Application and Innovation of Using Virtual Reality in Art Education

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Keywords: Art education; Virtual reality; Application and Innovation

Abstract: With the development of society, art has gradually been paid more and more attention in the development of humanities. However, art education has not been able to keep up with the pace of the times like social development - still maintaining a more traditional way of education. In recent years, there have been a lot of routine research on art education, and there are few studies in the field of emerging technologies. Virtual reality technology, as a rapidly developing science and technology in recent years, has a very promising future. The integration of virtual reality technology and art education can provide a variety of practical simulation education scenes for art education, creating a rich and realistic artistic atmosphere for students to explore. This paper studies the application of virtual reality technology in art education. Studies have shown that the use of virtual reality art education can make students more motivated and more beneficial to the development of art education.

1. Introduction

Art education is an aesthetic education activity that uses literature, music, and art as its art form and content. Its mission is to cultivate aesthetic concepts, appreciation and innovation. Cultivating the ability to appreciate and supplementing the ability to innovate enables the educated to learn aesthetic knowledge and form aesthetic ability in the practice of appreciating excellent works of art. In contemporary society, art education has two different meanings and contents. In a narrow sense, it conducts various theoretical and practical education for cultivating artists or professional artistic talents. In a broad sense, art education is the core of aesthetic education. Its fundamental purpose is to cultivate people who are fully developed, not professional art workers. There is often a connection between life and art. For example, listening to music, watching movies, reading novels, or enjoying paintings are all inextricably linked to art. Therefore, art education in a broad sense emphasizes the appreciation and evaluation of excellent works of art to improve people's aesthetic psychological structure.

Art education is an important part of humanities education. Some people say that the degree of development of a country is not based on how advanced its technology is, but on how high its artistic development is. Nowadays, people are generally aware that the art world is an infinite world, and art is an indispensable element for enriching life. Therefore, art education research is increasing. Yu Jinxiu's use of AHP to evaluate the teaching quality of public art education courses in colleges and universities[1]. He proposed that as a resource with the advantages of art disciplines, it is the responsibility of colleges and universities to think about and study the popularization mode of art education, integrate resources to explore ways to popularize art education in line with the characteristics of art and the requirements of the times, and effectively promote the development of art education in colleges and universities. To meet the needs of a comprehensive and growing artistic and cultural spirit, and to cultivate a new generation of talents with innovative and aesthetic capabilities[2]. In order to cultivate more excellent talents, the students' aesthetic ability in the process of artistic creation is effectively improved, and the aesthetic ability of students needs to be

cultivated in the process of art education[3]. Using information technology and art education to promote the cultivation of talents in colleges and universities, and the introduction of information technology into the field of education can improve the educational development of colleges and universities[4]. As a new technology, virtual reality technology, if art education can be combined with virtual reality, then the development of art education is bound to be very beneficial.

Virtual reality (VR) technology is a professional comprehensive information technology that surpasses multimedia technology, architectural animation and network technology in the 21st century[5]. In a sense, it is the latest development of integrated computer multimedia, graphics, artificial intelligence, network processing and other technologies. Virtual reality, also known as virtual reality or spiritual environment, is a computer system that can create and experience virtual worlds. It uses computer technology to generate a virtual environment with multiple perceptions of sight, sound, touch, etc., and users use various interactive devices. An interactive digital human-machine interface technology that interacts with entities in a virtual environment to create an immersive interactive visual simulation and information exchange. China's research on virtual reality technology began in the early 1990s, Xi'an Virtual Reality Engineering Technology Research Center, Tsinghua University National CD Engineering Research Center, Harbin Institute of Technology Computer Department, etc. The interface has obtained research results[6].

Virtual reality technology is a technology that simulates the real environment, not only giving participants an immersive feel, but also manipulating them - manipulating the virtual environment and participating in virtual events. Nowadays, virtual reality technology has been recognized by more and more people, and virtual reality is also applied in many aspects. For example, the application of virtual reality technology in the practical training course of tour guides[7]; can also be used in the protection of cultural relics, through the use of virtual reality technology, effectively integrate virtual reality technology and cultural heritage, better and more complete, Improve the cultural heritage protection work[8]; not only that, through the combination of inquiry-based teaching and virtual simulation teaching, it can repair the inherent defects of college ideological and political theory courses and achieve the effect of educating people[9]. Virtual simulation technology is more extensive in tourism research. Wu Xi applies virtual technology three-dimensional display to smart scenic spots to make the scenic area intelligent, and provides technical means for intelligent and information scenic spots[10].

Virtual reality technology can be used in art education to realistically simulate various artistic scenes, create a realistic simulation training environment, and create a rich and realistic artistic atmosphere for students to explore. It can also solve the problems of time limit, insufficient funds, time risk and equipment loss of the existing art education. At present, there are few studies on virtual reality technology in art education, but this gap is slowly being filled. In 2011, Nanjing Art College opened the first professional direction of virtual reality art in China. The professional graduates mainly worked on technology companies, special effects companies and education related to virtual reality art, and solved the development of virtual reality in art education. Void.

2. Method

2.1 Virtual Reality Technology.

Virtual reality can generate realistic three-dimensional muti sensory environments through computers, image workstations, and related devices. It has three important characteristics: immersion, interactivity, and imagination. These features enable the operator to actually interact with, interact with, and interact with a computer-generated interactive 3D virtual environment. Helps inspire the participants' thinking through the interaction of the participants with the simulation environment and the ability of the person to perceive and perceive the things they touch. This immersive immersion and the fun of human-computer interaction are the essential features of virtual reality.

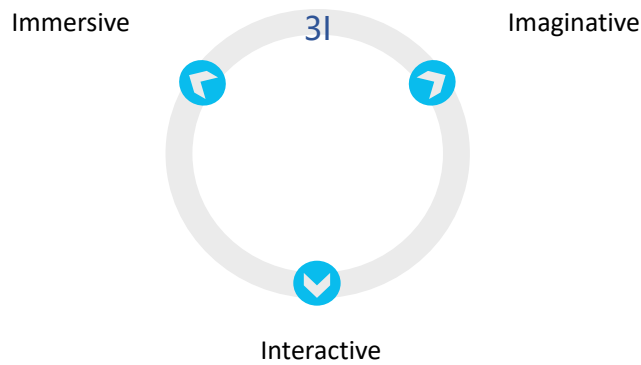Immersive   3I   Imaginative

Interactive

Figure 1. 3I features of virtual reality

Virtual reality technology designed a virtual reality system based on PC, realized a large panoramic virtual reality demonstration mode; developed a real-time roaming system of virtual building environment, and at the same time, in addition to the scene demonstration, the core technology also successfully solved the high-level behavior of people. The synthesis of specific face images and expressions; the study of gestures and head movements, the synchronization of speech and intonation, and the visual interface technology; the volume view and software interface in virtual reality.

2.2 Construction of Virtual Reality System.

Building virtual reality systems, computers, input and output devices, application software and databases are essential components. Computer as the core content, the creation of virtual reality environment of audio-visual integration needs computer to realize, natural human-computer interaction also requires computer feedback assistance. Human-computer interaction must also be implemented by means of input and output devices, which are used to identify the behavior of the participants and react in real time to the participants' control behavior. Common input and output devices include 3D mouse, data gloves, 3D sound system, etc.[11]. The software creates a three-dimensional virtual environment. The virtual reality system database is used to store model resources and corresponding model information in the environment. Since the virtual reality system includes a large amount of perceptual information and models, the integration technology of the system plays an important role. Integration technologies include information synchronization technology, model calibration techniques, data conversion techniques, identification and synthesis technologies.

In the virtual reality system, in order to achieve better visual effects, the sampling accuracy of the model is inevitably high, and the complexity of the established two-dimensional model far exceeds the current real-time graphics processing capability of the computer. The level of detail (LOD) method can effectively control the complexity of the scene to reduce the complexity of these models, reduce the number of polygons that the graphics system needs to process, and achieve real-time interaction. LOD technology is the Detail Elision technique used in real-time display systems. The basic idea is: if a scene is described by a set of objects with multiple levels, that is, objects in the scene have multiple models, and between models The difference is in the degree of detail description, so in the real-time display, the object model with simpler details can be used to improve the display speed. In real-time display, the choice of the model depends on the importance of the object, and the importance of the object is determined by various factors such as the area occupied by the object in the image space. In computer graphics, objects in a scene are usually described by a polygonal mesh, so the automatic generation of the LOD model translates into a simplified problem of a three-dimensional polygon mesh.

2.3 Related Software of Virtual Reality System.

3D modeling software: 3DS MAX, Maya. programming implementation tools: Play maker, Java

Script. Image processing software: Photo shop CS6.virtual implementation engine: unity3D 5.0.3DS MAX, Maya is a very popular 3D model creation software used in the design industry, mainly used for the construction of model scenes. 3DS MAX is very flexible in modeling, including poly modeling and spline modeling, which is very large in material performance and can express real texture. 3DS MAX can also be interconnected with a variety of virtual reality production software. 3DS MAX and Maya have very strong functions, and they are easy to use, and the production process is simple and efficient. It is suitable for development and production.

Play maker is a visual script created by Hotong Games. It is different from general scripting. This script is written in steps, and the script is written by calling actions and events to complete the interactive design. Play maker simplifies the programming process, is very suitable for personal development, and is also very suitable for group development, Play maker can greatly improve development efficiency.

Unity3D is an extremely powerful game engine that includes rotating motion of objects, terrain editor, particle system, graphical user interface, sound system, collision detection system, material editing system and more. Unity3D does not support modeling work, but other 3D software models can be imported into unity as resources. Unity3D is very compatible and has multiple programming languages.

3. Experiment

3.1 Establishing a Situation Cognitive Model.

The user's situation cognition of virtual reality involves three dimensions: immersion, interaction, and cognition. Each dimension contains three levels that gradually evolve, and the cognition in the real situation gradually approaches. The three-dimensional and horizontal characteristics of the situation cognitive model are described in the following table (Table 1).

Table 1 Three-dimensional and horizontal feature description of situation cognitive model

Dimension	Degree	Feature
Interaction	Level 1: Device interaction	Users participate in the device by means of sensors and other equipment
	Level 2: Environmental Interaction	The user interacts with the elements of the virtual environment, and the feelings in the simulation environment are consistent with the real environment.
	Level 3: Social interaction	In a multi-user virtual environment, users can naturally interact with each other.
Immersion	Level 1: Muti perception	Based on the visual perception function, it expands and enhances the senses of hearing, touch, force, movement, and even taste, smell, and so on.
	Level 2: Psychological immersion	The user is fully focused on the activity and is fully engaged in the simulation environment.
	Level 3: Heart Flow Experience	The user is not limited by time and space in the virtual scene, and is guided to enjoy the psychological state of enjoyment.
Understanding	Level 1: Situation Awareness	Aware of rational cognition
	Level 2: Information Processing	The user can generate new valid information during the appropriate processing of the collected information.
	Level 3: Meaning Construction	Users can actively explore construction

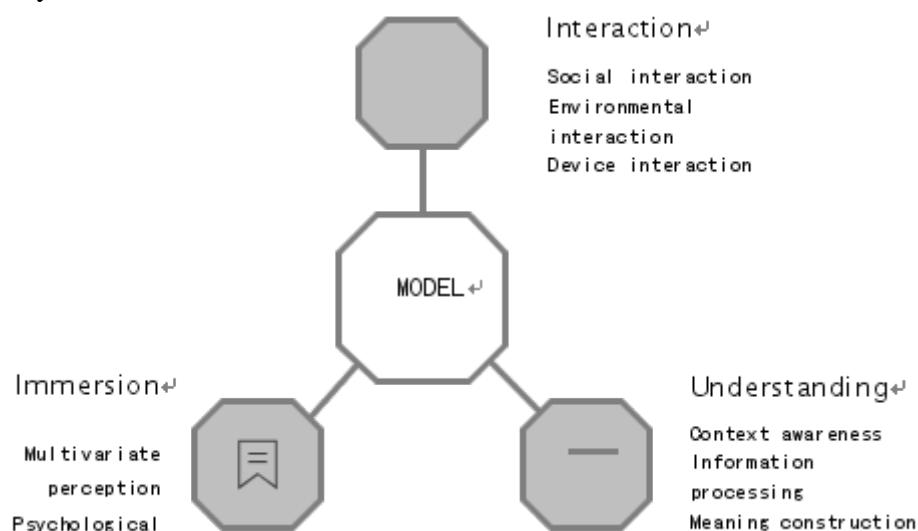The virtual reality situation model is as follows:

Figure 2. Virtual reality situation cognitive model

3.2 Application Trial.

This experiment selects a class of a certain art school to conduct a teaching experiment. After the experiment, a questionnaire is distributed, and finally the questionnaire is collected, statistics, analysis data, and conclusions are drawn.

A total of 40 questionnaires were distributed and 40 were effectively recovered.

4. Results

Organize the relevant data, organize it and draw it into the following table:

Table 2 Questionnaire results statistics

Question	Questionnaire results		
	Yes	Ordinary	No
Your understanding of virtual reality technology	15%	42%	43%
Do you feel immersive during the experiment?	57%	21%	22%
Is there more concentration in the experimental teaching?	49%	17%	34%
Are you interested in this experiment?	70%	26%	4%
Is there any difficulty in controlling the operation?	24%	50%	26%
Can using virtual reality help you?	54%	33%	13%

Through the analysis of the data, we can draw the following conclusions:

(1)The application of virtual reality in art education stimulates students' enthusiasm and enthusiasm for learning;

(2)The application of virtual reality in art education can improve practical ability;

(3)The application of virtual reality in art education is conducive to the development of education.

5. Conclusion

Through this research, we can understand that the application of virtual reality in art education is

feasible. When it reaches a certain level, it can certainly solve many problems in time limit, insufficient funds, time risk and equipment loss for art education. Through innovation, fundamental reforms in education and teaching can be achieved.

References

[1] Yu Jinxiu.Study on the Teaching Quality Evaluation of Public Art Education Courses in Colleges and Universities Based on AHP Fuzzy Comprehensive Evaluation Method[J].High Teaching Journal,2019(14):1-5.

[2] Zhai Tian.Exploration and practice of the popularization of art education for all people under the superior resources of colleges and universities [J]. Think tank era, 2019 (28): 288+291.

[3] Liu Yanjie, Li Feifei. Research on the Cultivation of Secondary Vocational School Art Education and Students' Aesthetic Ability in the New Period [J]. Northern Lights, 2019 (06): 29-30.

[4] Shen Wenting. The development trend of college art education and talent training in the era of big data [J]. Farm staff, 2019 (13): 257.

[5] Zhang Zhanlong, Luo Ciyong, He Wei. Overview of Virtual Reality Technology [J]. Computer Simulation, 2005 (03): 1-3+7.

[6] Inskeep Edward. Tourism Planning, An Integrated and Sustainable Development Approach [M]. New York: St Martin's Press, 1991.

[7] Wu Chaofei. Application of virtual reality technology in the "guide tour practice" training course [J/OL]. Journal of Beijing Institute of Industrial Technology, 2019 (03): 1-5 [2019-07-16].

[8] Yuan Wei The application of virtual reality technology in the protection of cultural relics[J]. Think tank era, 2019 (30): 270-271.

[9] Yu Tujun, Sun Meng, Jiang Xiaowu. The New Age Virtual Reality Technology Promotes the Teaching Reform of Ideological and Political Theory Courses[J].Thoughts of the Think Tank, 2019(29):52-53.

[10] Wu Xi. Design and Research of 3D Display System of Smart Scene Based on Virtual Reality Technology [J]. Science and Technology Innovation, 2019 (09): 75-76.

[11] Chen Changhu. Design and development of photography simulation experiment system [D]. Qufu Normal University, 2007.