

# Research on Teaching Innovation of Art Design Based on Virtual Reality Technology

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**Abstract**—The emergence of virtual reality technology has made the art design industry completely new, and has greatly promoted the development of art design, which will bring revolutionary changes to art design. Based on the definition and characteristics of virtual reality technology, this paper puts forward the concrete application method of virtual reality technology in art design teaching based on the analysis of the role of virtual reality technology in art design teaching.

**Keywords**—Teaching innovation; Art design; Virtual reality technology

## I. INTRODUCTION

Virtual Reality Technology (VR) is a technology that simulates the generation of an environment by means of electronic devices such as computers, and allows the examiner to “place” it through different sensing devices and realize natural interaction with the environment. At present, virtual reality technology has been applied to education and teaching activities, which has promoted the improvement of modern teaching quality and the development of education. The application of virtual reality technology in art design teaching can vividly express the teaching content and construct a good teaching space in a real and effective way, thus promoting students' mastery of professional knowledge and skills, improving teaching quality and optimizing teaching effects [1-2].

In recent years, with the continuous updating of China's educational concept, the teaching model of the new century has gradually changed from the traditional indoctrination or test-oriented mode to the modern teaching mode, that is, more emphasis on students' methods of learning knowledge and thinking-led teaching. In particular, more emphasis is placed on the cultivation of students' innovative abilities [3-4]. At the same time, it is the top priority of the current education reform to provide students with personalized, intelligent and modern teaching environment and conditions that integrate information and time or space, and improve students' ability to judge, analyze and solve problems. For the art design teaching, the introduction of virtual reality technology can effectively stimulate the function of the students' senses, help students to accept more design knowledge and content, promote the quality of art design teaching and talent training [5]. Innovation has a very important educational value and significance.

## II. THE BASIC CHARACTERISTICS OF VIRTUAL REALITY TECHNOLOGY

“Virtual Reality (VR)” is a computer simulation technology that makes realistic simulations of the real world in a computer. By using auxiliary technologies such as sensor technology, users can have an immersive feeling in the virtual space, interact with the objects of the virtual world and get natural feedback, and create ideas. Therefore, virtual reality can also be simply understood as a technical means for people to interact with computer-generated virtual environments. VR technology has been recognized as one of the important development disciplines of the 21st century and one of the important technologies that affect people's lives. The application of this technology improves the way people use computers to process multiple engineering data, especially when large amounts of abstract data need to be processed.

Virtual reality technology is a comprehensive and practical technology. It integrates computer technology, simulation technology, sensing technology, measurement technology and microelectronics technology to form a three-dimensional realistic virtual environment. It has been widely used. In various fields. The user uses a certain sensing device to enter a certain virtual space by using certain input devices, so that he becomes a member of the virtual space to perform real-time interaction, obtain relevant information while perceiving the virtual world, and finally reach the present. The experience of its environment.

### A. Immersion

Virtual reality technology is based on human visual, auditory and tactile characteristics. It is simulated by computer and other electronic devices to generate three-dimensional images, allowing users to wear helmet-mounted displays and data gloves and other devices to immerse themselves in a virtual environment for interactive experience. . Using virtual reality technology, users can completely immerse themselves in the virtual world, deeply immersing themselves in the physical and psychological impact of a realistic virtual environment.

### *B. Interactivity*

Human-computer interaction is a natural interaction between a sensor and a device through special helmets and data gloves. The interactive nature of virtual reality technology: Users can examine or manipulate objects in a virtual environment through their own language and body movements. This is because the computer can adjust the image and sound presented by the system according to the user's movements of hands, eyes, language and body.

### *C. Conceived*

Virtual real-world technology expands the range of people's awareness so that people can fully imagine. Because virtual reality technology can not only reproduce the real environment, but also create an environment that people can arbitrarily conceive, objectively non-existent, or even impossible.

## III. THE ROLE OF VIRTUAL REALITY TECHNOLOGY IN ART DESIGN TEACHING

Demonstrating the effect of abstraction as concrete and improving professional knowledge In the process of art design teaching, teachers can use the virtual reality technology to reproduce the process of student movement in the real world that cannot be observed by the naked eye. The abstraction is image, intuitive and specific, and can fully provide students with learning materials and improve students' ability to solve practical problems. Due to its practicability and adaptability, virtual reality technology has been widely used in many aspects of art design, whether it is frame design, graphic design, text design, space design, structural design or multimedia applications. Great results, teachers can make full use of this advantage to develop a perfect and creative teaching curriculum plan, combine theory and practice, and provide students with an immersive experience, which can improve teachers' professional knowledge of art design. Demonstration effect. Therefore, the application of virtual reality technology to art design teaching has improved the teaching quality and teaching effect of art design, and on the other hand, it has enhanced students' understanding and mastery of professional knowledge.

Conducive to enhancing the interaction between teachers and students, and promoting a new type of teaching cooperation mode. Teachers use their virtual reality technology in the classroom to give full play to their inherent subjective initiative and guide students to conduct interactive learning according to their own needs. The problems cooperate with each other and discuss together, so as to achieve the purpose of cultivating the initiative and enthusiasm of students' learning; guiding students to cooperate with each other in a certain virtual space to complete the design work of teacher layout; help students to participate in virtual reality technology In the virtual environment provided, intuitively and visually participate in the natural phenomenon of virtual environment objects or the movement development process of things, deepen the understanding and mastery of theoretical knowledge, and improve their thinking ability and innovation ability. In addition, teachers can cooperate with

students in the virtual environment simulated by virtual reality technology, which can fully mobilize the enthusiasm of students, and also help teachers and students learn harmoniously. The perfect combination of the environment, thus contributing to a new type of teaching cooperation model.

It is conducive to stimulating students' creative interest and grasping the creative connotation. From the perspective of art design, it is very important to maximize the design creativity of students. However, this needs to be expressed in a certain way. Virtual reality technology just provides such a possibility. Teachers use virtual reality technology in the process of art design teaching. Through the simulation of various objects, vivid and intuitive, they can help students to escape from the inherent space and time constraints, and fully rely on the ideas in their own minds. Creative and virtual reproduction, step by step to modify and improve their artistic design ideas, and then help students find a suitable visual design effect for themselves, but also enable students themselves to have a deeper and more realistic art design. Experience.

## IV. THE SPECIFIC METHOD OF VIRTUAL REALITY TECHNOLOGY APPLIED IN ART DESIGN TEACHING

The art design teaching method using virtual reality technology has strong flexibility, practicality and creativity. In the process of art design teaching, through a certain virtual environment, other various teaching methods follow, according to the typical, relevance, authenticity, specificity and image teaching principles of art teaching, in the art design teaching process. The middle school teachers can use the demonstration teaching method, the scenario simulation teaching method, and the computer simulation teaching method to carry out teaching activities.

### *A. Demonstration Teaching*

The demonstration teaching method refers to the teacher's present teaching mode, using multimedia technology to demonstrate the teaching content, sorting out the difficult points of knowledge, enabling students to perceive the law of theoretical knowledge, deepen students' understanding and mastery of knowledge points, and promote Students have a clear understanding of the law of the development of art design knowledge, construct a scientific and systematic art knowledge structure, and continuously improve students' artistic design skills.

### *B. Scenario Simulation*

Scenario simulation teaching method refers to the process of reproducing natural phenomena or the movement of things and movements through simulation, allowing students to change from onlookers to participants to help students understand the content of art design teaching, so that they can master knowledge and improve in a short time. A teaching method of abilities and learning skills. This teaching method can effectively break through the bottleneck limitation of the traditional teaching mode, and through the simulation of theoretical knowledge, students can understand the knowledge and content learned more intuitively and thoroughly, and improve the effectiveness of art design teaching.

### C. Computer Simulation

The computer simulation teaching method refers to a teaching method in which teachers use the various elements such as words, images, sounds, etc. to explain the related information of things or phenomena. It has the advantages of high teaching efficiency, large amount of information, and strong participation of students. A very important teaching method in modern teaching. For example, the national art study course, it is well known that there are fifty-six nationalities in China, and the national art is more diverse. It is impossible to lead students into all ethnic groups to experience the impossible tasks in the classroom. However, teachers can use computers. The simulation teaching method uses computer simulation technology to fully display this colorful and regional ethnic customs and religious beliefs, helping students to understand their national art to the maximum extent, and using virtual reality technology to produce multimedia courseware, which helps students to be An immersive experience to appreciate these artistic features and expressions.

## V. THE DEVELOPMENT DIRECTION OF VIRTUAL REALITY TECHNOLOGY IN ART DESIGN TEACHING

### A. Virtual Design Direction

Schools can adopt a new type of teaching method for art design students through virtual reality technology. Let students design things through the virtual world according to their own inner real thoughts. For example, for automotive design students, it is possible to avoid the situation where it is inappropriate to change the model after designing the model. By changing and revising its own design through virtual reality technology, it not only enhances its flexibility but also improves the accuracy. This avoids the time-consuming and laborious phenomenon in the previous design process.

### B. Virtual Experiment Direction

Virtual laboratories can also be used to create virtual laboratories such as structural strength laboratories and aerodynamic laboratories. Students can conduct timely experimental operations through virtual laboratories to better consolidate what they have learned and combine theory with practice.

### C. Virtual Training Direction

The interactivity and specificity of virtual reality technology can provide students with a suitable operating environment, so that students can be immersively integrated into the virtual world, so that students can be trained in various skills through specific integration with objective things. Improve their professionalism in the design process and stimulate their own innovation capabilities.

## VI. REALISTIC APPLICATION OF VIRTUAL REALITY TECHNOLOGY IN THE FIELD OF ENVIRONMENTAL ART DESIGN

First, based on the application of virtual reality technology measures, defects in the field of art design can be compensated. At the present stage, the process of artistic design work in China has a high probability of real problem limitation. For example, the problem of insufficient scale and insufficient funds will play a certain degree of hindrance in the process of art design work. effect. However, based on the application of virtual reality technology, art designers can simulate various types of scenes, so that problems in the field of art design have been properly solved.

Second, the potential level of risk can be circumvented based on the application of virtual reality technology measures. At this stage, in the field of art design in China, because it is subject to various types of practical conditions, various types of dangerous situations will occur. In order to ensure a certain degree of personal safety, designers will generally not It is a difficult thing to participate in the real scene and to form a personal experience of the art environment on this basis. Based on the application of virtual reality technology, the environment that people have no way to visit can be simulated, so that designers can operate in this environment, avoiding potential dangers and forming a personal experience.

Third, based on the application of virtual reality technology measures, the restrictions on the space-time level can be broken down. Virtual reality technology is actually a technical measure that has surpassed the limitations of time and space conditions. It can simulate any situation, from very large cosmic objects to very tiny bacteria, from hundreds of millions of years ago to today. Designers can explore the environment simulated by virtual reality technology. For example, in the case of the study of the dinosaur era, because dinosaurs have long since disappeared on the earth, it is more difficult for people to test it again, but in the virtual reality technology measures On the basis of a certain degree of application, people can actually simulate the era of dinosaur life and explore the work in this environment.

## VII. IMPACT OF VIRTUAL REALITY TECHNOLOGY ON LABORATORY CONSTRUCTION

The market-oriented employment pressure and the diversification of educational choices have made colleges and universities pay more and more attention to the coordination between their training objectives and the needs of the labor market. At the press conference on February 25, 2009, 2009 Greater China VR League Selection Competition, Zhao Heng, global vice president of Dassault Systèmes in France, said in an interview: "One of the development directions of virtual reality is to provide consumers with a A perceived environment. There is a large demand for talent in the field of user experience design. Dean Huang Xinyuan, Dean of the School of Information, Beijing Forestry University, pointed out: "In the field of architectural design, the application trend of virtual reality is the realization of interaction."

As an important practice base for college students, the laboratory is one of the construction projects that universities attach great importance to. At present, the construction of

environmental art design labs in various universities mainly include digital media laboratories, model making laboratories, photography laboratories, materials and construction technology laboratories, and ceramic art laboratories. The application prospects of virtual reality technology and the market-oriented training goal put forward new requirements for the construction of environmental art design professional laboratory at this stage. In addition to the construction of traditional laboratories, universities can build virtual reality laboratories according to actual conditions. The ring screen projection laboratory and the curtain city planning exhibition hall can also install VRP-Builder, Converse3D, WebMax and other virtual reality production software in the computer room, digital media laboratory and other laboratories for teaching.

Using virtual reality technology, we can completely break the limitations of space and time. Students can do all kinds of experiments without leaving home, and gain the same experience as real experiments, thus enriching perceptual knowledge and deepening the understanding of teaching content.

#### VIII. CONCLUSION

In summary, the reference of virtual reality technology in art design teaching can effectively enhance the intuitiveness and simulation of teaching content, and help students master the more abstract art theory knowledge better and faster. At the same time, the application of virtual reality technology in art design teaching can greatly enrich the teaching content, promote the efficient integration of art and technology, facilitate students' understanding and mastery of theoretical knowledge, and improve the theoretical and practical ability to ensure the actual operation of students. The training of skills, so as to achieve the optimization of the teaching process, the improvement of teaching quality and the ultimate teaching objectives of practical talent training.

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#### REFERENCES

- [1] Wang Zhaofeng. Teaching Research on Virtual Reality Design Course for College Students Majoring in Art Design[J]. Science and Technology Information, 2011(07):132,397.
- [2] Cao Yu. Let the design "moving" - the application of virtual reality technology in art design teaching [J]. Pictorial, 2006 (04): 43-44.
- [3] Gao Fei. The Application of Virtual Reality in the Field of Art Design—Taking Interactive Display and Interaction Design as an Example [J]. Art Grand View (Art and Design), 2013 (03): 100.
- [4] Chen Ying. When Chinese movies fall in love with national instrumental music--On the film music of the art film "Three Monks" [J]. Grand Stage, 2010 (03): 112-113.
- [5] Zhang Xiaofei. The Application of Virtual Reality Art in Art Design Major[J]. Big stage, 2012(06).54.