

The Application of Virtual Simulation Technology in the Intelligent Education Platform

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Abstract: With the development of virtual simulation technology, it is widely used in the construction of intelligent education platform to create an immersive digital learning environment. This study first analyzes the working mechanism of virtual simulation technology, including virtual reality, augmented reality, and multi-perception interaction. Then this paper discusses how virtual simulation technology serves intelligent education, which can not only simulate experimental operation, but also architecture virtual scene to realize situational teaching. Based on this, the system architecture of the intelligent education platform is designed, using modular design and integrating the virtual simulation system. The results show that the virtual simulation technology can improve the students' learning interest and participation, especially for the subjects with high hands-on operation requirements. This study verifies the deep integration of virtual simulation technology and intelligent education platform, and explores the application of the new virtual practical training system in information technology teaching, which provides a reference for the promotion and application of such systems.

Keywords: Virtual Simulation Technology; Intelligent Education; Technology.

1. Research Background and Research Significance

With the rapid development of virtual simulation technologies, such as virtual reality, augmented reality, and multi-perception interaction, we have entered a new era of technological innovation. Advances in these areas have not only spawned a wave of innovation across industries, but also triggered tremendous changes in education. In such a background, the concept of "intelligent education" arises at the historic moment. Its core purpose is to use digital tools to improve the intelligence and personalized degree of the education system, enrich educational resources, so as to better meet the growing learning needs of students. The introduction of virtual simulation technology provides a solid technical support for the practice of this educational concept. In the current teaching mode, there are many problems that are difficult to simulate the real situation through the traditional methods, but the virtual simulation technology can provide effective solutions to help students to further understand and master the key points of knowledge. By combining it with other advanced technologies, we are able to explore an effective way to use virtual simulation technology widely in the education field. Exploring the application of virtual simulation technology in the intelligent education platform not only has profound theoretical value, but also has great significance in the practical level. This not only promotes the deep integration of the virtual simulation technology and the intelligent education platform, opens up a new road for the construction of education information, but also enriches the functions of the intelligent education platform, and provides a strong support for the realization of a more real and immersive teaching environment. In addition, it also expands the application scope of virtual simulation technology in the teaching field, promotes the penetration of relevant technologies in the education industry, and provides rich resources and reference for the development of teaching content based on virtual simulation, thus promoting the sustainable development of the relevant industrial chain.

From the perspective of teaching effect and resource utilization, the use of virtual simulation technology for teaching can provide a more intuitive and vivid learning experience, significantly improve the teaching effect, and reduce the teaching cost. Especially for some practical training projects that require expensive equipment or special environment, virtual simulation technology can provide a safe and cost-efficient solution. At the same time, it also inspires us to reflect on and improve traditional teaching methods and seek more efficient and innovative approaches to education. Although the application prospect of virtual simulation technology in the field of education is very broad, there are still a series of challenges and problems to be deeply discussed and solved urgently. For example, how can we ensure that the virtual simulation teaching content is scientific and accurate, how to improve teachers and students for the acceptance of virtual simulation technology and use ability, and how to ensure the stability of technology operation and security, these need us in the future research and practice to dig and solve. Through the systematic research of these problems, we will be able to give full play to the role of virtual simulation technology in the intelligent education platform, and make a positive contribution to promoting the modernization of education.

2. Literature Review

In the past few decades, the rapid development and wide application of information technology has greatly promoted the innovation in the field of education, among which the research on the integration of virtual simulation technology and intelligent education platform has become the focus of the academic and practical fields. This paper summarizes the research progress in related fields, and systematically combs and analyzes the research progress of virtual simulation technology and the platform for intelligent education.

2.1. Virtual Simulation Technology

Virtual reality technology shows great application potential in the field of education with its unique immersion and

interactivity. Shen et al. (2019) [1] A set of virtual surgery teaching system is developed with virtual reality technology, which provides a safe and controllable learning platform by simulating the real surgical environment, and greatly improves the learning effect and surgical skills of medical students. Moreover, augmented reality has been widely used in education, Squire et al (2007) [2] A geographic learning system based on augmented reality was designed, which enhances students' learning experience and interest by stacking virtual information into a real environment. These studies show that virtual simulation technology has become an important supporting technology in the field of education, and its deep integration with education is the main trend of future development.

2.2. A platform for Intelligent Education

With the development of big data, cloud computing, artificial intelligence and other technologies, the intelligent education platform has become an important tool to realize education informatization and promote educational innovation. Wang Daokun et al. (2020) [3] A network platform for intelligent classroom is built, which provides an efficient and convenient teaching and learning environment for teachers and students by integrating a variety of information technology and educational resources. Meng Wu, et al. (2019) [4] From the perspective of artificial intelligence technology, this paper studies how to use AI technology to realize personalized learning and provide students with customized learning content and strategies. These studies show that the smart education platform is becoming a key force in promoting educational innovation and improving the quality of education by integrating various advanced technologies and educational resources.

3. Research Content and Methods

3.1. Study Contents:

Based on the research of the latest development of virtual simulation technology, such as virtual reality, augmented reality and multi-perception interaction, combined with the actual needs of intelligent education platform, in-depth exploration and research. We will start with the basic theory of virtual simulation technology and intelligent education platform, and conduct a comprehensive overview and systematic analysis of it, aiming to build a solid theoretical foundation, and provide strong support for subsequent research. On this basis, this study will focus on exploring and analyzing how the virtual simulation technology can enhance the function of the intelligent education platform, reveal its great potential in improving the learning experience and improving the teaching effect, and explore the effective ways to apply it widely in the field of education. Through in-depth research on relevant technologies and methods, we will design and build an intelligent education platform architecture with virtual simulation as the core, to ensure that it can meet the needs of modern education in terms of efficiency, stability and ease of use, and provide strong technical support for the construction of educational informatization. Subsequently, in order to comprehensively evaluate the teaching effect and application value of the designed platform architecture, we will systematically evaluate and analyze it from multiple dimensions to ensure that the proposed solution can achieve the best effect in the actual teaching environment. In this process, we will pay

close attention to the possible problems and challenges in the practical application, and propose practical solutions on the basis of analysis to ensure that the application of virtual simulation technology in the intelligent education platform can be fully supported and guaranteed. Through this study, we hope to provide theoretical and practical guidance for the deep application of virtual simulation technology in the field of education, promote the development of intelligent education, realize the deep integration of education and technology, and contribute to the continuous innovation and development of the relevant industrial chain.

3.2. Study Methods:

In order to ensure the comprehensiveness and depth of this study, we will use the literature research method to systematically comb and review the theoretical basis, technology development and application status of related fields. Specifically, we will comprehensively summarize and analyze the development process of virtual simulation technology, key technologies, application fields, and existing problems and challenges by retrieving and reading domestic and foreign academic journals, conference papers, monographs and related policy documents. In addition, we will also discuss the composition, functional characteristics and the current situation and trend of integration with virtual simulation technology.

4. Introduction of Relevant Technologies and Platforms

4.1. Virtual Simulation Technology

As the concept of "universe" (Metaverse) is hot, the connection between information technology and social life and mutual feed become a hot topic of domestic and foreign academic discussion, by the attention of the world and cause infinite daydream, build high embedded space technology also received widespread attention, especially the virtual simulation technology (Virtual Reality), which is called daily VR technology. Virtual simulation, also known as virtual reality, is in the existing information technology (multimedia technology, communication technology), on the basis of fusion simulation technology form a technology, the building space is "a kind of navigation space, namely by human mind free imagination, drawing and dominate the space" is with the development of digital communication technology, artificial intelligence and form a new space form. In other words, VR technology is a kind of digital virtual environment shaping technology, mainly in the combination of computer graphics, simulation, sensing series technology on the basis of integrating teaching materials, images and other teaching resources, and through the corresponding electronic equipment to build virtual teaching scene in order to achieve good teaching effect, teaching practice is different from previous experience [1]

Virtual simulation technology is applied in the real world, and can play many roles such as virtual economy and virtual social governance. According to the practical application of virtual simulation technology, it is found that the following key characteristics are shown.

One is to present an immersive virtual scene. Immersion refers to the concentration of people's thoughts and emotions and devotion into something. The immersive scene is to put the listening touch of the educated in the virtual environment, so that the educated can explore the teaching problem

situation like immersive, and then stimulate the interest and enthusiasm of the educated.

The second is to create an interactive experience effect. Interactive refers to the communication between people or between people and things. In the teaching of ideological and political courses, virtual truth technology is used to broaden the perspective of teaching content in the way of virtual and real. At the same time, the educated people can get the full truth experience with the help of data gloves and position trackers, so as to realize the effective interaction between teachers and students and between students.

Third, it shows the strong force of the integration of digital and intelligence. Digital intelligence fusion refers to the integration of various technologies, the set of various technology, based on a variety of large data, effect, amplification, assigned to realistic teaching, create a balance operation of virtual ecological space, let technology single point advantage in teaching extends to the teaching process, to the educators before some feelings [2]

4.2. Virtual Reality Technology

Virtual reality technology (Virtual Reality) is a human-computer interface technology that uses computers to generate a three-dimensional virtual environment in which users can browse, navigate, operate and interact. The core of virtual reality technology has three elements:

1) Immersion (Immersion): By cutting off the external sensory stimulation, people are placed in the virtual environment.

2) Interaction (Interaction): Users can actively navigate, operate, select and other interactive behaviors in the virtual environment.

3) Imagination (Imagination): Virtual environment has a strong virtuality, which can present some impossible scenes in reality.

The key hardware to realize virtual reality are: head-mounted display, hand controller, motion capture system, etc. The software needs to run interactive programs on the 3D engine.

Virtual reality technology is widely used, such as games, military training, industrial design, medical education and other fields. It can greatly enhance the user's immersion and scene presence, and is one of the important technologies to realize virtual simulation.

4.3. Augmented Reality Technology

Augmented reality (Augmented Reality, AR) is a technology that calculates camera images in real time and adds virtual elements to the screen. It features a fusion of virtual elements with the real world.

The main features of augmented reality technology are:

Real-time sex- -It can capture real-world images in real-time and add virtual elements.

Interactivity-Users can interact with the virtual content in real-time.

Spatial positioning-Ability to determine the user location to provide orientation-related information.

The key technologies to realize augmented reality include: video capture, scene recognition, motion tracking and registration, 3 D modeling, etc.

The application fields of augmented reality technology include medical imaging, industrial manufacturing, tourism, education and training, etc. It makes up for the limitations of virtual reality divorced from the real environment and

integrates virtual content into the real world.

4.4. Multi-perception Interaction Technology

Multi-perception interaction technology is an interactive mode proposed for the virtual simulation system. It combines a variety of sensory modes to realize a more natural and immersive human-computer interaction. The main features of multi-perceptual interactions include:

Multimodal input: interactive input supporting visual, auditory, touch and other senses.

Multimodal output: to provide visual, auditory, tactile and other multimodal feedback output.

Natural interaction: support voice, gesture and other natural interaction mode.

Context perception: It can perceive the user's emotions and behavior patterns.

Key technologies to achieve multi-perception interaction are:

Sensing technology: to capture the user's multimodal input information.

Feedback technology: Provide immersive output feedback.

Natural interaction technology: to make the interaction more natural and intelligent.

Emotional computing technology: to analyze the emotional state of users.

Multi-perception interactive technology can greatly improve the sense of reality and immersion in the virtual simulation environment, make it easier for people to integrate into the virtual world, and is an important enhancement means of virtual simulation. It has a great application prospect in teaching, training and other aspects.

5. Smart Education Platform

5.1. The Concept of Intelligent Education

Intelligent education is an educational form that builds an optimized education ecosystem with the support of the new generation of information technology, realizes the intelligent, personalized and resource-rich education process, so as to promote knowledge dissemination, ability cultivation and all-round development. Smart education is an open, shared and interactive education, which needs the support of a lot of intelligent resources and data. After years of education information construction, the national, provincial and colleges and universities have basically built an online education platform for high-quality courses, and launched a number of high-quality courses for famous teachers. In addition, a large number of enterprises have entered the ranks of intelligent education, relying on advanced technology to achieve the rapid growth of educational resources, such as SuperErya, netease, etc. However, even if high-quality educational resources are all over the Internet, students cannot contact and use them because of "information cocoon" and knowledge gap. In view of this situation, teachers should not only actively recommend high-quality educational resources to students, but also guide students to master the ways and methods of obtaining educational resources, to meet their personalized development needs [3]

The main characteristics of intelligent education include:

1) With the help of emerging information technology to realize education informatization, digitalization, network

2) Build an open, flexible and continuous new education ecosystem

3) Realize the data collection, analysis and application of

teaching activities, resources and processes

4) Support the independent, personalized and collaborative learning style

5) Establish an intelligent teaching operation and management mode

6) Improve the learning experience, cultivate the learning interest and motivation

7) Optimize the role of teachers and play the leading role of teachers

8) Promote students' all-round development and lifelong learning

Smart education focuses on the deep integration of technology and education, and the ultimate goal is to improve the effect and experience of teaching and learning, so as to cultivate talents to meet the needs of future development. It is an important direction of educational development.

5.2. The Composition of the Intelligent Education Platform

1) Network infrastructure and terminal equipment: through the Internet, mobile network and other network equipment, as well as laptops, tablets, mobile phones and other intelligent terminals, constitute the hardware foundation of education information.

2) Platform support system: including user identity authentication, data collection, storage and processing, resource allocation and scheduling, application management and other platform-level functional modules.

3) Teaching applications and services: all kinds of educational applications and services for teachers, students and managers, such as intelligent classrooms, digital resources, online learning space, etc.

4) Data center and knowledge base: collect and process all kinds of educational data, provide learning and analysis services, and build a knowledge management warehouse.

5) Security and management system: provide authority control, data security, application monitoring and other functions to ensure the safe and stable operation of the platform.

6) User interface: intuitive and friendly operation interface, including PC, mobile and other user access interfaces.

7) Open API interface: open interface for third-party applications, supporting the docking of wearsure education applications and services.

Through the design and integration of the above key elements, an information platform serving intelligent education will be formed to improve education performance and experience.

6. Application of Virtual Simulation Technology in the Intelligent Platform

6.1. The Convergence Points between Virtual Simulation and Intelligent Education

There are the following points between virtual simulation technology and intelligent education:

1) Both emphasize the use of digital means to improve teaching and learning.

Virtual simulation relies on digital technology to build the virtual environment and content. Intelligent education realizes intelligent teaching through education informatization.

2) Both provide personalized, immersive learning experiences. Virtual simulations can adjust the difficulty to the individual differences. Smart education can recommend resources according to students' preferences. Both can improve learning immersion.

3) Relying on data to achieve the analysis and optimization of teaching. Virtual simulations can collect learning behavior data. Smart education platform can conduct learning and analysis. Both rely on data to improve their teaching effectiveness.

4) Need a strong technical support and reserves. Virtual simulation requires computer graphics, interaction and other technologies. Smart education needs artificial intelligence and big data technology. Both are highly dependent on technological innovation.

5) We need to pay attention to safety, ethics and other issues. Virtual environments may affect health. Smart education handles large amounts of private data. Both need to consider the social impact in their application.

6) Both play an important role in improving the teaching means and methods.

To sum up, virtual simulation technology and intelligent education are highly compatible in the concept and technology level, and the integration of the two can achieve better teaching results.

6.2. Suggestions and Measures of Virtual Simulation Technology

1) In order to make better use of virtual simulation technology to promote education innovation and improve the teaching effect, this paper puts forward the following Suggestions and measures: strengthen the planning and construction of virtual simulation content, rich teaching resources: in order to give full play to the role of virtual simulation in teaching, need system planning and construction of high quality virtual simulation content, constantly enrich and improve the teaching resources. This requires educational administrative departments, schools and teachers to work together to actively guide and support the development and application of high-quality teaching resources.

2) Improve the simulation degree and interactivity of the virtual simulation environment: the simulation degree and interactivity of the virtual simulation environment directly affect the teaching effect. Therefore, it is suggested to increase investment in technology, introduce advanced hardware equipment and software platform, and constantly improve the quality and level of virtual simulation environment.

3) Integrate virtual simulation data to provide personalized teaching: by collecting and analyzing students' learning behavior and reaction data in the virtual simulation environment, personalized teaching for students can be realized. It is suggested to establish a learning behavior database, develop intelligent analysis tools, and provide accurate learning suggestions and resource recommendations.

4) Strengthen the teacher training and improve the application ability: teachers are the leader and organizer of virtual simulation teaching, and their application ability directly affects the teaching effect of virtual simulation. It is suggested to strengthen the training of teachers to improve their ability of information technology application and virtual simulation teaching design.

5) Focus on the combination of various teaching methods

to use virtual simulation: virtual simulation should be combined with traditional teaching methods and other modern educational technologies to form a diversified teaching mode. It is suggested that teachers should fully consider the synergistic effect of virtual simulation and other teaching methods in the teaching design, give full play to their respective advantages, and improve the teaching effect.

6) Develop virtual simulation solutions suitable for different disciplines: different disciplines have different teaching contents and requirements, which require different virtual simulation solutions. It is suggested to develop a suitable virtual simulation teaching scheme based on the characteristics of each subject to meet the learning needs of students of different subjects and different levels.

7. Summary and Outlook

This paper deeply and comprehensively analyzes the virtual simulation technology and the basic concept of intelligent education platform, key features and their important role in the field of modern education, and discusses in detail how the virtual simulation technology can effectively expand and enhance the diversity of wisdom education platform, to play an important role in improving the quality of teaching and learning efficiency. On this basis, this paper builds a set of innovative and virtual simulation-oriented intelligent education platform framework, whose purpose is to create an efficient, convenient and interactive learning and teaching environment for teachers and students through the integration and innovative application of various advanced technologies. In order to ensure that this framework can effectively landing and maximize its potential value, the article also puts forward a series of practical and guiding

Suggestions and strategies, covering from strengthening the construction of virtual simulation content, improve the simulation environment of reality and interactive, realize personalized teaching, improve teachers' application ability, to pay attention to the fusion of diversified teaching methods, and developed to meet the needs of different disciplines of all kinds of virtual simulation teaching scheme. In the future, with the continuous progress of information technology and the innovation and evolution of education mode, the close combination of virtual simulation technology and intelligent education platform is expected to be more in-depth, and its application in various fields will be increasingly expanded. We expect that through unremitting technological innovation and rich teaching practice, we are expected to serve the cause of education to a greater extent, and contribute to the cultivation of innovative talents and the promotion of national education level.

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