

Application of Virtual Reality Technology in the Teaching of Engineering Equipment Courses in Vocational Colleges

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Abstract

Applying virtual reality technology in the teaching process is unstoppable. The article takes the teaching of engineering equipment as an example. The paper discusses in detail the current problem of the teaching of engineering equipment courses, including the existence of theoretical and practical disconnect; The content of the course is derailed from the demand, and the learning is not used; Training safety hazards; a single dilemma of teaching methods. It puts forward and discusses the advantages of using virtual technology in equipment teaching, which can improve the efficiency of practical teaching; saving teaching resources and costs ; changing teaching methods, breaking through the limitation of space when teaching, and cultivating students innovative ability. Hope to provide some help for the teaching research of equipment courses in vocational colleges.

1. Current Situation of Engineering Equipment Courses

1.1. Introduction to Engineering Equipment Courses

Engineering equipment courses are an important teaching subject for colleges and universities to implement equipment education. The content of the course often includes the structural composition of the equipment, principle and performance, operation and use, maintenance, trouble shooting and use management. The course learning requires multidisciplinary basic knowledge and long-term practice as a support.

1.2. Teaching Situation

Taking vocational colleges as an example, at present, under the current teaching style, the equipment technology courses of various colleges still organize teaching according to the mode of "equipment principle course + equipment training course", This mode has many drawbacks in the actual teaching process. Such as: (1) there disconnect between theory and practice. As the country is vigorously promoting vocational education, colleges and universities are expanding the scale of enrollment. However, there are serious shortcomings in the teaching conditions of funds, equipment and venues, as a result, teaching resources and student scale are not developed in the same proportion, in turn, there teachers spend a lot of time explaining the principles and construction of equipment. However, the equipment course emphasizes the learning of practical content, but also because the students lack of practical experience, resulting in the situation that students can not transform knowledge into professional ability. (2) The course content and the demand deviate, the study is not used. At present, due to the rapid development of science and technology, the frequent displace of engineering equipment, the school can not keep up with the pace of replacement, and it is impossible to timely understand the technical skills that market enterprises need in this practical work, so that the teaching content and social enterprises demand is out of line, leading to difficulties in student employment. (3) Training safety hazards. Equipment course teaching must be a combination of theory and training. On the one hand, due to the lack of safety awareness and basic knowledge of students, it is inevitable that irregularities in operation will lead to accidents during the training process; on the other hand, equipment training often includes training in mechanical, electronic, hydraulic, etc. Some students are not interested in some of the content and then

evade the operation, so that some students can not master the technology that they want to correspond. (4) A single teaching method. At present, when teachers explain the knowledge of equipment courses, they all use teacher board books or static and dynamic picture demonstrations. On the one hand, it method makes students lack vividness and three-dimensional sense, which makes it difficult for students to understand, and makes students lack of interest and participation. On the other hand, it is time-consuming and inefficient for teachers to explain.

2. The Advantages of Virtual Reality Technology in the Teaching of Equipment Courses

2.1. Introduction to Virtual Reality

To put it simply, Virtual Reality (VR) is an advanced technology that has emerged from the development of computer technology, also known as the “cyberspace technology” or “artificial environment”. VR technology is a three-dimensional virtual world created by humans through computers. The user interacts with the virtual world through a series of sensory experiences such as sight, hearing, touch, smell, taste, etc., and interacts in the virtual environment and causes changes in some objects in the environment to realize human-computer interaction. It combines digital image processing, computer graphics, multimedia, sensors, simulation and network parallel processing and other technologies. Virtual reality technology originated from the combat simulation system of the US military. However, with the popularity of computer networks, the technology has been developed rapidly, and the fields involved have become more and more extensive, especially in the field of education and teaching. By establishing a virtual reality environment, the teaching problems can be fundamentally solved, and the teaching content and achievements of the school can be improved, so that students can actively participate in the course learning. In addition, it can also provide students with practical training before employment, which can promote students to better apply theoretical knowledge to practical work [1]. The application of virtual technology in practical teaching can not only reduce the cost of practical training base and equipment in vocational colleges, but also effectively guarantee the teaching quality and promote the active participation of students in teaching practice, solving the practical problems encountered in the training of education [2].

2.2. Application Advantage

(1) Improve the efficiency of practical teaching. First, practical teaching is an important part of teaching activities. Through practical teaching students can improve their hands-on ability and have a comprehensive understanding of equipment, including equipment work process, assembly of parts and so on. Then, by using virtual technology to build a virtual platform, place the equipment on the platform, the students use the tool of the mouse or keyboard to simulate the actual operation, these includes equipment disassembly, troubleshooting, etc. Let students have a very intuitive understanding of the working principle and component composition of the equipment, which can stimulate students' interest and experience. In the actual equipment operation, because the students have a more comprehensive understanding of the equipment, the teacher can be more relaxed and effective when explaining and operating, and the students are more acceptable.

(2) Saving resources and costs. Students want to master a comprehensive knowledge of all aspects of the equipment, only through long-term practical operation, but, repeated disassembly, assembly and maintenance of the equipment are required during this period, which causes a great cost burden. Such as: ① school needs a lot of money to buy equipment. ② Students will inevitably cause certain damage to the equipment due to lack of practical experience, which requires a lot of maintenance costs. ③ In order to improve the teaching effect, the training session need a large number of teachers to conduct on-site guidance

and operation, which inevitably increases the recruitment cost of the school. But, by adopting virtual technology the component virtual practice platform can solve the above problems. First, the real teaching situation will be transferred to the virtual platform the device does not require real tangible, which can reduce the investment of training. Then, only one teacher is needed to direct all students to carry on the equipment content study through the Internet on-line teaching, without a large number of teachers to conduct professional guidance, which can reduce the labor cost of teachers in colleges and universities. Finally, it is more important that every student can learn at the same time, without worrying that some students do not have enough time to train because of inadequate equipment.

(3) Improve safety. At present, in the real training of colleges and universities students are often in high-risk environments such as high temperature and pressure. Due to the lack of experience and unfamiliar with the equipment, it is inevitable that there will be wrong operation, which will bring serious consequences and even threaten their safety. But through the virtual platform, students can perform simulation operations on the platform. These operations will not only cause any loss but also can be repeated while each student can get full operation opportunities. After these technologies are mastered, entering the real environment can reduce the difficulty of learning while reducing certain risks and increase their own hands-on ability.

(4) Change the teaching method. As matters stand, colleges and universities are still using the teacher-based teaching philosophy when imparting the equipment course, and then gradually let the learners participate through the lecture. In the specific teaching method, it is mainly to use the corresponding words, symbols and graphics to reflect the actual equipment in reality. The lack of stereoscopic leads to the one-sidedness of students' understanding of equipment. But the virtual technology adopts the learning mode of "multi-function autonomous learning". By simulating the actual teaching, all the contents of the equipment and the tools used are put into the platform in a modular way. Teachers and students can teach and learn independently through the platform. First, teachers can be materialized abstract objects through virtual technology in teaching activities and at the same time increase students' perception of physical objects. Secondly, through the operation of the platform students can intuitively obtain various information of the course content. To operate through practice students can intuitively observe the overall and internal nodes of the equipment. Finally, with the help of platform can enhance students' spatial thinking ability and increase their imagination.

(5) Break through the limitation of time and space. The teaching of equipment in reality is completed in a limited time and space. Virtual technology can completely solve the time and space problems in the training. It can be used to construct a virtual teaching site and practice. Teachers and students can complete teaching preparations and a variety of experiments and skills at any time and place can greatly shorten the teaching time.

(6) To cultivate students' innovative ability. The development of technical equipment can not only be separated from practice operation, but also from one attempt after another. Due to various factors, students in school have no conditions to explore equipment for a long time. Students do not fully divulge and improve their thinking in the process of learning, there are just to be a passive recipient. However, the teaching of virtual technology will gradually transform students from passive learners into active ones who have time and conditions to participate in the practice of inquiry learning independently. The platform will create a flexible and free learning atmosphere for students. It can develop their own thinking mode and innovative ability by using the resources on the platform to design and assemble their own equipment in order to achieve the level of further mastery of the equipment.

3. Conclusion

The development potential of virtual reality technology in the teaching of engineering equipment courses is huge. It will play a enormous role in solving practical problems such as teacher teaching and student learning. With the rapid development of network technology the traditional teaching methods will be further combined with virtual technology and will also promote the transformation of teaching methods.

References

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