Application of Virtual Reality Technology in Computer Practice Teaching

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Abstract. With the advent of the digital information age, modern information technology is constantly changing people's production and life style, and the field of education has also ushered in the era of information reform. As a new information teaching method, the research and application of virtual reality technology in the field of education is booming. Based on the theoretical basis of virtual reality technology, this paper analyzes the application field of virtual reality, discusses its important significance in computer practice teaching, and takes “computer assembly and maintenance” course as an example to introduce the application mode of virtual reality technology in computer practice teaching.

1. Introduction
With the advent of the digital information age, modern information technology is constantly changing people's production and life style, and it also has an important influence on the way of thinking and learning, and it also constantly promotes the adjustment and reform of education. In this context, To achieve educational means from text to image, from three-dimensional technology to virtual reality is the only way to reform. At the same time, because of the rapid development of Internet technology, information network has gradually penetrated into all aspects of human life, and the field of education has also ushered in an era of network education. The combination of network and virtual reality technology can better promote the use of high-tech in human life, so as to accelerate the modernization of education in China.

2. Virtual Reality Technology and Its Application in Teaching
Virtual reality technology, or VR technology, is the use of computers to simulate real and unrealistic 3D scenes. Virtual reality technology is the highest level of simulation and virtual reality. In the process of virtual simulation, we need the means of information technology such as computer hardware, network technology and broadband, so that users can realize human-computer interaction in real time, thus entering a virtual reality situation. The virtual space created by virtual reality can reflect the rich imagination of human beings. People can learn and work in the virtual space, which can bring different feelings and experiences to the people involved in them.

With the continuous development and progress of virtual reality technology, and the technological achievements and applications gradually mature, in recent years, the application of virtual reality technology is very wide. In the past, virtual reality technology was only used in entertainment and simulation training, but it has gradually expanded to scientific visualization, aerospace, architectural engineering, medical treatment, communication, military, railway, education, art and other fields, and has realized the wide application and development of many fields.

(1) Scientific visualization
Scientific visualization technology is an effective technical means to understand a large number of scientific experimental data. The combination of virtual reality technology and scientific visualization system can improve the quality and efficiency of scientific research. Virtual reality technology can provide a non visual way to perceive data correlation for scientific research. Examples of the successful combination of virtual reality technology and scientific visualization include the "virtual wind tunnel" developed by NASA Ames - a fluid experimental environment that is constructed as a visual wind tunnel.

(2) Design and planning
Design activity is a circulation process from model-design to analysis and continuous improvement. Virtual reality technology can operate directly on the object in virtual space. Based on this advantage, the combination of virtual reality technology and design activity can make the design activity get great benefit. At present, many fields, including architectural design and appearance planning, have gained many benefits from virtual reality technology.

(3) Education, training, entertainment and art
Virtual reality technology is closely integrated with education, training, entertainment and art. At present, the appearance of virtual teaching application research classroom, virtual movie, virtual game, virtual museum of virtual VR technology and so on, can let people feel the achievements of virtual reality technology anytime and anywhere. Virtual reality technology has a very obvious role in the field of education. Virtual reality technology can not only describe the real world simply, but also change the rules governing the virtual environment, so that users can experience and learn in the environment of different virtual worlds. Therefore, the integration of virtual reality technology and education can make the focus of the education field on the promotion of students' cognitive skills, not in the details of a given virtual environment.

(4) Medical treatment
The main applications of virtual reality technology in medical treatment include anatomy, pathology teaching, surgery operation training, complex surgery operation planning, information support during the operation, and remote control surgery. Through this, virtual reality technology can also be used to help the human body recover and improve the quality of life of the disabled individuals. In 1992, the world's best product "wheelchair VR" is to enable people to sit in a wheelchair and roam in the VR world.

(5) Military, aviation and aerospace
Many countries' military departments and aerospace departments attach great importance to the application of virtual reality technology, and have invested a lot of funds and experiences to develop and apply virtual reality technology in this field. Currently, in these areas, virtual reality technology is mainly used for personnel training, product testing and strategic planning, and many other aspects. The main achievements include SIMNET virtual battlefield, virtual stinger missile trainer, Boeing aircraft virtual design system and astronaut space training system.

(6) Psychological experiment platform
Virtual reality technology can produce a stimulus environment, which can not be realized by physical technology. Therefore, virtual reality technology can verify human perception and become an effective means to verify the perception theory, including human vision, auditory sense and tactile sense and other sensory stimulations, and psychological experiment platform constructed by virtual reality technology can do related research of short-term or long-term impact on users.

(7) Manufacturing industry
Virtual reality technology can provide different stages of technical support for various manufacturers in the manufacturing industry, such as testing the manufacturer's product design, parts and finished products and other stages.

The application of virtual reality technology in teaching has created a new field of virtual teaching. Virtual reality technology can fully reflect the high technology of teaching. It is an important means to realize the modernization of education and informatization. The application of the virtual reality technology is very broad in the field of education, and the teaching simulation is an important means in the future teaching work proved by practice. The teaching simulation is to use the modeling and simulation technology of computer to show the structure of some systems in the eyes of the students,
to provide an environment for the students to observe and experience, and to observe the concrete structure of the knowledge, so as to better grasp the knowledge. By establishing and describing the model of the simulated object, the teaching simulation can reflect a true knowledge system and demonstrate the knowledge prospect that a teacher expects to express. At present, in teaching, the specific usage of teaching simulation software includes experience, experiment, demonstration, game, intelligent tutor, micro world and many other kinds.

Teaching activities need to rely on certain technical means. Therefore, with the change of teaching technology, teaching mode and teaching activities will change. Under the emergence and popularization of virtual reality technology, virtual education has broken through the traditional education and teaching mode, which has brought a unique and unprecedented educational model for the field of education. This educational mode will definitely bring great influence to the development and innovation of education in the future.

3. The Application of Virtual Reality Technology in Computer Practice Teaching

Is it possible to introduce virtual reality teaching into computer courses? How to introduce? These problems have become the focus and difficulty of information construction in computer courses.

After the thorough excavation of the content of computer courses, the author believes that there are several characteristics in Computer Teaching: (1) the content of computer courses needs to be changed at any time. With the progress of science and technology, the contents of courses need to be updated all the time. (2) the computer courses belong to a tool and need to combine theory with practice. (3) the computer courses have a high demand and can be effectively applied in many fields. Therefore, the teaching of computer courses should not only keep pace with the times, but also choose the teaching mode scientifically and rationally.

Take the course of "Computer assembly and maintenance" as an example. This course is a basic course for computer application technology and other computer related majors of Shenzhen Polytechnic. It is also a core course for the students of computer application technology development. From two angles of hardware and software, this course introduces the working principle and performance index, performance test, analysis and elimination of failure phenomenon of each hardware component of computer, and how to install, optimize, backup and restore, maintain the computer system and application software and so on. Through the learning of this course, students can master the knowledge of computer maintenance and repair, and have the ability of management and maintenance of large machine rooms.

It is thanks to the important basic position of the course in the computer major teaching plan and the wide employment and application market of computer maintenance technology. Since the establishment of this course in 2002, through continuous teaching practice and in-depth teaching research, the teaching content and system of this course have been perfected day by day. But with the continuous development of modern information technology, virtual reality technology and computer system integration technology, how to keep pace with the times, develop and innovate on the concrete level of teaching content adjustment, teaching means updating, teaching method reform and so on? It is a new problem urgently needed to be solved in the new era of "Computer assembly and maintenance" course.

Virtual reality technology can simulate and restore some special teaching scenes vividly, so that students can do practical operation in person. Good teaching results have been achieved in medical treatment, biological, physical, military and other fields. In the course of "Computer assembly and maintenance", there are also some teaching contents, such as the assembly and maintenance of large servers and workstations, which are impossible for students to do practical work because of the limitation of the field and equipment. The necessary skills in these practical jobs can not be taught to students in the classroom due to the limitation of the equipment conditions. If the corresponding teaching tools are developed and the virtual reality - this new technology is introduced into the course of "computer assembly and maintenance", it is undoubtedly a beneficial extension and innovation to the teaching content and teaching methods. At present, there are no precedents for introducing virtual reality technology into many similar courses in higher vocational colleges and universities at home and abroad.
On this basis, combining with the knowledge points which need to be introduced and the practical operation that students need to master, the author has developed a series of large server VR practice training platforms for the students to carry out VR training for the disassembly and assembly of the rack type, cabinet type, blade type and tower type server. The training platform is based on HTC Vive platform, 1:1 restore the VR teaching software of Lenovo X3650 M5, X240 M5, TD350, X3850 X6 server. It can simulate computer room management scene, server disassembly, installation and fault detection practice. Students should wear a vive helmet, through the manipulation of the handle, can enter the simulated computer room management scene, according to the screen operation hints, manually disassemble and install the server in person, as shown in Figure 1. Through these simulation operations of virtual reality, students can get an in-depth understanding of the composition and structure of these large servers, and master the practical skills of disassembly and installation.

Figure 1. Students are doing VR practice training in class.

4. Conclusion
In the future of computer teaching, virtual reality technology will have a great impact. In computer teaching, the use of VR technology can create a more specific and real teaching environment. It can not only help students to study the teaching content effectively, arouse the enthusiasm of the study, but also facilitate the teachers to prepare lessons, improve the quality of teaching, and solve the difficult situation of the past teaching. With the rapid progress of network technology, VR technology has a very wide application prospect and will certainly become the trend of computer teaching in the future.

5. References
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