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Research on the Application of Virtual Simulation Technology in Higher Vocational Education Teaching

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Abstract: In the era of artificial intelligence, virtual simulation technology has injected vitality into the reform of higher vocational education. It is conducive to innovating practical teaching models, improving students' practical abilities, enabling real-time monitoring of the teaching process, and carrying out precise teaching, thereby enhancing teaching quality. This paper analyzes the importance of applying virtual simulation technology in higher vocational education and teaching, examines the current status of its application, and proposes approaches to promote high-quality development of higher vocational education, such as building virtual simulation training bases through school-enterprise cooperation, compiling virtual simulation teaching cases, simulating typical work scenarios, conducting good virtual simulation data analysis, and improving skill evaluation and feedback mechanisms.

Keywords: Virtual simulation technology; Higher vocational education; Importance; Current teaching situation; Application paths

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1. Introduction

Virtual simulation technology, based on computer, electronic information, big data and other technologies, creates realistic virtual scenes that can meet the needs of different scenarios. It brings users realistic visual and tactile experiences, allowing them to enjoy unique learning, entertainment and tour experiences. Virtual simulation technology can meet the teaching needs of different majors, help higher vocational teachers create various teaching situations and work scenarios, and enable students to conduct online simulation operation exercises, thereby improving their practical operation abilities. Based on this, higher vocational colleges should cooperate with enterprises to establish high-level virtual simulation training bases, develop virtual simulation textbooks and cases, monitor the teaching process in real time, adjust teaching contents and methods in a timely manner, and comprehensively improve the quality of vocational education.

2. The importance of virtual simulation technology in higher vocational education and teaching

2.1. Conducive to improving the quality of practical teaching

Virtual simulation technology has innovated the practical teaching methods in higher vocational education, which applies to various majors. It helps teachers build virtual scenarios according to teaching contents and monitor students' online operation processes in real time, so as to find out the problems in their actual operations, carry out targeted online evaluation and guidance, standardize students' operation steps, and thus is beneficial to improving the quality of practical teaching [1]. At the same time, virtual simulation technology can alleviate the problem of insufficient high-end training equipment in some higher vocational colleges. It can simulate typical work case scenarios, allowing each student to conduct online simulation operation training, thereby expanding the content of practical teaching, creating more training space for students, and helping to improve the quality and effectiveness of practical teaching.

2.2. Conducive to enhancing students' practical ability

With the support of virtual simulation technology, teachers in higher vocational colleges can simulate enterprise production scenarios, import relevant equipment parameters, create realistic enterprise production scenes, record standardized operation videos, guide students to carry out online simulation operation exercises, help them practice operation steps repeatedly, deepen their memory of production processes, and thus be conducive to improving students' practical ability in posts. In addition, virtual simulation technology helps teachers carry out precise teaching and enables them to monitor and comment on students' online operation processes in real time. For example, students' operations can be evaluated according to the sequence and data of their online operations, and the evaluation results can be fed back to teachers and students. This facilitates teachers to carry out personalized guidance and students to conduct targeted exercises, thereby improving students' practical operation ability [2].

2.3. Conducive to building an integrated teaching system of industry, education, research and application

Higher vocational colleges should actively introduce virtual simulation technology and improve software and hardware facilities to promote the connection between industrial development, professional teaching, scientific research, and enterprise production, accelerate the construction of an integrated teaching system of industry, education, research, and application, and thus promote the high-quality development of vocational education. Virtual simulation technology helps teachers in higher vocational colleges simulate intelligent production, animal husbandry, and other scenarios, make up for the deficiencies of traditional practical teaching modes, enable students to keep abreast of cutting-edge scientific research achievements, new technologies, and new concepts in the industry, and allow them to simulate participating in front-line production, clinical treatment, and other work online. In this way, students can transform their professional course achievements into productivity, which is conducive to improving their practical ability and professional ethics, thus improving the industry-education-research-application system of higher vocational colleges and enhancing the quality of education and teaching [3].

3. Current application status of virtual simulation technology in higher vocational education teaching

3.1. Virtual simulation software and hardware facilities need to be optimized

VR glasses, VR headsets, and professional virtual simulation platforms are the foundation for integrating virtual

simulation technology into higher vocational education and teaching, and also important factors affecting the quality of virtual simulation teaching. Due to the high cost of these devices and high maintenance expenses, higher vocational colleges are facing financial constraints, making it difficult to purchase a large number of devices such as VR glasses and VR headsets. This leads to insufficient equipment quantity, with the problem of multiple students sharing one device, which affects the quality of practical teaching [4]. At the same time, the update of virtual simulation training software in schools is not timely, making it difficult to import parameters of new technologies and equipment in the industry. The created virtual simulation scenarios are relatively simple, and the image quality is not clear enough, which affects students' experience in virtual simulation training.

3.2. There is little cooperation between schools and enterprises in virtual simulation teaching

School-enterprise cooperation is one of the main education and teaching as well as talent training models in higher vocational colleges. However, its application in the construction of virtual simulation training bases and the development of teaching resources is relatively limited, which affects the application and promotion of virtual simulation technology in higher vocational education and teaching [5]. For example, schools and enterprises have not jointly invested in the establishment of virtual simulation training rooms, resulting in aging equipment in the training rooms, which hinders the development of training teaching. In addition, the joint development of virtual simulation textbooks is neglected, and typical enterprise work cases and production processes are not integrated into virtual simulation teaching, which invisibly affects the quality of school-enterprise cooperative education.

3.3. Virtual simulation teaching resources are single

Virtual simulation teaching in higher vocational colleges mainly relies on textbooks of various majors, and is carried out in combination with the content of experimental teaching and training teaching. There is a lack of project-based textbooks compiled and digital teaching resources developed based on industrial development and typical enterprise work cases, which affects the connection between industrial development, post skills, and teaching content, and is not conducive to cultivating students' practical ability. Moreover, at present, there is a shortage of digital teaching resources for virtual simulation technology, and there are no video tutorials on virtual simulation technology operation or operation manuals for virtual simulation experiment software. This affects students' understanding of virtual simulation technology and brings considerable challenges to the implementation of virtual simulation teaching [6].

4. Application paths of virtual simulation technology in higher vocational education and teaching

4.1. School-enterprise cooperation to establish virtual simulation training bases

Higher vocational colleges should make good use of school-enterprise cooperation platforms to jointly build virtual simulation training bases, realize the optimal allocation of educational resources, and thus improve the quality of school-enterprise cooperation. Taking animal husbandry majors as an example, higher vocational colleges should introduce virtual simulation technology according to their professional characteristics, deepen cooperation with farms, veterinary stations, and pet hospitals, jointly establish virtual simulation training bases, and equip them with VR glasses, VR helmets, and virtual simulation experiment software to meet the training teaching needs of animal husbandry majors and lay a good foundation for improving the quality of training

teaching [7]. For example, schools and enterprises can jointly invest in purchasing relevant equipment to build a comprehensive and intelligent virtual simulation training base, divided into four training functional areas: animal medicine, animal pharmacy, pet medical care, and modern animal husbandry, equipped with VR glasses or helmets, projectors, and operating platforms to meet the training teaching needs of animal husbandry majors. In addition, schools should actively introduce advanced enterprise equipment, such as various animal medical inspection equipment and examination equipment, to lay a good foundation for the development of virtual simulation training teaching and enable students to master professional equipment operation skills in advance. For example, schools and enterprises can introduce blood testing and X-ray equipment from pet hospitals, connect them with virtual simulation experiment software, simulate pet hospital consultation and treatment scenarios, facilitate students' online simulation operations, intuitively display students' operation processes, and thus improve the quality of training teaching [8].

4.2. Using virtual simulation technology to simulate typical work scenarios

Higher vocational teachers should actively learn virtual simulation technology, master the operation process of virtual simulation experiment software, and the parameter design skills of VR glasses and helmets, to improve their ability to apply virtual simulation technology and use it to improve teaching quality. Firstly, teachers can use virtual simulation technology to simulate typical work situations, carry out situational teaching, guide students to be immersed in virtual scenarios to learn professional knowledge, help them master abstract and complex core concepts, experimental operations, and other knowledge, and improve their learning efficiency and quality [9]. For example, teachers of animal husbandry majors can create virtual teaching scenarios according to the key points of course teaching, simulate the experimental process of poultry and livestock breeding, and the process of preparing drugs and treating avian influenza, guide students to wear VR glasses to enter the virtual scenarios, and let them learn knowledge such as animal genetics and breeding, common diseases of livestock and their treatment methods in the scenarios, to improve the quality of classroom teaching. Secondly, teachers can collect cutting-edge breeding technologies and veterinary technologies in animal husbandry, clarify industry development trends and enterprise talent needs, collect typical cases, and then use virtual simulation technology to simulate typical work scenarios, promote the connection between industry development, post skills, and classroom teaching, and thus improve students' practical ability in posts [10].

4.3. Joint compilation of virtual simulation teaching cases by schools and enterprises

Higher vocational colleges should integrate virtual simulation technology into the design of teaching cases. On the one hand, they should explain in detail the connotation of virtual simulation technology, operation processes, and the operation skills of virtual simulation experiment software, guiding students to use virtual simulation technology to learn professional knowledge; on the other hand, they should compile virtual simulation teaching cases and implement project-based teaching to improve students' autonomous learning ability [11]. Taking the teaching of animal husbandry majors as an example, teachers can compile teaching cases combined with training teaching content, integrate virtual simulation technology into case design, explain to students the application of virtual simulation technology in fields such as animal medical inspection, animal husbandry and veterinary medicine, pet medical care, and animal breeding, stimulate students' enthusiasm for learning virtual simulation technology, improve their information literacy, and gradually guide them to use virtual simulation technology to learn animal husbandry professional knowledge, enrich their professional knowledge reserves, and improve their comprehensive ability. In addition, schools can jointly compile virtual simulation teaching cases with enterprises,

compile project-based teaching cases around modern animal husbandry, animal medicine, animal pharmacy, and pet medical care, intersperse virtual simulation experiment cases, clarify the operation process of the virtual simulation experiment platform, and match relevant experimental operation videos, so that students can master professional knowledge according to virtual simulation experiment cases [12]. For example, teachers can compile virtual simulation experiment cases of ear mite bacteria in pet cats, use videos to explain the experimental operation process and experimental data, and synchronize the cases in WeChat groups and online teaching platforms, so that students can understand the content of virtual simulation experiment teaching in advance and lay a good foundation for the development of virtual simulation experiment teaching.

4.4. Comprehensive analysis of virtual simulation teaching data

Firstly, teachers should regularly summarize the data of the virtual simulation experiment platform, analyze the download volume of demonstration experiment videos and courseware, and students' experimental operation steps, focus on evaluating whether students' experimental steps are correct, whether experimental data are standard, and whether experimental reports are complete, find out the problems existing in students' virtual simulation experiment operations, provide accurate data for offline experimental teaching, facilitate personalized guidance, and thus improve students' experimental operation ability [13].

Secondly, teachers can use virtual simulation technology to carry out online tests, design test experiments on animal breeding, animal husbandry and veterinary medicine, pet medical care, and animal medical inspection, require students to complete experimental operation tasks and submit experimental reports within a specified time, and set relevant standard parameters for experimental operations to realize intelligent monitoring and evaluation, and improve the accuracy and scientificity of virtual simulation experimental data analysis. For example, teachers can use virtual simulation experiment software to intelligently analyze students' experiment videos, accurately find out students' operation errors and data problems, realize intelligent monitoring and evaluation, and give full play to the advantages of virtual simulation technology in higher vocational education and teaching [14].

4.5. Improving the teaching evaluation and feedback mechanism

Firstly, higher vocational teachers should join hands with enterprise experts to participate in the evaluation of virtual simulation experiment teaching, allowing them to remotely evaluate the virtual simulation experiment teaching process and students' virtual simulation experiment practice videos, point out the existing problems, and improve the scientificity and practicality of virtual simulation teaching evaluation. Secondly, teachers should comprehensively analyze students' messages, evaluations, and suggestions on the virtual simulation training platform, understand the professional knowledge, employment information, and vocational skills assessment they are interested in, collect relevant teaching resources in a targeted manner, meet students' personalized learning needs, and thus stimulate their enthusiasm for autonomous learning [15]. Taking animal husbandry majors as an example, teachers can produce videos on pet grooming, common disease treatment of pet cats and dogs, and dairy cow breeding technology according to students' evaluations and feedback, and make supporting operation videos to facilitate students' online autonomous learning, enrich their professional knowledge reserves, and thus improve their professional learning ability and lay a good foundation for their future employment.

5. Conclusion

In conclusion, higher vocational colleges should actively promote and apply virtual simulation technology. They

should build virtual simulation teaching bases through school-enterprise cooperation platforms, compile virtual simulation teaching cases, and innovate practical training teaching methods to improve the quality of practical training teaching. The use of virtual simulation technology in experimental and practical training teaching allows students to conduct online virtual operation exercises, enhancing their practical operation abilities and cultivating more practical and skilled talents. In addition, teachers in higher vocational colleges should use virtual simulation technology to simulate typical work scenarios, guide students to master job skills in virtual environments, thereby improving their practical capabilities. They should also conduct data analysis on virtual simulation experimental teaching and case teaching, improve the teaching model, and comprehensively enhance the quality of vocational education.

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Disclosure statement

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