Construction of Interactive Teaching Platform of Modern Undergraduate Vocational Education based on AR Technology

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Abstract：This paper focuses on the training and measures of vocational undergraduate, as the main base for the cultivation of skilled talents, to help the practical teaching of high-quality vocational education with the application of online simulation platform. According to this technology, this paper designs an interactive classroom platform, expounds the key technology of teaching, the corresponding teaching theoretical basis, introduces the construction method of online teaching platform and the most popular equipment at present.

Keywords：Vocational Education; Undergraduate Level; Simulation; Practical Teaching Platform

1．Introduction

Vigorously promoting vocational undergraduate education is an important sign that China's vocational education has entered a high-level connotation development stage. Its talent training quality, training methods, training paths and means are in the process of exploration and practice. With the development of social economy, science and technology, the transformation and upgrading of industrial technology, various industries have put forward new requirements for employees, capacity, production environment and equipment conditions. Under the circumstances of limited space and funds and rapid renewal and iteration of equipment, especially in high-risk employment environment, how to continuously and effectively provide high-level technical ability training is an important issue in the practical teaching of vocational undergraduate education. Based on this situation, a new technology, represented by virtual reality (VR) and integrating augmented reality (AR), hybrid reality (MR) and other interactive technologies with good virtual real integration characteristics, strong interactivity and good sense of experience, has been rapidly integrated into the field of education. It provides convenient and natural interactive scenes for people's production activities and the simulation of high-risk environment, and also effectively avoids the danger. Taking the construction of online simulation teaching platform of Hainan Vocational University of Science and Technology as an example, this paper focuses on its construction experience of online simulation teaching platform.

2．Overview of online simulation technology

The main application technologies of online simulation teaching include VR \ AR \ MR, etc. The so-called VR, AR and MR are generalized virtual reality interaction technologies. This technology uses computer technology to digitize the real environment

and computer image rendering technology to form the corresponding three-dimensional virtual space, which gives users sensory perception based on vision, hearing and touch. Therefore, users can experience and exchange information from it. It simulates the real scene in a pure digital environment. Augmented reality (AR) technology superimposes virtual images, animation, audio and other electronic elements on the real scene. It can also integrate dynamic and static real scenery into the virtual scene, giving people a richer and real sense of experience and fidelity. It is the integration of digitization and real environment. Compared with virtual reality technology, augmented reality has better scalability and integration. Augmented reality technology plays a very important role in product design, display, tourism guide, training and maintenance, remote cooperation, game experience and so on. Mixed reality (MR) technology supports natural gesture interaction, and the experimenter does not need to wear rings, gloves, etc., it can accurately track the movements of 22 joint points, so that the experimenter's hands can be liberated and used more quickly.

3. Design of interactive teaching platform

3.1 Design of interactive teaching platform

In order to better build an interactive teaching platform, the school needs to follow the principles of advanced technology, economic rationality, process applicability, feasibility, maintainability and operability in purchasing VR glasses, bluetooth scanning handle, smartphone hardware equipment, high-performance server, mass storage equipment and other hardware, analyze and compare the supply requirements to determine the best purchase scheme of the equipment. Through the design of interactive teaching platform, students can more intuitively understand what they need to master in the learning process. For example, when students need to understand the description of the plate shape in the geography textbook, teachers can keep the scanning handle in the horizontal position, or scan the outer contour of the image, convert the optical signal into digital signal and send it to the digital processor, which can be used for the processing and conversion of digital information. The digital processor performs tilt correction, image mosaic and OCR recognition on digital information, as well as graphics processing of bluetooth scanning handle. It converts the information into editable graphic information stored in the memory and transmits it to the computer or mobile phone through the wireless transmission element. On the computer or mobile phone learning platform, teachers can match the obtained value with the 3D view prepared before class, and control the virtual software through the bluetooth joystick to make it play the view prepared before class.

3.2 Using LabVIEW virtual experiment system platform

The theoretical problems in teaching often need to be proved by practice. The establishment of virtual simulation platform can realize the good integration of theoretical knowledge and practice, and then achieve the unity of theoretical teaching and experimental teaching. In the higher vocational education curriculum, practice teaching is advocated to reach more than 50% . The professional core curriculum requirements of most colleges are very practical and technical, and pay special attention to students' theoretical application ability, practical ability, innovation ability and creative skills. At present, the online simulation platform has a wider application range and has become a mainstream trend in the development of the current teaching industry. For example, some relevant scholars mentioned the concept of LabVIEW, which is an excellent simulation and software development platform. It is a graphic programming language research and development, which can develop drawing programs through C language, and has been widely recognized by research and development laboratories in the education industry. LabVIEW's rich library functions are very suitable for the analysis and application of electronic communication. The powerful data function analysis library is suitable for the teaching of data measurement principle; Hardware and software applications can be well combined. These advantages can help students complete many electrical and electronic experiments. Configurable virtual instruments are composed of single chip microcomputer, embedded hardware module and LabVIEW platform, which can help students complete experimental tasks.

4. Conclusion

Hainan Vocational University of Science and Technology has set up a virtual simulation teaching research center to guide all professional undergraduate majors to build a practical teaching environment, practical teaching tasks and practical teaching projects based on the virtual simulation teaching platform, which has realized the transformation from traditional practical courses to virtual simulation course platform. In this application process, the students' sense of experimental experience is enhanced, the participation rate is high, the actual time is greatly shortened, and the practical effect is also greatly improved. Through nearly two years of practice, the development and application of virtual simulation teaching platform will help to improve students' innovative spirit and practical creative ability in an all-round way. It is of great significance to the development of virtual simulation experiment teaching and the cultivation of Engineering application-oriented talents in the future.

References

1. Feng L, Ma L, Ng G. Personalized customization system solution using augmented reality technology. MATEC Web of Conferences 2021.

2. Feng L, Ma L, Huang Y. Evelopment and application of analysis module based on AR / VR technology. Scientific and Technological Innovation and Application. 2021; (5): 149-151.

3. Long D. Design and construction of landscape design experiment teaching based on virtual simulation teaching platform. Modern Vocational Education 2020; (9): 34-35.

4. Gao E. Research on the application of information teaching in education and teaching in vocational colleges——Taking the teaching design of "maintenance of intake air temperature sensor" as an example. Modern Salt Chemical Industry 2020; 47(1): 70-71.

5. Nian L. Wei J, Wu Y, et al. Research on the construction and application of virtual simulation training platform based on the integration of theory and practice. Modern Vocational Education 2020; (35): 99-101.

6. Sun Y, Lou X, Feng W, et al. Research on the construction of computer network course experimental platform based on "virtual reality combination". Modern Vocational Education 2017; (16): 78-79.