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Exploration and Practice of Computer Teaching Management based on Virtual Reality Technology

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Abstract

Virtual reality teaching is one of the most important educational means and modes in modern vocational education, which can better support teaching and teaching management. This paper discusses the case of computer teaching management based on virtual reality technology. Through the case selection, the application of virtual reality technology in computer teaching management advantages and potential. The model can effectively improve students' interest and effect in study, enhance students' computer practice ability and innovation spirit, and promote teachers' teaching level and teaching management ability.

Keywords

Virtual Reality Technology; Computer Teaching Management; Practice Cases; Teaching Results.

1. Introduction

With the rapid development of information technology, computer teaching has become an important part of the field of education. The traditional computer teaching model has been difficult to meet the needs of students in some aspects, so it is an urgent task to explore a new teaching model. In recent years, the rise of virtual reality technology has brought new opportunities for computer teaching management. Based on the virtual reality technology, computer teaching management, with its immersive and interactive features, provides students with more real and vivid learning experience, which is expected to become an important development direction in the future education field. The purpose of this paper is to discuss the implementation process, effect and challenge of computer teaching management based on virtual reality technology, and to provide reference for related research and practice.

2. Overview of Virtual Reality Technology

2.1. The Definition and Development of Virtual Reality Technology

Virtual reality technology, also known as VR technology, refers to the computer to create a three-dimensional, simulation environment, users can interact with it through special equipment, get immersive experience. Since the mid-20th century, with the rapid development of computer technology, sensor technology and display technology, virtual reality technology gradually from science fiction to reality, has become a hot area of science and technology. With the development of technology, virtual reality has experienced the evolution from simple 3D model to complex holographic projection, from single visual experience to multi-sensory interaction. Today, it has been widely used in education, entertainment, medical, military, industrial design and many other fields, for human life and work has brought unprecedented changes.

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2.2. The Basic Principle of Virtual Reality Technology

Virtual reality technology, as one of the representatives of modern science and technology, its basic principle is based on three core pillars: three-dimensional graphics technology, display technology, and interactive technology. These three interdependent, common role for users to build a both real and dream of the virtual world.

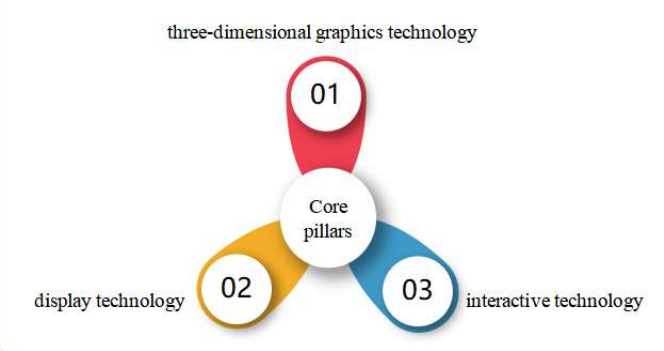

Fig. 1 VR three core pillars

(1) Three-dimensional graphics technology is the cornerstone of virtual reality technology. It uses powerful computing power and precise algorithms to create detailed and lifelike 3D scenes and objects in digital space. These three-dimensional models not only have a high degree of geometric accuracy, but also can simulate the real world lighting, texture, shadows and other complex visual effects, make everything in the virtual world look so realistic and fascinating.

(2) Display technology is the key to present these carefully constructed 3D images to users. Through devices such as head-mounted display and stereoscopic projection, display technology can present computer-generated 3D images to the user in a specific way, creating a sense of depth and stereo. Users feel as if they are in a new virtual space, cut off from the real world.

(3) Interactive technology adds dynamic and real-time to virtual reality experience. With the help of various sensors and input devices, such as motion capture systems and tactile feedback devices, interactive technology can capture users' movements, postures and even emotional responses in real time, and translate it into instructions and data that the computer can understand. These instructions and data are then used to control the objects and behavior in the virtual environment, enabling a natural, fluid interaction between the user and the virtual world.

2.3. The Main Application Fields of Virtual Reality Technology

In the field of education, virtual reality technology provides a new means and tools for computer teaching. By constructing virtual classroom, virtual laboratory and other teaching environment, students can practice in the virtual world, improve learning interest and effect. Virtual reality technology can also simulate complex systems and phenomena to help students better understand and grasp the abstract concepts and principles. In the entertainment field, virtual reality technology for users to bring an immersive gaming experience. Players can wear a virtual reality helmet, hand-held controller, in the virtual world of the game free to walk, fight and explore, access to unprecedented game fun. In the medical field, virtual reality technology is widely used in surgery simulation, rehabilitation training and medical education. Doctors can use virtual reality technology to simulate the operation before the operation to improve the success rate of the operation, and patients can carry out rehabilitation training in the virtual environment to speed up the process of rehabilitation. Virtual reality technology also plays an important role in military, industrial design and other fields. In the military field, virtual reality technology can simulate battlefield environment and help soldiers to carry out actual combat

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drills. In the industrial design field, designers can make use of virtual reality technology to carry out prototype design and display of products, improve design efficiency and quality.

3. The Present Situation and Problems of Computer Teaching Management

3.1. The Present Situation of Computer Teaching Management

Under the tide of Information Age, computer teaching has become an indispensable part of higher education, which plays an important role in cultivating students' information literacy and improving their comprehensive ability. With the continuous innovation of Technology and the renewal of educational ideas, the face of computer teaching management has also undergone profound changes. Most colleges and universities respond to the call of the times, not only bring the computer course into the teaching system, but also devote themselves to the construction of an all-round and multi-level teaching management system. This system starts from the formulation of the teaching plan, combines the student's learning needs and the curriculum goal, plans the teaching content and the time sequence scientifically; Through modern means such as teaching management information system, real-time monitoring and data analysis are carried out to provide a strong basis for teaching adjustment To evaluate the teaching effect in a diversified way and promote students' all-round development.

3.2. Problems in the Management of Computer Teaching

In the field of computer teaching management, although some remarkable progress has been made, there are still some deep-seated problems to be solved. These problems not only affect the teaching effect, but also restrict the long-term development of computer education. It is an outstanding problem that the individualized needs in the teaching process can not be satisfied. With the diversification of student groups and the Individualization of learning needs, the traditional“One-size-fits-all” computer teaching method has been difficult to adapt. The current teaching management system often lacks the attention and support to the individualized teaching needs, which leads to the inability of some students to obtain the teaching resources and services that match their learning style, interests and abilities. Not only has affected the student's study enthusiasm and the effect, also has restricted the computer education innovation and the development. The imperfection of teaching evaluation system is also a problem to be concerned about. The existing teaching evaluation system often pays too much attention to the quantitative index, such as the examination result, the certificate obtains and so on, but neglects to the student computer practice ability, the innovation thought and the Comprehensive Quality Comprehensive Evaluation. This kind of quantitative evaluation method not only can not reflect the computer level of students, but also easily lead to the deviation of educational objectives and the decline of teaching quality. The Lag of technology renewal in teaching management is also a problem that can not be ignored. With the rapid development of information technology, new teaching tools, platforms and methods are emerging. Due to the lack of sensitivity and application ability to new technology, some teaching management organizations and individuals are relatively obsolete and can not meet the needs of computer education in the new era. It not only limits the promotion of teaching effect, but also hinders the advancement of computer education with the times.

3.3. The Development Trend of Computer Teaching Management

With the continuous progress of science and technology and the continuous renewal of educational ideas, computer teaching management is facing a series of profound changes. In view of the existing problems, the future trend of development is becoming clear, mainly reflected in the following aspects:

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(1) Teaching will be personalized and differentiated direction of in-depth development. In the big data, artificial intelligence and other cutting-edge technology, the teaching management system will be unprecedented analytical capabilities. By mining and analyzing the massive learning data, the system can accurately grasp each student's learning habits, interests and abilities, and then tailor personalized learning paths and resources for them. Not only help to stimulate students' interest and motivation, but also effectively enhance their learning effect and satisfaction.

(2) The real-time monitoring and dynamic adjustment of the teaching process will become the norm. The future teaching management system will pay more attention to the overall control of the teaching process, with the help of advanced monitoring technology and real-time feedback mechanism to ensure the smooth implementation of teaching activities. The system will also flexibly adjust teaching strategies and resource allocation according to students' learning progress and real-time feedback to meet students' learning needs in an optimal manner. Not only help to find and solve problems in time, but also can effectively enhance the adaptability and flexibility of teaching.

(3) The innovation of teaching mode will become the important direction of computer teaching management. Under the guidance of the student-centered and problem-oriented teaching concept, the future teaching model will pay more attention to the students' subjective status and active participation. Through the use of project-based learning, collaborative learning and other innovative teaching methods, in order to train students' critical thinking, teamwork and problem-solving ability. Teaching management system will also provide comprehensive support and services for these innovative teaching models to ensure their effective implementation and achieve good results.

4. Construction of Computer Teaching Management Model based on Virtual Reality Technology

4.1. Application of Virtual Reality Technology in Computer Teaching Management

With the rapid development of information technology, virtual reality technology has injected new vitality into computer teaching management, and its application gradually shows great potential and value. In the aspect of the virtualization of teaching resources, virtual reality technology, with its unique advantages, makes a new deduction of traditional teaching resources such as teaching materials, courseware and experimental equipment. By means of high-precision three-dimensional modeling and realistic scene reproduction, these teaching resources are endowed with more vivid and vivid forms of expression, which not only greatly enrich the teaching content, also effectively enhance the students' learning interest and experience. The virtualized teaching resources are easy to share and spread, break the limitation of time and space, and realize the efficient use and maximum value of teaching resources. In the area of teaching scenario simulation, virtual reality technology has built zero lifelike virtual learning environments for students. Whether it is a virtual classroom, a virtual laboratory or any other kind of virtual scene, it provides students with an immersive learning experience. In this kind of environment, students can not only carry out the practice operation of high simulation, but also deepen the understanding and mastery of theoretical knowledge in the simulated situation. This kind of teaching method not only effectively promotes the student's practice ability and the innovation spirit, but also has greatly expanded the teaching possibility and the boundary. In the aspect of visualization of teaching process, virtual reality technology has brought revolutionary changes to teaching management. Through real-time monitoring and recording the teaching process, teachers can directly understand the students' learning status, grasp the situation and feedback, so as to timely adjust teaching strategies and

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optimize the teaching process. This visual teaching method not only improves the efficiency and effect of teaching management, but also provides teachers with more scientific and accurate teaching decision-making support.

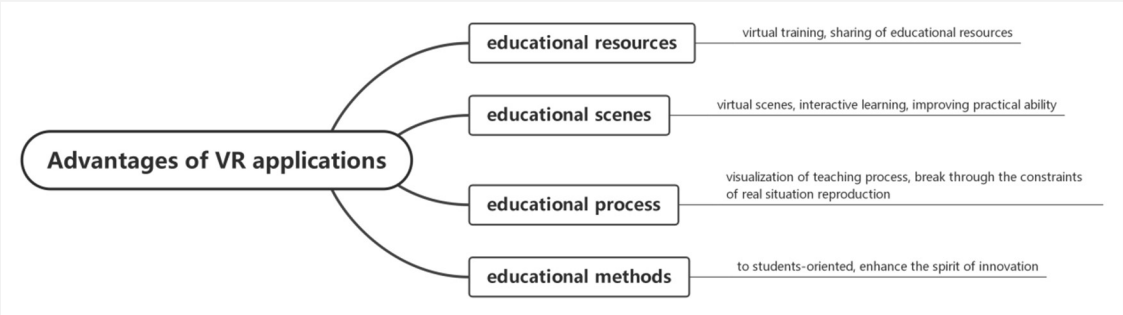

Fig. 2 advantages of VR application

4.2. Design of Computer Teaching Management Mode based on Virtual Reality Technology

In the exploration of the computer teaching management mode based on virtual reality technology, the following concrete designs are carried out from the student-centered and practice-oriented design concept:

(1) In the setting of teaching objectives, we will definitely train students' computer practice ability and innovative spirit in the first place. The aim is to guide students to immerse themselves in the study of virtual reality technology, not only master the basic knowledge of computer, but also exercise the ability to solve problems in practice and stimulate innovative thinking.

(2) In the selection of teaching content, we should carefully select the suitable virtual reality teaching content and resources according to the teaching objectives and students' needs. These contents not only include basic computer theory knowledge, but also cover a wealth of practical cases, aimed at providing students with a comprehensive and systematic learning experience.

(3) In the construction of teaching environment, virtual reality technology is used to create a highly realistic teaching environment. This environment not only simulates the real computer operation scene, but also provides rich teaching interaction and experience function, which makes students feel the same operation experience as reality in the virtual world.

(4) Pay attention to the monitoring and recording of the teaching process. Through virtual reality technology, we can monitor students' learning status, operation process and feedback in real time, and provide teachers with timely and accurate teaching feedback. Not only help teachers adjust teaching strategies, but also ensure that every student can receive personalized guidance and attention.

(5) In the evaluation of teaching effect, we adopt diversified evaluation methods. In addition to the traditional examination results, we also pay attention to the students' practical operation ability, innovative thinking ability and team cooperation ability evaluation. This kind of comprehensive assessment aims at reflecting the students' learning achievement and teaching effect more truthfully, and providing a strong basis for the subsequent teaching improvement.

4.3. The Implementation Steps of Computer Teaching Management Mode based on Virtual Reality Technology

When promoting the computer teaching management mode based on virtual reality technology, its implementation steps should be carefully planned to ensure that each link can effectively link up, so as to ensure the smooth operation of the teaching mode.

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(1) In the preliminary stage, the first task is to complete the hardware equipment procurement and configuration, to ensure that the virtual reality equipment can meet the teaching needs and provide students with a smooth operating experience. Virtual reality software development and testing is also a key link, needs to be closely integrated with the teaching content to ensure the practicality and stability of software functions. Teachers' training and technical support can not be ignored. Only when teachers master the virtual reality technology, can they be better applied to teaching.

(2) In order to ensure the successful implementation of the computer teaching management model based on virtual reality technology, the pilot classes or courses were selected to make a preliminary attempt. Through the pilot, we can gradually collect feedback, understand the advantages and disadvantages of the teaching model, and then optimize and improve. In the promotion process, we should pay attention to the communication with teachers and students, encourage them to participate actively and offer valuable suggestions.

(3) In the stage of integration of teaching resources, we are committed to transforming the existing teaching resources into the form of virtual reality in order to achieve the sharing and efficient use of teaching resources. This includes the virtualization of teaching materials, courseware, experimental equipment and other resources, so that it can be fully utilized in the virtual reality environment. Pay attention to the renewal and maintenance of resources to ensure the timeliness and accuracy of teaching resources.

(4) During the implementation stage of teaching process, teaching should be carried out according to the designed teaching mode and steps. We should pay attention to students' participation and experience, and encourage students to carry out practical operation and inquiry learning in the virtual reality environment. The participation of teachers to provide students with the necessary guidance and support to ensure the smooth progress of the teaching process.

(5) At the end of teaching, students' learning achievement and teaching effect are evaluated by diversified evaluation methods. Including students' examination results, work quality, practical ability and other aspects of comprehensive evaluation. We also collect teachers and students' feedback in time to understand the shortcomings of the teaching model and provide a strong basis for the subsequent adjustment of teaching strategies.

5. Case Study of Computer Teaching Management based on Virtual Reality Technology

5.1. Case Selection and Background

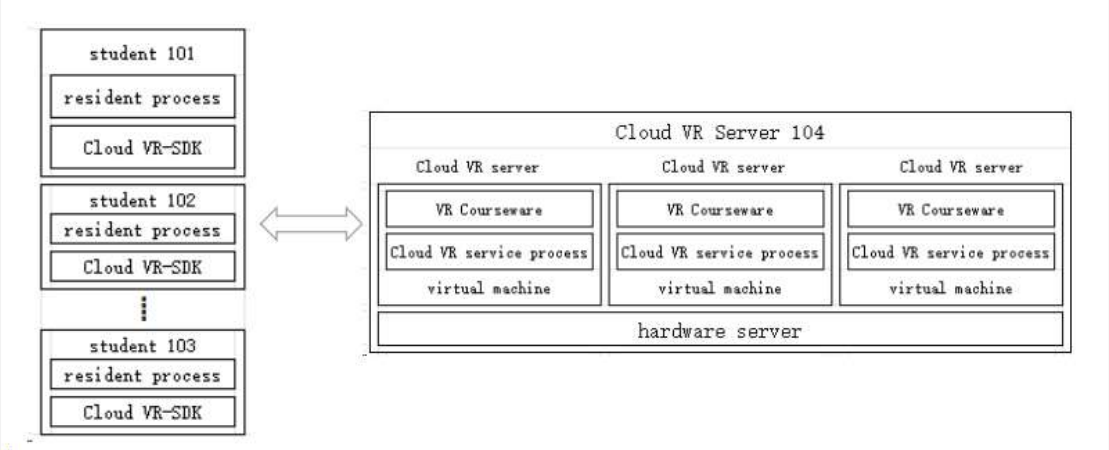

Fig. 3 VR teaching management and devices as well as systems and processes

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The case chooses a representative school, which actively introduces virtual reality technology in the field of computer teaching management, and has achieved remarkable results. Figure 3 shows the overall structure of the university's VR teaching management, including key elements such as facilities, systems, and processes. The university not only has advanced VR equipment, but also integrates a wealth of educational resources, it provides a strong guarantee for the implementation of computer teaching management based on virtual reality technology. Through the in-depth analysis of the university's practice, we can better understand the application value and implementation points of virtual reality technology in computer teaching management.

(1) The university makes full use of the advantages of virtual reality technology in computer teaching management, and constructs a set of perfect VR teaching management system. The system integrates hardware equipment, software resources and teaching content, and realizes overall virtualization and efficient management of teaching process. Through this system, teachers can easily carry out teaching design and resource management, students can be in the virtual reality environment for practical operation and self-learning.

(2) In terms of installation, the university is equipped with high-performance virtual reality equipment and professional technical support team to ensure the stability and smoothness of the virtual reality environment. These devices not only provide students with a realistic learning experience, but also support multi-person online learning and improve the efficiency of the use of teaching resources.

(3) In terms of systems and processes, the school focuses on the standardization and individualization of the teaching process. Through virtual reality technology, teachers can monitor students' learning status and Operation Process in real time, and provide timely feedback and guidance. The system also supports custom learning paths and schedules to meet the learning needs of different students.

5.2. Case Implementation Process and Result Analysis

(1) In the process of implementing the computer teaching management based on virtual reality technology, the university first made full preparation, including hardware equipment procurement and configuration, virtual reality software development and testing. On this basis, the school carried out the promotion of teaching mode, through pilot classes or courses, gradually in students to promote the virtual reality technology-based computer teaching management mode. In the process of teaching implementation, the school pays attention to students' participation and experience, through the virtual reality technology to build a realistic teaching environment, providing rich teaching interaction and experience. The school also carried out real-time monitoring and recording of the teaching process, providing teachers with timely teaching feedback in order to adjust teaching strategies and optimize the teaching process.

(2) Results analysis after a period of practice, the university's computer teaching management based on virtual reality technology has achieved certain results. Through a variety of evaluation methods, the school comprehensively evaluated the students' learning results and teaching results. The results show that the computer teaching management model based on virtual reality technology can effectively improve students' interest and effect in learning, and improve students' computer practice ability and innovation spirit. The implementation of this mode also improves the teaching effect and teaching management level of teachers, and provides strong support for training innovative talents. The school also carried out in-depth analysis and summary of the problems encountered in the implementation process. For example, some students are uncomfortable with the teaching mode of virtual reality technology, and there are physical reactions such as vertigo. The configuration and maintenance costs of virtual reality equipment are high, which is difficult to achieve for some schools in poor areas. In order to

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solve these problems, the university takes active measures to improve, such as strengthening students' health education, optimizing the configuration and use of virtual reality equipment.

6. Conclusion

The case analysis of computer teaching management based on virtual reality technology shows that integrating virtual reality technology into computer teaching management not only enriches the teaching means, but also enriches the teaching method, it also improves the teaching effect and the learning experience of the students. By building a realistic virtual environment, students can understand and master the computer knowledge more deeply in practice, so as to cultivate their practical ability and innovative spirit. This kind of teaching mode also put forward higher request to the teacher's teaching ability and the management level, promoted the teaching management innovation and the development. The computer teaching management mode based on virtual reality technology has a broad application prospect and is worth popularizing and implementing in more university computer teaching.

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References

[1] Jia Xiaoqi, Lu Jianyao. Construction of simulation teaching platform based on virtual reality technology ----taking“Computer assembly and maintenance” as an example [J] . Intelligent computers and applications, 2023,13(10) : 88-91 + 97.

[2] Wei Hu. Application of virtual reality technology in computer course teaching [J] . IC applications, 2022,39(10) : 128-129.

[3] song Zhipeng. Teaching application and software development of computer virtual reality technology [J] . Infographic materials, 2021,22(08) : 135-137.

[4] Chan Fo-lin. Application of VR technology in higher vocational computer course teaching [J] . China new communications, 2020,22(12) : 218.

[5] Makiyin. On the application of virtual reality technology in computer teaching [J] . Computer and information technology, 2020,28(03) : 91-94.