Teaching reform of safety engineering specialty based on Virtual Reality Technology

Xiaozhang Shi[1],Ying Lin[2],Hualin Cai[1],Xiaoning Xing[1],Gang Lei[1]

1.Yibin College, Yibin 644000, Sichuan

2.Xingwen Taiping Middle School, Yibin 644000, Sichuan

Abstract: with the continuous development of science and technology, virtual reality technology arises at the historic moment and is widely used in the field of professional education. It shows great vitality in enriching teaching forms and improving teaching effectiveness, which also provides good development enlightenment for the teaching of safety engineering in Colleges and universities. Professional teachers should be based on the educational background of the information age, face the characteristics and connotation of virtual reality technology, and do a good job of its infiltration in professional theory and practice courses, so as to ensure the effectiveness of education, and lay a scientific and technological keynote for the improvement of students' professional quality and comprehensive ability. In view of this, this paper analyzes the teaching reform of safety engineering specialty based on virtual reality technology in detail, hoping to provide some valuable references for teachers and friends.

Key words: virtual reality technology; Safety engineering; teaching

Introduction

Safety engineering is highly practical and operational. With the continuous development of society, the society and related enterprises have new definitions and requirements for college talents. The traditional safety engineering professionals have been unable to meet the needs of today's society and the development of related enterprises. Therefore, it is very necessary for colleges and universities to optimize and upgrade the teaching of safety engineering, improve the effectiveness of professional teaching, strengthen the quality of professional talents, and transform the traditional professional talents into compound talents needed by society and enterprises, so as to contribute to the development of society and enterprises. The application of virtual reality technology in safety engineering teaching has important practical significance for the development of college students. For virtual reality technology, as a simulation technology, it is mainly a technical process of constructing a virtual world and simulating nature, environment and sensors. Infiltrating it into the teaching of safety engineering, it can simulate a three-dimensional interactive virtual world with the convenience of virtual technology, and show students realistic three-dimensional images, so that students can more conveniently and comprehensively understand the connotation and essence of relevant knowledge points. Professional teachers should face up to the value and role of virtual reality technology, and apply it in the professional teaching process to help students' professional ability and quality development.

1. The meaning, application principle and application field of virtual simulation technology in safety engineering

1.1 Meaning

Virtual simulation technology, also known as virtual reality technology, is based on information technology, which uses touch, hearing and vision to act on users, so that users can obtain an immersive virtual experience. Simulation technology integrates a variety of computer technologies, such as sensor technology, image processing technology, computer graphics technology and voice technology. Virtual simulation technology is an important achievement of the development of modern simulation technology. Virtual simulation technology can be divided into two types: immersive and non immersive. Immersive virtual simulation technology can be completed only by equipping special hardware facilities, while non immersive virtual simulation technology can be completed by using professional software.

1.2 Principle

In the actual teaching of safety engineering, non immersive virtual simulation technology is widely used, which mainly uses the computer keyboard, display, mouse and other related computer equipment to create and build a virtual window environment, so that the content of the computer is closer to the ideal virtual reality technology. In the training process of virtual simulation technology, the most used equipment is basically made by 3D modeling technology. In the teaching process of safety engineering, teachers can guide and inspire students to form a preliminary understanding of relevant instruments, equipment and tools, and use computer technology to build a virtual practice environment, By adjusting the relevant data, we can build different environments. In this way, in the virtual environment, students can repeatedly carry out different kinds of skill training and obtain experimental data in different environments. The application of virtual simulation technology in training teaching, in which the experimental environment and related equipment are all virtual, can not only provide students with repeated use and training, but also reduce unnecessary expenses and reduce the costs caused by equipment maintenance, equipment update and the use of training site. At the same time, its application can also continuously update the training according to the development prospects and trends of relevant industries, and always give play to the advancement of platform training. And because the training equipment and instruments are virtual, in this case, students do not have to worry about accidents or equipment damage caused by operational errors during the training operation. At the same time, it will not lead to some potential safety hazards in the training process, which can make students' innovative ability and innovative thinking more fully developed and shaped.

1.3 Application fields

1.Realistic reproduction of scientific research, experiment and computer simulation results. In the process of scientific research on safety engineering, relevant researchers can use the combination of VR technology and visualization technology to create a virtual environment, which can display a large number of numerical values stereoscopically through this technology, and people can observe the results by changing relevant parameters, which greatly improves the efficiency of scientific research.

2. safety performance design. Nowadays, in the market, any social product has its own safety. However, before the relevant products are produced, consumers cannot feel its safety. At this time, the application of VR technology can well solve this problem, so that designers and users can personally feel the safety of the product before delivery, which provides users with more use experience, helps them remember the best choice, and also provides a basis for designers to modify the product.

3. disaster relief command decision. When an accident occurs, the disaster relief command department should know the exact situation of the disaster accident at the first time, so as to reasonably arrange solutions and better carry out disaster relief. At the same time, it should also understand the curriculum development trend of the disaster situation. At this time, virtual reality technology can play an important role, which can be used to model the accident sceneSimulation solutions and Simulation of the development trend of the disaster, so as to provide guarantee for better solving the accident.

4. daily safety education and disaster avoidance training. Virtual reality technology can also be used in daily safety education. By simulating relevant accident situations, vivid safety education is carried out for personnel. At the same time, relevant accidents are simulated, and relevant personnel are trained in disaster avoidance, disaster prevention and other related contents to prevent the occurrence of disasters.

2. The important value of virtual reality technology in safety engineering teaching

2.1 Improve the effect of theory teaching

In the new era, the application of virtual simulation technology in the teaching of safety engineering specialty in Colleges and universities breaks through the limitations of traditional classroom teaching, can change and abandon the original boring and boring learning methods, directly bring college students into vivid, intuitive and specific realistic scenes, and stimulate their learning enthusiasm, So that they have a deeper understanding and perception of the boring professional theoretical knowledge, and can achieve the combination of theory and practice, better improve the professional teaching effect, and lay the foundation for the improvement of their professional quality.

2.2 Strengthen the effect of practical teaching

There are many practical teaching links in safety engineering major, such as various internships, graduation designs and course designs. However, there are some difficulties in the practical teaching of this major, which greatly affects the improvement of students' practical ability. The main reason for this situation is that the practice teaching of safety engineering specialty is not suitable to be carried out on campus, and there are many restrictive factors for the practice teaching on site, such as safety factors, cost factors, environmental factors, equipment factors, etc., which increase the difficulty of the practice teaching of safety Engineering Specialty in Colleges and universities. The application of virtual reality technology can well solve this problem. Its cost is relatively low, the safety of practice teaching is effectively guaranteed, and the relevant practice environment is diverse, which can make students repeat practice learning for many times, and the equipment operation is simple. Therefore, the application of virtual reality technology in the teaching of safety engineering specialty in Colleges and universities has important practical significance.

2.3 Cultivate students' innovative ability

Virtual simulation technology can cultivate the innovation ability of students majoring in safety engineering to a certain extent. The main reasons are as follows: first, virtual simulation technology provides college students with a very powerful practice voucher, enabling them to enrich their practical experience through repeated practice in the virtual simulation environment provided by the platform, Strengthen their professional cognition. By simulating a variety of practical environments, students can summarize their own practical experience, and summarize and summarize the corresponding simulation results, so as to find the rules and draw new conclusions. In addition, virtual simulation technology can also provide students with a difficult situation in the real environment to help them improve their hands-on ability and the ability to solve unexpected problems. Through virtual simulation exercises, students can comprehensively apply the relevant knowledge points in different courses, improve their logical thinking system, make them form a professional knowledge system, and further improve their comprehensive ability.

4. Teaching reform path of safety engineering specialty based on Virtual Reality Technology

4.1 Theory courses

According to the educational practice, the safety engineering course has the characteristics of many knowledge points and strong logic, which also puts forward deeper requirements for the teaching and learning of teachers and students. In the past, most of the professional teaching was carried out around the verbal or didactic way, which not only easily made students feel disgusted or afraid of difficulties, but also directly affected the teaching effectiveness. In this regard, in the new era, teachers may wish to put their perspective on the virtual reality technology, so that the relevant theoretical knowledge points can be presented in three-dimensional and three-dimensional way. At the same time, using the switching of multi perspective structure, they can create an experience environment for students, so that they can understand the connotation of relevant knowledge more conveniently and profoundly. For example, when learning safety system engineering, teachers can rely on virtual reality technology to show it and provide students with good learning reference. This can not only arouse students' learning enthusiasm and keep them active in classroom learning for a long time, but also deepen their professional learning cognition and help to orderly improve their thinking, innovation and other abilities. It can be said that it can kill many birds with one stone.

4.2 Practical courses

As we all know, practice course, as an important part of safety engineering education, is the key factor affecting the effect of professional education. However, due to the limitations of equipment and technical conditions, the contents of some practical courses are difficult to operate. In this regard, teachers should also help practical teaching according to the convenience of virtual reality technology, and create a virtual practice link for students, so that they can practice boldly and obtain more learning benefits. For example, in the teaching of fire and explosion prevention course, due to the dangers of these practices, it is impossible to carry out on-site practice teaching for students, which affects the improvement of students' practical ability. Teachers can create a simulated environment by relying on desktop VR system, and then design relevant practical tasks to enable students to complete the tasks in the form of group cooperation. In this way, not only can they strengthen their practical ability and cultivate their professional quality, but also can promote them to form a sense of cooperation, which can provide strong help for their future development.

4.3 Construction of online teaching system

In order to better play the role of the virtual simulation training teaching platform, colleges and universities should also actively do a good job in the development of online training teaching system. Specifically, they can actively connect with enterprises and build a "cloud based online simulation training system" relying on school enterprise cooperation to provide more perfect online training conditions and environmental services for students. On this basis, professional teachers can use the teaching equipment to connect the platform and access the system, so that the virtual simulation training technology can serve more students. In order to better play the role of online teaching system in promoting virtual simulation training teaching, colleges and universities should focus on the high participation of training teaching and meet the training and learning needs of students at different levels and levels. The designed system should have a variety of situational backgrounds to match the needs of the training process, so that students can better integrate into it and feel the training points, Access to capacity development. On this basis, the system also has the functions of teacher error correction and student query, so as to ensure the interaction between teachers and students in the process of practical teaching and provide the effect of practical teaching. When setting up the online training system, we should ensure the recording function of the training process of the platform, especially for those key links, we must design data monitoring and recording nodes, so that teachers can better grasp the practical ability of students. At the same time, it is also necessary to be able to produce training teaching reports, so that teachers can fully grasp the online virtual simulation training process, and then better guide students' learning and improvement in the follow-up teaching practice.

Epilogue

In a word, it has a lot of practical significance to infiltrate virtual reality technology into the teaching of safety engineering specialty in Colleges and universities. It is necessary for teachers to base themselves on the education situation of the information age, rely on virtual reality technology, and actively use new thinking and new methods to create a new situation in the teaching of safety engineering in Colleges and universities, and do a good job in the innovation of theory and practice teaching, so as to ensure the effectiveness of teaching and protect the development of students' professional ability through the creation of virtual environment.

References:

[1] Zan Liang Design of automobile repair professional training teaching system based on virtual reality technology [j]Information and computer (theoretical Edition), 2022,34 (02): 241-243

[2] Chufeng Huang,Wen Zhang Application of virtual reality technology in the teaching of product design [j]Industrial design, 2021 (11): 43-45

[3] Jiafan Xie Application of virtual reality technology in the teaching of publication design [j]Today media, 2021,29 (11): 146-149

[4] Fayou Yan,Chi Ma,Chao Tang,Dong Hu Application of virtual reality technology in experimental teaching reform of new energy courses for electrical engineering [j]Industry and information technology education, 2021 (10): 57-60+74

[5] Lu Wei,Haogang Yao,Mengjia Xu Application of virtual reality technology in the teaching of Architecture Specialty in Vocational Colleges [j]Architecture and culture, 2021 (10): 31-32

[6] Fan Wu Analysis on the application of virtual reality technology in the teaching of digital media art [j]Cultural industry, 2021 (22): 109-110

[7] Tianliang Zhang Research on the application of virtual reality technology in technical teaching of sports major [j]Science fiction pictorial, 2021 (07): 186-187

[8] Ying Xie The application of virtual reality technology in the practice teaching of tour guide [j]Cultural and educational materials, 2021 (19): 205-206

[9] Chen Hou,Wancheng Zhu,Honglei Liu,Penghai Zhang Teaching reform of mining engineering specialty based on virtual reality technology [j]Education and teaching forum, 2021 (21): 73-76

[10] Feng Sun,Yu Wu,Jun Wu,Lian He Discussion on the development direction of water supply and drainage science and engineering professional English Teaching Reform Based on virtual reality technology [j]Modernization of education, 2020,7 (56): 49-51

[11] Manzhu Ye,Shifang Liao Problems of virtual reality technology in practical teaching of Surveying and Mapping Engineering Specialty in Colleges and universities [j]Science and technology wind, 2020 (09): 82

[12] Xiuhui Huang Exploration and research of virtual reality technology in practical teaching of energy and power engineering [j]Teacher, 2020 (08): 82-83

[13] Haiwang Duan Application prospect of virtual reality technology in geophysics Teaching -- an interview with Dr. liuzhishui, School of geological engineering and surveying and mapping, Chang'an University [j]China Science and technology industry, 2019 (12): 73-74

[14] Xiongjian Huang Application of virtual reality technology in vehicle engineering teaching [j]Modernization of education, 2019,6 (23): 61-62

[15] Qiquan Wang,Yibo Zhang,Xingang Yang Research on the application of virtual reality technology in safety engineering teaching [j]Information recording materials, 2019,20 (02): 103-107