Research on Cultural Inheritance Teaching of Environmental Protection Lamp Design in Han Dynasty Based on Virtual Reality Technology

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ABSTRACT. *Based on the influence of virtual reality technology on teaching research and the new challenge of teaching research to virtual reality technology, this paper uses Maya, Rhino, PROE, 3D MAX, Unity3D and other high-precision software to realize the virtual restoration of historical relics through the case study of environmental protection copper lamps unearthed in Han Dynasty in China. The related parameters of Han Dynasty environmental protection lamp in the process of virtual reduction are analyzed and the simulation experiment is carried out. By consulting the relevant data of environmental protection lamps and lanterns in Han Dynasty in China, this paper makes a detailed study on the pattern, material, color and modeling of cultural relics, and then through the practical course operation of VR end and Web end, completely reduces the shape of the utensils and carries on the virtual modeling and the actual exercise display. Through the virtual simulation experiment teaching project of environmental protection lamp design in Han Dynasty in China, on the one hand, immersive VR virtual simulation experiment teaching can truly experience the excellent traditional cultural design works of China, which is conducive to carrying forward cultural confidence and transforming this kind of national pride into the motive force of learning. On the other hand, through immersive VR virtual simulation, we can experience the process of immersive cultural relics restoration, and deeply understand the design of its environmental protection structure. This experiential learning style can trigger learners to establish a more intuitive artistic feeling and integrate design concepts into their own design works, which is one of the effective ways to assist learning by means of science and technology.*

KEYWORDS: *Virtual reality technology; Chinese Han Dynasty lamps; environmental protection; innovative teaching research*

1. Introduction

Virtual reality, as a forward-looking science and technology, not only promotes the development of digital technology, but also innovates the means of cultural relics restoration and scientific preservation methods. It can be said that the research of virtual reality technology has important popularization significance and broad application prospect for the protection, display and dissemination of historical relics.

Chinese Han Dynasty environmental protection lamps and lanterns are an important part of Chinese excellent history and culture. Based on the application of virtual reality technology in Chinese ancient cultural relics, it is of great value to inherit and carry forward the Chinese traditional aesthetic spirit. With the advent of the information age, the development of science and technology not only brings convenience to people's lives, but also brings new breakthroughs and innovations to teaching research and educational methods. The new generation of information technology with virtual reality technology as the core will promote the reform of education.

The teaching research of virtual reality technology in the protection of cultural relics heritage has shown an imperative trend in the application of modern science and technology to the protection and teaching research of cultural relics heritage. In the restoration and restoration of cultural relics heritage, the application of science and technology is conducive to the better restoration and restoration of precious historical relics. Based on the analysis of the current research situation, virtual reality technology has been permeated in various aspects of work and life closely related to people, such as military exercises, medical anatomy, construction engineering, education and teaching, shopping and sales, cultural tourism, art display and other fields have been successfully applied and obtained good application feedback, which has been recognized by many fields and industries at home and abroad.

2. Purpose and Significance of Virtual Reality Technology in Teaching Research

2.1 Overview of virtual reality

Virtual reality technology (Virtual Reality), also known as VR technology, is a multi-person shared network technology platform which integrates 3D modeling, scene simulation, network, artificial intelligence, human-computer interaction, real-time sensing, multimedia deduction and other advanced science and technology. It can use computer to construct virtual environment with human-computer interaction function in virtual space, thus giving people a sense of real-time 3D experience and environmental immersion.

Nowadays, with the development of science and technology and the continuous attention of the country to the field of education and teaching, virtual reality

technology has been gradually widely used in many fields of our lives. With the research and development of 5G technology and its popularization in various industries in the near future, the application of virtual reality technology in the future will have a brighter future.

The application of virtual reality technology in teaching research is mainly divided into four categories: 1.Mobile phone virtual reality system; 2.PC computer virtual reality system; 3. Immersive virtual reality system (such as: 4D film); 4. Distributed virtual reality system.

2.2 Purpose and significance of virtual reality technology in teaching research

The main purpose of virtual reality technology in the current teaching research is to change the boring and inefficient teaching form in the traditional teaching mode, so as to achieve the teaching experience of "teaching in pleasure and teaching students according to their aptitude", which is of great research value and historical significance for exploring the future teaching mode.

Based on the application of virtual reality technology in teaching research, it is found that virtual reality learning environment plays a good role in promoting and guiding students' enthusiasm for learning. First of all, virtual reality technology can provide teaching assistance closer to life, so that students can learn obscure knowledge in traditional textbooks in the living environment, which improves the situational and intuitive nature of knowledge presentation.Secondly, virtual reality technology can provide students with personalized and colorful learning environment. Thirdly, virtual reality technology can integrate the characteristics of game scenes and effectively improve the interest of students in learning. Finally, the classroom teaching based on virtual reality technology will change the boredom of the traditional classroom, provide students with interactive communication and active exploration of learning opportunities, and greatly promote the autonomy and enthusiasm.

3. Case Analysis of Virtual Reality Technology in The Teaching and Research of Environmental Protection Lamps in Han Dynasty

3.1 The historical background of lamps and lanterns in Han Dynasty in China

The Han Dynastywas an important period in the history of ancient Chinesecivilization,with the implementation of the policy of "rest and recuperation" in the early Western Han Dynasty, the stable social situation greatly improved the level of social productive forces, and the utensils and techniques were innovated step by step, which made the development of traditional utensils to the peak. The environmental protection bronze lanterns of Han Dynasty in China, which are rich in shape and complete in category, developed to the peak in this period. According to the classification of this kind of bronze lamp, there are three main categories:

character lamp, multi-lamp and animal lamp. Among the Han Dynasty lamps and lanterns discovered by archaeology, a large number of bronze lamps can be regarded as rare and lonely products. Among them, "Changxin Palace Lamp", "wrong Silver Copper cattle Lamp", "Goose Fish Lamp" is the exquisite lamps and lanterns of this period.

3.2 Modeling Aesthetics of Environmental Protection Lamps in Han Dynasty in China

In terms of production process,the environmental protection lamps and lanterns of Han Dynasty in China carefully conceived the excellent bronze raw materials with the characters and animals forms of the lamps and laterns,and then organically combined them. First of all, on the basis of ensuring that the shape of bronze lamp is vivid and lifelike, the shape of palace lamp is divided as a whole, and some of the structures should be installed and combined with each part through tenon and tenon structure. In the manufacturing process, each part will be cast separately by wax loss method, and then the parts will be integrated into parts before they can be finally assembled into a complete lamp. The "Changxin Palace Lamp" of the first house lamp in China is also made of such a complicated process. In terms of decoration techniques, the decoration techniques of Han Dynasty lamps and lanterns are more superb and diverse, showing rich and changeable decorative effects. In the Han Dynasty, "Changxin Palace Lamp" was gilded on the appearance of Changxin Palace Lamp. On the shape, a woman knelt on her knees with a lamp in her hands and made the ground. As a whole, she gave a kind of visual effect of tranquility without losing Wang Hou Fugui. At the same time, the metal mixture attached to the surface of Changxin Palace Lamp had a good hindrance to the oxidation of palace lamp.

The artistic achievements of Chinese Han Dynasty environmental protection lamps in the world can not be separated from intelligent, skilled Han Dynasty craftsmen and industrious bronze lamp craftsmen. In China more than 2000 years ago, they poured wisdom and beauty into every piece of utensils, not only creating practical Han Dynasty copper lamps with advanced functions, but also achieving the Han Dynasty environmental protection lamps and lanterns in the five thousand years of civilization history of China.

3.3 Environmental protection design of China Han Dynasty environmental lanterns

The design of environmental protection lamp in Han Dynasty has extremely high research value in environmental protection, science and art. It is the result of people's wisdom and contributes to the history of human culture development. Environmental protection lamps and lanterns of Han Dynasty, Han Dynasty period of copper water-analogy-simulation lamp metal works, mainly by the lamp panel

chimney smoke tube of a place in the body water-analogy-simulation lamp base four parts. The lampshade is a double-layer cylindrical structure, which can be manually adjusted in the range of 150 angles to adjust the direction of light and light. Due to the limited production technology at that time, the lamp oil of bronze lamps in the Han Dynasty was mainly animal fat, the lamps and lanterns would produce a lot of smoke and fumes during combustion. The makers of lamps and lanterns in the Han Dynasty were very clever. In the Han Dynasty, more than 2000 years ago, they had this kind of advanced environmental protection consciousness, to reduce the dust pollution of environmental thoughts through the unique modeling of lamps and lanterns and structure in the design and manufacture of copper water-analogy-simulation lamp to reflect.

3.4 Research on the application of virtual reality technology in environmental protection lamps in Han Dynasty

The rarity and vulnerability of lamps and lanterns in China's Han Dynasty determined that cultural relics could never be contacted by the general public. However, under certain circumstances, virtual scenes created by virtual reality technology can allow ordinary people to touch cultural relics and feel their real existence more realistically.

Restoration methods of traditional historical relics are not only inefficient but also need to invest a lot of manpower, material resources and financial resources. Moreover, it is extremely easy to cause secondary damage to cultural relics in the process of restoration. Virtual reality technology can quickly establish detailed stereoscopic images of ancient buildings in need of restoration and provide accurate parameters. It is helpful for restoration personnel to establish 3D database to accurately preserve various kinds of data of ancient cultural relics and provide objective basis of visual and data for selecting the best conservation scheme of ancient cultural relics.

4. The advantages and challenges of virtual reality technology in teaching application

4.1 The advantages of virtual reality technology in teaching application

Virtual reality technology is a new technology. At present, it is seldom used in teaching. However, it has to be admitted that the application of virtual reality technology in teaching has become a trend. Therefore, we must recognize the advantages of virtual reality technology. There are six advantages of virtual reality technology in current teaching research.

Compared with traditional teaching mode, it can play a better role in promoting students' mastery of knowledge and skills.

It can provide students with a rich and varied and personalized learning environment.

It can promote students' learning motivation and stimulate students' learning initiative and interest.

Through virtual reality technology, more effective distance education and online cooperative learning can be realized.

It can be released on the mobileplatform and PC platform at the same time, making learning and operation more convenient and satisfying the operation needs of different people.

Virtual reality technology can simulate high risk experimental operation environment and save experiment cost. By promoting standard immersive teaching content, students at different levels can enjoy equal teaching environment and alleviate the problem of lack of high-quality teaching resources.

4.2 The challenge of virtual reality technology in teaching application

Although the application of virtual reality technology in various fields in the future has a good prospect, it also has some challenges in the application of education. For example, the unsolved vertigo problem and system fluency problem of virtual reality technology itself, the design problem of virtual reality learning environment, the resolution problem (it is easy for the operator to produce window screening effect), the real-time transmission and sharing problem of information materials, the connection problem between virtual reality classroom and traditional classroomand so on and so forth. With the development of science and technology and Internet technology, the above problems can be solved timely and appropriately in the future, which will promote the development progress of virtual reality technology in the application of education.

In view of this, this study analyzes and discusses the advantages of virtual reality technology in the application of education and the challenges it faces in its development, paving the way for subsequent empirical studies.

The design of virtual reality learning environment involves programming development, interactive design, interface design, teaching content design, scene modeling, character modeling, animation production and other knowledge and skills in different fields. In addition, researchers in different fields, such as pedagogy and computer science psychology, are required to collaborate across disciplines. Only in this way can we realize the perfect combination of education and virtual reality technology, and then build up the virtual reality learning environment.

5. Conclusion

With the continuous development of science and technology, virtual reality

technology is also making continuous progress. It is becoming more and more important to our life. Virtual reality technology has gradually played a very important role in the protection of Chinese historical relics. Nowadays, virtual reality technology can not only be successfully applied in various fields, but also play a substantial role in the repair of precious damaged cultural relics. In addition, historical and cultural information carried by cultural relics can be preserved to the maximum extent, and cultural relic's information can be displayed from multiple angles to promote real-time sharing of cultural relic's information.

Virtual reality technology has been able to be personalized with specific subject content in teaching research at home and abroad. And it has been widely used in various disciplines. Although virtual reality technology still has some problems to be solved due to its own problems, the idealized teaching mode, which used to be teaching students according to their aptitude through lively activities, has been applied to our teaching research through virtual reality technology at the present stage. The teaching based on virtual reality technology will promote the better inheritance and innovation of Chinese culture.

References

[1] L.Cao(2017). The Status Quo and Trend of Foreign Virtual Reality. Competitive Intelligence, vol.13, no.2, p.51-58.

[2] X.H. Zhang (2017). The application prospect of museum VR technology from the concept of cultural relic protection and restoration . Cultural Relics World, no.5, p.65-67.

[3] H.L. Yan(2018). Analysis of the shape of the Han Dynasty figure-shaped lamps. Art Grand View, no.7, p. 68-69.

[4] L.Yu (2012). The instrument is used to carry the heavens and man to unite - the aesthetics and environmental awareness of the bronze lamps of the Han Dynasty. Creative and Design,no.5, p.24-29.

[5] N. Ding, Y.Z.Wang (2017). The Application of Virtual Reality in Education: Advantages and Challenges . Modern Educational Technology, vol.27, no.2, p.19-25.