Research on Application Mode of VR Technology in Environmental Art Design Teaching in Applied Colleges and Universities

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Abstract: Virtual reality (VR) education is a new type of education mode that is able to apply VR technology to the teaching of environmental art design thus to provide students with more intuitive and vivid multi-sensory stimulation and it is of great help to students' learning. At the same time, it can change the traditional teaching mode and innovate the practice mode of students, which is conducive to the cultivation of compound talents in environmental art design. In this respect, this study mainly started from the content and characteristics of VR technology, and analyzes the effects of display technology, sound technology and sensory technology. On this basis, the application mode of VR technology in environmental art design teaching of applied colleges and universities in the new era is studied combined with practical experience. On the other side, the main mode and key process of VR teaching are determined as well, and then it proposed a new model of environmental art design teaching in applied colleges and universities in order to seek breakthroughs in the education's reform and innovation of the research and production for environmental art design majors in applied colleges and universities.

1. Introduction

VR technology can play the model function through various simulation software to realize the simulation of teaching environment and teaching process. VR technology teaching belongs to a kind of modern and innovative teaching mode, which can bring students into virtual reality space and environment, and then acquire target knowledge to thereby achieve the purpose of teaching. It shows the objective reality that is produced by knowledge to learners and encourage students to acquire knowledge and information through the senses while it enhances students' innovative consciousness, creative thinking and innovative ability, which is of vital significance to student development through a virtual learning environment which is created by VR technology [1]. Accordingly, it is necessary to introduce VR technology in the environmental art design teaching of applied colleges and universities in China and build a simulation teaching system based on the virtual reality environment, and then create a good VR learning environment for students, and comprehensively promote subject teaching and student growth and development. This is the top priority of the environmental art design teaching reform and has become the focus of people's attention in the new era.

2. The Content and Function of VR Technology

VR technology refers to advanced human-computer interaction formed by modern artificial intelligence, modern network technology, and modern sensor technology. The application of virtual reality technology in teaching is inseparable from virtual instruments. It mainly promotes teaching through the function of the virtual instrument panel, which highlights the core role of the software. It specifically includes:

(1) Display technology. The display technology in virtual reality mainly simulates the effect of the human eye. Its principle is similar to that of 3D eyes. In visual imaging, each eye can receive

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information at a different information juvenile frame rate thus to present a certain stereoscopic visual effect. From the perspective of the user's position, the spatial position of the user's VR device represents the spatial position in the virtual reality scene. When people's VR device is in operation, the head sensor will rotate accordingly, so that the users can clearly perceive changes in external things.

(2) Sound technology. People can understand the spatial position of the sound source based on the sound. Whether it is vertical or horizontal, it can all be displayed by the corresponding phase difference. This principle is also the effect that people can accept stereoscopic sound. The sound technology in virtual reality is based on the spatial position of the sensor to interpret the sound effect in the virtual environment. However, sound technology and the direction of head swinging belong to two independent control systems.

(3) Feeling technology. The virtual environment only provides people with a spatial structure scene. People can only analyze the information of things through the spatial structure. It is impossible to obtain a certain thing in the virtual space. In order to enhance people’s tactile effects, gloves are generally used as a sensing linkage mechanism. When people exert corresponding pressure on the gloves, they will be synchronously transmitted to the virtual environment. After the spatial parameter information in the virtual environment is changed, the information parameters will be fed back to the glove device in time. If the virtual object in the space structure is consistent with the parameters transmitted by the glove, the glove will produce a certain vibration thus forming a virtual reality experience.

3. The Application of VR Technology in the Teaching of Environmental Art Design in Applied Colleges and Universities

3.1 Practice Platform Teaching

It is necessary to build a VR education practice teaching platform and integrate environmental art design teaching resources with virtual reality technology resources, then improve the practical teaching system of environmental art design majors, so that students can effectively improve their practical and innovative abilities while improving their knowledge and skills [2].

The VR education practice teaching platform includes intelligent teaching environment and hardware equipment, such as computer equipment, teaching environment with intelligent monitoring, evaluation, and tutoring functions. Students can use computers, computer technology, network technology to digitally process various elements of stage performances to form a virtual art practice space. The intelligent teaching environment is able to carry out targeted monitoring, testing, and tutoring according to students' virtual practice performance and the level of work completion. In addition, it enables teachers to tutor students through diversified teaching methods which include online and offline methods to thereby realize real-time interaction between students and teachers, which greatly stimulates students' interest in learning and internal learning motivation and achieve a win-win situation in teaching.

3.2 Multiple Integrated Teaching

While integrating the environmental art design major with VR technology, it should also pay attention to the innovation and entrepreneurship education of students. Besides, it is necessary to incorporate the thinking of innovation and entrepreneurship into teaching and guide students to innovate and entrepreneurship in the process of teaching. According to the characteristics of VR technology including interoperability, visual operability, simulation, and so on, modern environmental art design principles can be transmitted to students to guide students to carry out innovative design in order to cultivate more and better original design talents and adapt to the pace of social development.

In the process of carrying out the innovation and entrepreneurship teaching of virtual reality environmental art design major, teachers need to apply new teaching concepts and continuously innovate their own teaching methods, so that students can actively learn and explore, fully discover

their own personality characteristics, and inspire students' innovative consciousness. On the other side, teachers should pay attention to practical teaching and use virtual reality technology and simulation technology to create a practical environment to increase students' practical design experience while making up for the lack of facilities, insufficient funds, and lack of venues in real teaching. Besides, all aspects of environmental art design teaching, such as classroom learning, market research, environmental analysis, virtual practice, and group discussion ought be paid corresponding attention.

3.3 Deep Integration of Production and Education

In the teaching of applied environment art design major, the in-depth integration of virtual reality technology and school-enterprise cooperation projects can fully reflect the teaching mode of independent construction of knowledge that integrates teaching, learning, practice and doing, which is in line with the market-oriented method of integration of production and education. In order to realize the in-depth integration of virtual reality technology and production and education, teachers need to collect various teaching materials according to the teaching objectives before class, and fully understand the cutting-edge information of relevant majors and the learning status of students, etc., and use computer technology and network technology to create virtual teaching environment, content, plot, and so on, to guide students to do research.

In the classroom teaching process, in order to provide enterprises with intuitive and visual design works, teachers can first lead students to understand the overall requirements of the project and guide students to measure data and budget in the virtual teaching space according to the project requirements, and then guide students to design drawing, learn to use virtual reality technology to complete their own design, and finally communicate and experience the completed work with students [3]. In this process, teachers and students can also exchange roles and fully interact and cooperate thus to enhance teaching effects.

4. Development of Environmental Art Design Teaching in Applied Colleges and Universities Based on VR Technology

4.1 Teaching Analysis

The teaching analysis of environmental art design in applied colleges and universities includes demand analysis, teaching objective analysis, knowledge point analysis, learner analysis and resource analysis. Among them, demand analysis is used to make sure which teaching content is suitable for performance in a virtual learning environment; Teaching objective analysis is the key to the entire design, which determines the general direction of teaching, and subsequent design work will be carried out around it; Knowledge point analysis needs to determine the key points and difficulties of teaching, and then emphasizes them in environmental art teaching and interaction design to guide learning; Learner analysis is based on the individual differences in the cognition of different learners, and the characteristics of learners need to be considered in the design; Resource analysis is the analysis and planning of production software, production process, structural design, content design, material collection and processing from the perspective of production.

4.2 VR Art Design

3dsMax can be used to complete the design and production of various art works, including physical modeling, material and lighting, animation, rendering, editing, and picture effects, and so on. Besides, it constructs a scene display by using VR technology to enhance the intuitiveness, interest and authenticity of environmental art design teaching in applied colleges and universities. Artwork is the basis for constructing a virtual learning environment, and high-quality design can present vivid learning situations. Therefore, teachers must grasp the important content of art display in the process of environmental art design teaching in applied colleges and universities, create a favorable art display atmosphere based on VR scenarios, and enhance students' awareness of environmental art in a virtual reality environment, and improve students' artistic level and

performance ability in a subtle way.

4.3 VR Situation Interaction

The VSL scripting language and software development kit (SDK) provided in the VR software can be used to create a custom interactive system in the teaching of environmental art design in the applied colleges and universities. It is available to drag and drop the required BB into the behavior script of the object to write scripts, set parameters and connect processes, and interactively control three-dimensional objects with strong portability and maintainability, such as rotation, zoom, forward, back [4]. This interactive VR scenario can fundamentally improve students' perception of environmental art design, allow students to learn more environmental art knowledge in the interactive process, and fundamentally improves students' level of knowledge and ability through the use of VR simulation environment. It is very positive for the development of environmental art design teaching in applied colleges and universities.

5. Conclusion

VR teaching require combining the teaching demands of environmental art design in applied colleges and universities with VR technology content and make full use of Virtools, VR-platform and other platforms to form a rich interactive behavior module and intuitive graphical development interface to provide students with high quality and high efficiency virtual learning and simulation environment. Under the construction of the above environment, students can interpret all kinds of information in multiple dimensions while integrating three-dimensional scenes with students' subjective consciousness to effectively enhance the sense of substitution of the environment, and improve the students' established knowledge system thus enhancing students' artistic perception and practical ability.

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References

[1] Chaoshun, W. (2010, November). Application of Virtual Reality Technology in environment art design teaching. In 2010 IEEE 11th International Conference on Computer-Aided Industrial Design & Conceptual Design 1 (Vol. 2, pp. 1012-1014). IEEE.

[2] Lehtonen, M., Page, T., Thorsteinsson, G., & Hepburn, M. (2007). An application of a virtual learning environment in support of teaching and learning for design and technology education. International Journal of Learning Technology, 3(2), 133-151.

[3] Chong, Y., & Liyan, T. (2019). Feasibility Study on the Application of Virtual Reality Technology in Art Design Teaching.

[4] Xie, G., & Chang, X. (2020, March). Research on the Training Method for Involving VR Technology in Interior Design. In 4th International Conference on Culture, Education and Economic Development of Modern Society (ICCESE 2020) (pp. 258-263). Atlantis Press.