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Research Article

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Application of virtual reality in teacher training

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Abstract VR technology is a practical technology integrating computer information technology, simulation technology, display technology, sensor technology and so on. Its basic implementation is using the computer to generate a simulated interactive environment (also known as the virtual world), and call the user's visual, auditory, tactile and other senses to immerse it. In the field of education, VR has a broad and far-reaching future. Especially for teachers, VR can provide training in teaching resources, emergency Response, getting along with students and so on.

Keywords Virtual Reality; teacher; training

1. Background of virtual reality

Virtual reality, referred to as VR for short, is a three-dimensional virtual world simulated by computer equipment to provide users with visual, auditory, tactile and other sensory simulation, so as to help users feel immersive. In 1965, Ivan Sutherland first described virtual reality technology at the IFIP conference. Later, Jaron Lanier, the "father of virtual reality" in the United States and the founder of virtual reality laboratory research, officially put forward the concept of "virtual reality", pointing out that VR is a multi-dimensional digital environment system generated by computer network technology, simulation technology, display technology, multiple sensing technology and artificial intelligence. Through the use of science and technology with interactive computer technology as the core, Create a virtual environment that is highly similar to the real environment in vision, hearing and touch. Users can produce an experience similar to the real environment and spanning time and space by using relevant professional equipment to interact with virtual objects [1-2].

In March 2020, the American Association for information technology in Higher Education issued the 2020 EDUCAUSE horizon report: teaching and Learning Edition, which takes XR (AR, VR, Mr, haptic) as an emerging technology and practice, and predicts that its application to distance learners will become a future development trend. With the continuous development of science and technology, VR has been fully developed and applied in various fields, made great progress, and gradually changed our study, work and life. At present, VR is mainly used in the military field, commercial field and entertainment game field, which has produced good repercussions. However, in the field of education, VR has not been widely used due to the problems of technology and capital investment, but it is undeniable that for education in the field of education, VR has a broad and far-reaching future. Especially for teachers, VR can provide training in teaching resources, emergency handling, getting along with students and so on [3].

2. Software and hardware requirements for applying VR in teacher training

The conditions for VR to realize teacher training include the following aspects:

(1) Equipment side. Including display technology, positioning technology and recognition technology.

At present, there are three types of VR display devices: external head display, all-in-one machine and mobile phone case. Among them, VR glasses need to use computer system; Positioning technology, including external laser positioning, external visual positioning and built-in visual positioning. The generation of image in VR

depends on the realization of positioning, which involves two technologies: head positioning and handle positioning; In recognition technology, the system needs to accurately identify various actions and states of the operator, including gestures, gestures, expressions, etc. [4].

(2) application side. Including content development, video production and network technology.

Content development, VR teaching development is similar to game development, mostly using U3D, UE4 engine, 3DMAX, Maya and other 3D production software; Video production, there are many optional devices for the production and implementation of VR video, and there are many more convenient ways to realize 360 panoramic shooting with camera, camera and shooting frame. In addition, in order to solve the insufficient bandwidth and the limitation of chip decoding, it is necessary to understand the video fragment encoding and decoding technology and the volume photography technology of shooting the same scene from multiple cameras and multiple angles, and finally synthesizing the 3D video scene; Network technology, cloud VR is the future development trend of virtual reality, so the support of cloud server is an indispensable part, so the problems of cloud content coding and efficient cloud transmission also need to be solved.

3. VR system design framework for teacher training

(1) Data layer

The data layer is used to store and manage various data in the VR system, which is also the most important aspect, including scene base, knowledge base, training object behavior database, training object attribute database, etc. the scene base mainly stores all displayed scenes, static objects and dynamic objects in the VR system, and the knowledge base mainly stores all training resource data, It mainly refers to all the knowledge content that the trainee needs to master. The training object behavior database mainly stores the data generated by the trainee when using the VR system, including training progress, operation feedback, etc. the training object attribute database mainly stores the information of all trainees in the system.

(2) Operation layer

When the VR system is running, the application programming interface (API) provides a series of program interfaces for the data layer and virtual simulation layer to realize the functions of authorization and authentication of user access, control of VR simulation system operation, recording of training process, adaptive presentation of training resources and so on. The information reading (such as access to various knowledge and calling of various scenarios) and writing (such as updating relevant knowledge resources and updating trainees' attributes) of the data layer are completed through the operation layer.

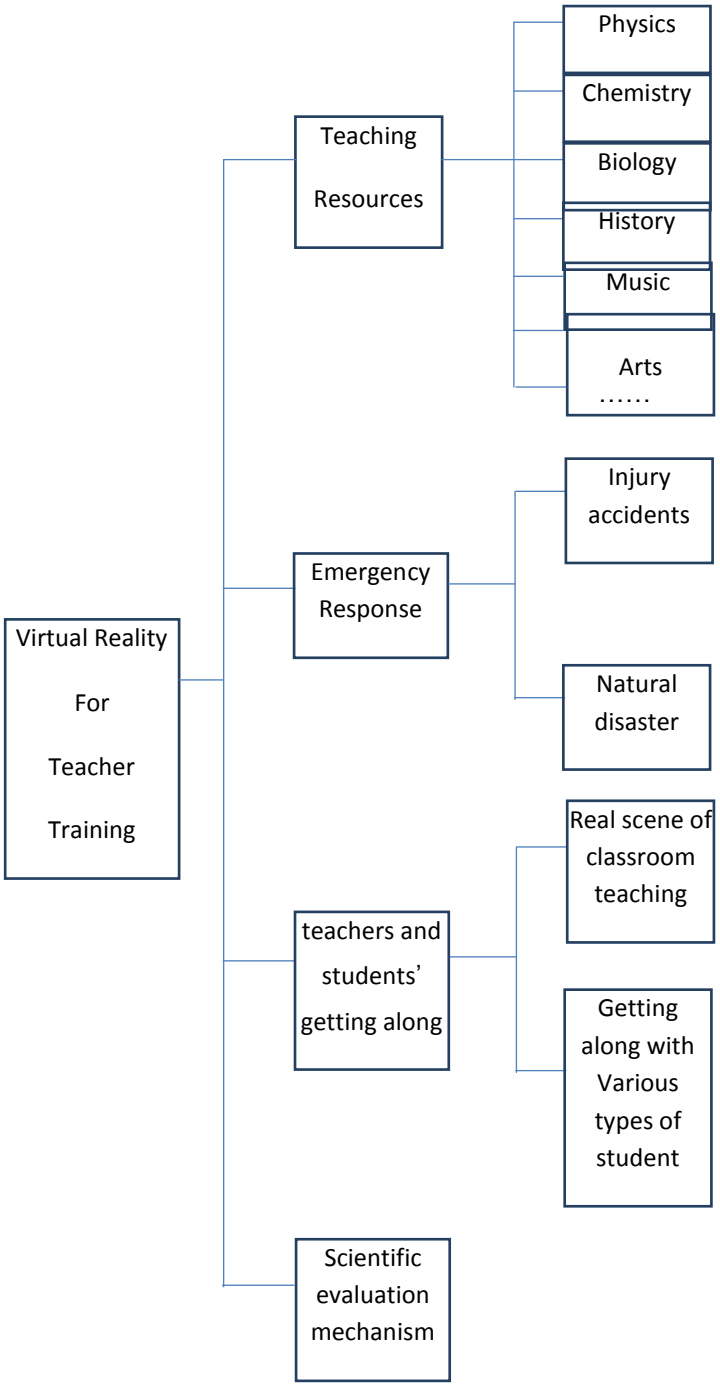
(3) Virtual simulation layer

The virtual simulation layer is the core layer of the system and supports teachers to carry out virtual simulation training. It includes three modules: advance test, situational training and ability assessment. It is composed of three situations: resource learning, emergency handling and student relationship handling. The trained teachers can conduct pre-test, training and comprehensive test in the virtual simulation environment [5].

4. Application of VR in teacher training

(1) Provide teachers with rich teaching resources

VR provides teachers with rich virtual resources of various disciplines. Teachers can learn how to use these virtual resources, so that students can better immerse themselves in the virtual environment created by VR, such as verifying Newton's law or Einstein's theory of relativity, exploring the mystery of chemical reaction Enjoy, various experiments can be repeated without worrying about consumables and safety until correct results are obtained or completely mastered, talking to historical figures in the long river of history, Just like Harry Potter in Hogwarts School of witchcraft and Wizardry, he freely talks with the portrait in the painting and shuttles through different spaces ,experiencing immersive local customs all over the world, and observe art treasures closely, and experience the charm of symphony in the music theater... VR will enable teachers and students to simulate operations in a virtual environment, and also solve many contents that are difficult to realize in practical operation and some operations with high risk or high cost in practical operation.



After mastering the virtual resources of VR, teachers can purposefully guide students to immerse themselves, stimulate students' curiosity, desire for exploration and strong desire for knowledge, further stimulate students' learning initiative and enthusiasm, cultivate students' imagination and creativity, and find students' interests and specialties in the process of guidance, Thus, the traditional passive indoctrination learning mode is completely transformed into active exploratory learning mode.

(2) Provide teachers with the experience of dealing with emergencies

At present, most schools have not formed a complete training course for emergency handling. On the one hand, the training content of emergency handling is relatively scattered most of the common training contents rely on text and video, and the interaction is not strong, which can not provide effective help for teachers' practice. On the other hand, the common teaching method of emergency handling training is still low-level simulation

scenario simulation teaching, including case analysis and role-playing. There are many limitations in low-level simulation teaching: it can not truly reflect trauma signs or pathological indications in real people, which is not conducive to learners' observation and learning; Invasive first aid operation training cannot be carried out on real people, and learners cannot get operation feedback; The simulated situation is single and does not match the real classroom environment, which is not conducive to the trainees' knowledge transfer., teachers who lack training experience may be unable to deal with it, and even lead to regret.

VR enables teachers to enter the virtual environment of emergencies. In the virtual environment, teachers can face all kinds of emergencies, such as students' injury or illness. Teachers can bandage students to stop bleeding, fix broken bones, implement Heimlich first aid and even cardiopulmonary resuscitation. And for example, how should teachers organize students to safely avoid danger in case of earthquake or fire Fire escape and other operations. Even in case of terrorist attacks, how can teachers calm students' emotions and organize students to escape to a safe place. Teachers can continuously train in the virtual environment until they completely master the methods to deal with emergencies, so as to calmly face the unexpected situations that may occur at any time in future teaching.

(3) Provide an environment for teachers and students to get along with each other

As a teacher, we should not only be able to impart knowledge to students, answer questions and solve doubts, but also point out the way for students' growth and cultivate students' sound personality. Teachers should not only pay attention to the teaching of subject knowledge, but also pay attention to the cultivation of students' personality, and try to avoid cultivating students with high scores and low abilities.

VR can provide an environment for teachers and students to get along. In the teaching environment provided by VR, teachers can observe students' different actions and reactions in class and give corresponding teaching measures in time, so as to ensure the normal and effective teaching order; In the teaching problem environment brought by different types of students provided by VR, teachers should be able to educate and guide different types of students according to different problems, such as contradictions between students, puppy love, school weariness and so on. In the face of extroverted and introverted students, teachers often should take different measures, even for students with different temperament types, Teachers' handling methods are also different, Just like the process of cultivating different talents in cultivation games, which requires teachers to continuously train with the help of VR to gradually cultivate the ability to get along with different types of students, educate and guide them on the right path in the virtual environment.

(4) Provide scientific evaluation for teacher training

Whether preparing teaching resources, dealing with emergencies or getting along with students, When teachers are trained in the virtual environment provided by VR, the VR system can scientifically score according to teachers' different choices and operations, and give scores after the training. Teachers can continue to train for lost scoring items until the training is completed. At the same time, the system can also record the unexpected operations and reasonable suggestions generated in the teacher training into the database and feed them back to the designers in time, which can be incorporated into the training system after comprehensive evaluation.

Compared with the high equipment cost and huge resource loss in traditional classroom teaching, VR can realize virtual environment and virtual resources through introduction and repeated call after the initial development, so as to reduce the cost of teaching environment resources, and greatly reduce various conventional costs while teachers complete all training in VR.

5. Conclusion

With the continuous renewal and change of science and technology, virtual reality technology will also develop continuously. At present, the development and innovation research in the field of virtual reality technology in the United States has become a model in the world. Among them, the combination of VR technology and teacher training has brought great enlightenment and research value to the development of teacher training in China in the future. Nowadays, China's virtual reality technology is also developing rapidly. It can be predicted that in the future, virtual reality technology will play a more important role in the field of teacher training and become one of the powerful driving forces to promote the development of "Internet Digital Education +".

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