the time and space constraints, and enable traditional culture to be displayed and disseminated on digital platforms. This paper takes "AR technology + Yang Mingwen Creation" as the research core, combined with the design practice project "Yang Mingwen creation", based on the design of traditional cultural and creative products, carried out the theory and application research of AR technology in cultural and creative products. It is believed that the new cultural and creative products integrated with AR technology can not only better spread Yangming culture, but also play a better role in the dissemination and protection of other traditional Chinese culture, even intangible cultural heritage, further broaden the design space of cultural and creative products, so that it has a new breakthrough on the road of technology and culture integration.

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