

Teaching Strategy of University History Based on Virtual Reality Technology

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ABSTRACT

Today's mature virtual simulation technology should be effectively combined with college education to give full play to better educational advantages. The history teaching supported by modern information technology paves the way for the rational distribution of educational resources and the movement of centralized users to fragmented learning time, which brings infinite possibilities for the development of education. A more liberal education model will inevitably advocate higher requirements of users for self-discipline, so it is difficult to ensure the teaching quality in relevant practice. The rapid development of virtual simulation technology improves the possibility of successful history teaching reform, and the combination of virtual simulation technology and history teaching will effectively promote the great changes and outstanding development of the whole education industry. The combination of virtual technology and history teaching can make students better integrate into the teaching situation, improve learning efficiency, and effectively achieve the educational purpose.

KEYWORDS

History Teaching, University Education, Virtual Environment, Virtual Simulation Technology

INTRODUCTION

With the development of information technology, the advantages of virtual simulation technology, such as reality, vividness, immersion, experience, and interaction, have gradually become apparent (Aidinopoulou & Sampson, 2017). Especially the restoration of historical scenes, which combines vision, hearing, and touch, is constructed by virtual simulation technology so that students can better experience the historical background, historical environment, and the occurrence of historical events (Ashby, 1997). It is important to (a) fully integrate virtual reality, the computer, and the human and the database and the network; (b) focus on teacher-student interaction, knowledge application, and effect improvement; (c) and better integrate knowledge and behavior in teaching (Biocca, 1992).

In the educational process of our country, history teaching is mainly responsible for deepening students' understandings of the diversity and richness of world civilizations, exploring the dialogue among different civilizations based on our history, broadening our horizons, and establishing national

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self-confidence and pride (Barton, 2012). In the process of education, general history teaching courses are very important for inheriting excellent cultural traditions and historical deeds and enhancing national confidence (Billingsley & Scheuermann, 2014). Virtual technology is suitable for information technology education, and it helps to improve the teaching effect of general history and culture courses (Cheng, Ma, et al., 2022). Therefore, it is necessary and reasonable in the curriculum system of history teaching (Cheng, Yang, et al., 2022).

Therefore, while clarifying the educational purpose, colleges and universities should consider not only the scores of professional knowledge examinations but also students' practical abilities and professional skills, so that the focus of educational content will gradually shift from professional knowledge to professional knowledge (Domingo & Bradley, 2018). The traditional guidance method is centered on theoretical guidance (Freedman et al., 2008). If we continue to use the traditional guidance method, it will not help the improvement of students' practical abilities (Cheng, Wei, & Cheng 2022).

VIRTUAL SIMULATION TECHNOLOGY

Virtual Simulation Technology and Its Development Status

Virtual reality (VR) technology is characterized by immersion and interaction. It can use technical means and related equipment to completely stimulate people's vision, hearing, touch, and other sensory functions, so that people can interact with each other in a three-dimensional space (Han et al., 2016). Therefore, it is of practical significance to introduce VR into the experimental classroom of history in colleges and universities for the related teaching and research of history in colleges and universities and the "construction of new free art" in history (Howatt & Smith, 2014). At present, VR has become a hot spot in the development and application of network technology, and its excellent simulation function enables virtual simulation technology to complete positive feedback to social reality quickly. For example, the Paris municipal government helped to complete the reconstruction work, and the society has exerted great influence and positive feedback on the development of many historical virtual simulation technologies (Hartzler et al., 2001). In the field of higher education, many famous universities have built their own virtual simulation laboratories, including Beijing Normal University, Tsinghua University, Shanghai Jiaotong University, Beijing University of Aeronautics and Astronautics, etc., which are used for education and academic research. In 2016, China also began to pay attention to the development of VR technology (Kenyon et al., 2004).

In recent years, with the rapid development of computer science in China, virtual reality technology has been greatly supplemented, but most of the funds and research directions are directed to entertainment industries such as movies and games, and the development in the field of culture and education is extremely limited (Lee., 1983). The year 2016 is regarded as the "first year of virtual simulation" in China (Liangxi & Vinh, 2022). In this year, the viewpoint of "realizing systematic breakthrough of core technologies" was put forward. VR technology establishes a virtual space environment through a computer and carries out real-time simulation interaction through visual, tactile, and other perceptual methods (McMichael, 2007). *Virtual environment* refers to the use of a computer plane system and various interface devices to display and control the interactive three-dimensional environment generated on the computer. In the past two years, benefiting from the residential economy, the global VR industry has experienced explosive growth, with shipments reaching 6.7 million units in 2020, a year-on-year increase of 70.4% (Makriyanni & Psaltis, 2007). It is expected to approach 15 million units in 2022. The forecast of global VR shipments from 2018 to 2022 is shown in Figure 1. China's VR shipments will be 1.9 million units in 2020, and it is expected to reach 5 million units in 2020. The forecast of China's VR shipments from 2018 to 2022 is shown in Figure 2.

Virtual simulation technology has three basic characteristics. First is *immersion*; that is, users can master related equipment and enter the virtual environment, which is almost the same as the real world and will not make people feel incongruous. The second is *interactivity*, which is reflected

Figure 1. Forecast of global VR shipments from 2018 to 2022

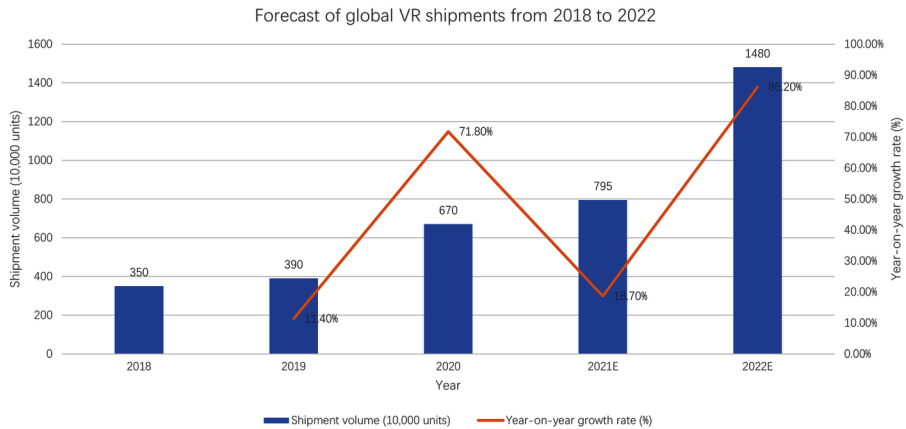
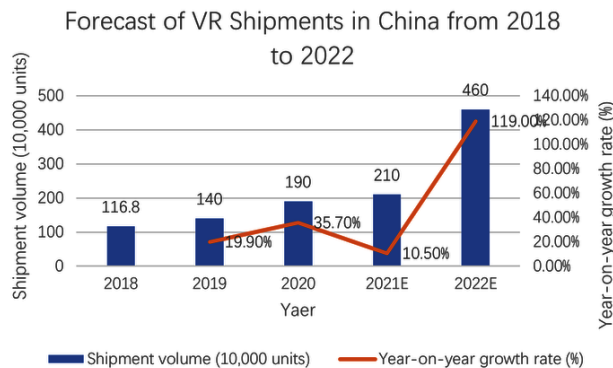


Figure 2. Forecast of VR shipments in China from 2018 to 2022



in the fact that users can interact with the three-dimensional virtual environment when they are in the virtual environment (McCall, 2016). That is to say, the three-dimensional virtual environment can be changed by external control, and the information provided by the change affects users through the three-dimensional environment (McCully, 2012). Third is *imaginative*; that is to say, the virtual environment can change the three-dimensional virtual scene according to the change of the thinking state of the user's cerebral cortex, and constantly change according to the user's imagination (Raskind et al., 2005).

The Theoretical Basis of Virtual Simulation Technology in History Teaching

In order to solve some problems in traditional teaching, we need to divide the learning content according to the actual teaching situation and student learning requirements. The initial stage of platform construction should be entered into students' admission situations, including student learning interests, the results of learning, and the adjustments of real-time learning, to ensure that the learning platform can meet student learning requirements. The goal of history teaching is to absorb historical knowledge and cultural knowledge into students' bodies and minds (Simpson, 2002). Students can learn from history and culture and shoulder the mission of the Chinese nation.

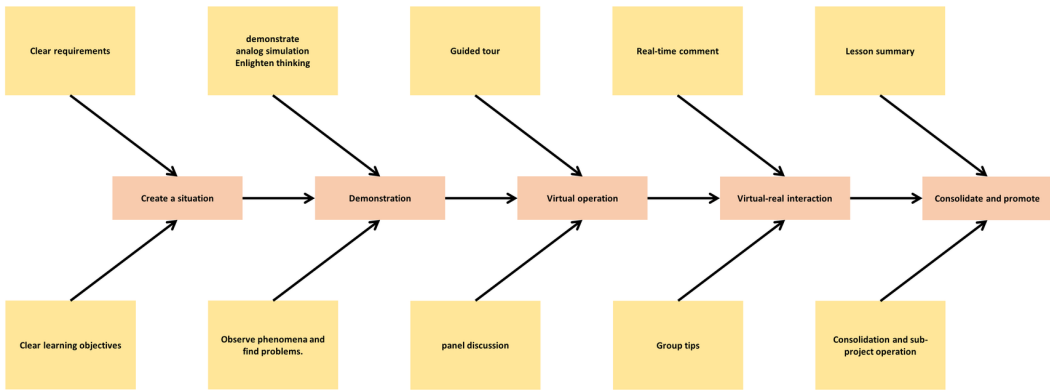
Marxist thought clearly points out: “The essence of human beings is not the abstraction unique to human beings, but the synthesis of all social relations in reality” (Shirley, 1998). Therefore, by using virtual simulation technology, students can place it in the historical scene, experience the background of the historical era and enhance student understanding and feelings about history and culture (Schultheis & Rizzo, 2001). Thus, the related theory of Marxism lays a theoretical foundation for using virtual simulation technology in the general courses of history and culture (Wang et al., 2013).

Traditional teaching is more likely to form a teaching mode in which teachers speak alone and ignore the interaction between teachers and students (Wilson & Wineburg, 1988). Therefore, the creation of a student-centered classroom has gradually formed a consensus on the realization of a new education model with students as the main body and teachers as the leader (Wineburg & Wilson, 1988). Change teachers from knowledge transmitters to organizers and limited participants in classroom activities. Virtual simulation technology is used to realize the dual theme effect of teachers and students, and both of them enter the historical scene. Student proficiency and knowledge application can be judged by their answers in virtual experiments, which can be improved through feedback. Therefore, virtual simulation technology is easier to realize the student-centered teaching idea. The virtual experience process is shown in Figure 3.

ADVANTAGES OF VIRTUAL SIMULATION TECHNOLOGY IN TEACHING HISTORY

The traditional history teaching method is usually dominated by teachers, and the course is usually not equipped with textbooks. Therefore, students need to record what they have learned through PPT, teacher’s explanation. Such a teaching mode can easily make students tired after a long period of teaching time, and it is difficult to keep a strong interest in the course content and a positive learning attitude. The traditional teaching mode is easy to make students tired during a long period of teaching time, and it is difficult to maintain interest in the course content. The virtual simulation technology is highly experiential. Through the setting of scenes and the completion of tasks, it constantly stimulates students’ auditory and visual nerves and even their whole-body experiences. Through continuous visual experience and drama listening experience, it awakens students’ attention and excites their brains, and increases participation. Virtual technology has the characteristics of a strong real experience, strong interaction, and strong immersion effect, and the teaching effect achieved in the general courses of history and culture has a strong integration advantage. In order for teachers and students to experience the ambiance of history and the occurrence of historical events, a virtual historical scene can be constructed using virtual simulation technology. Students can freely explore,

Figure 3. Virtual simulation experience process



observe, and engage with virtual historical situations through the use of virtual simulation technology, which helps them grasp historical events and historical culture more naturally. With the real-time demonstration, interactive question and answer sessions, and other methods, teachers can explain in a virtual setting, more vividly communicate historical information, and increase students' interest in and participation in their learning. Through students' answers in virtual experiments, teachers can judge the degree of students' knowledge mastery and application, feedback, and improve teaching.

Traditional teaching is more likely to form a teacher-centered teaching model, while ignoring the real classroom center. Therefore, we have gradually formed a consensus on building a student-centered classroom, realizing a new teaching model with students as the main body and teachers as the leading role, and allowing teachers to transfer knowledge to classroom organizers. Teachers will make scripts in advance, disregarding students' own problems and situations. In this way, because students need to participate fully, they can pass the test without any problems and enter the next scene, so the concept of students as the main body is better reflected through interaction. Teachers with learning levels can make more effective use of their role in the classroom, guidance, and problem-solving through clear guidance. In traditional classroom teaching, teachers and students are in the same space, and students acquire knowledge through teachers' guidance. In the process of teaching, the identity, age, knowledge background, and other factors between teachers and students will have an impact on teaching. Teachers need to make appropriate adjustments in these aspects in order to better provide help to students. When the teachers and students are far away, it is difficult for students to grasp the content wholeheartedly. In addition, with the help of language education, it is difficult for students to feel happiness directly. For example, during the application of virtual simulation technology, in a realistic historical scene designed by teachers, teachers use student role-playing as a means, and with the help of many scene switching, as historical protagonists and parties involved in historical events, they are completely immersed in the experience course of jointly judging historical problems and feeling history and culture, and their intense immersion experience is very consistent with the content of history teaching courses.

COMBINING VIRTUAL SIMULATION TECHNOLOGY AND HISTORY TEACHING

Establishing a New Teaching System

When information technology is adopted in the course, the organization of the teaching content under the traditional education mode should be changed. Therefore, in order to reflect the educational goal and teaching goal better, a new teaching system should be built on the basis of virtual simulation technology. First, analyze the learning needs from multiple angles. To solve traditional teaching problems, it is necessary to divide the learning content into stages according to the actual teaching situation and student learning needs. In the initial stage of platform construction, student registration information needs to be entered, so that students can use the learning platform to meet their learning needs.

At present, there are three main needs of students. The first is to help students master the learning focus and avoid a lack of interest in learning due to a lack of clear learning goals, which leads to inconsistent knowledge structure. Second is to match the colors in the simulation module into a unified style to ensure the visual effect for students. Third, students with the same cognitive level are divided into the same group according to their real-time performance and learning needs, which is more conducive to teaching.

Virtual simulation technology, especially when describing a specific historical figure or turning point of the times, needs to fully explain the historical background, historical development, and historical influence through the selection of the debut figure, the setting, and the completion of the task. It should use abstract visual theory, visualize the fictional environment, and use virtual simulation technology to portray the historical situation, deepen student understanding, and improve teaching effectiveness. Therefore, the teaching goal of using virtual simulation technology in history teaching is to plan and design a virtual learning environment, so that students can experience the occurrence

of history and feel the great deeds of historical figures—in the torrent of history, to feel the historical background and historical power, especially the power of the Chinese nation.

Practicing and testing learning effectiveness in virtual simulation experiments can achieve the goal of history teaching. History teaching should not only adhere to historical advantages but also constantly improve teaching methods. No matter how the methods and contents change, history teaching always needs to start from historical ontology and emphasize its historicity. Virtual simulation is just a tool. It cannot really restore history itself but exists in the form of a perspective and a possibility. It cannot just focus on technology and ignore its historical nature. The reform of history teaching methods is essential for continuous understanding.

Modeling, Rendering, and Virtual Scene Building

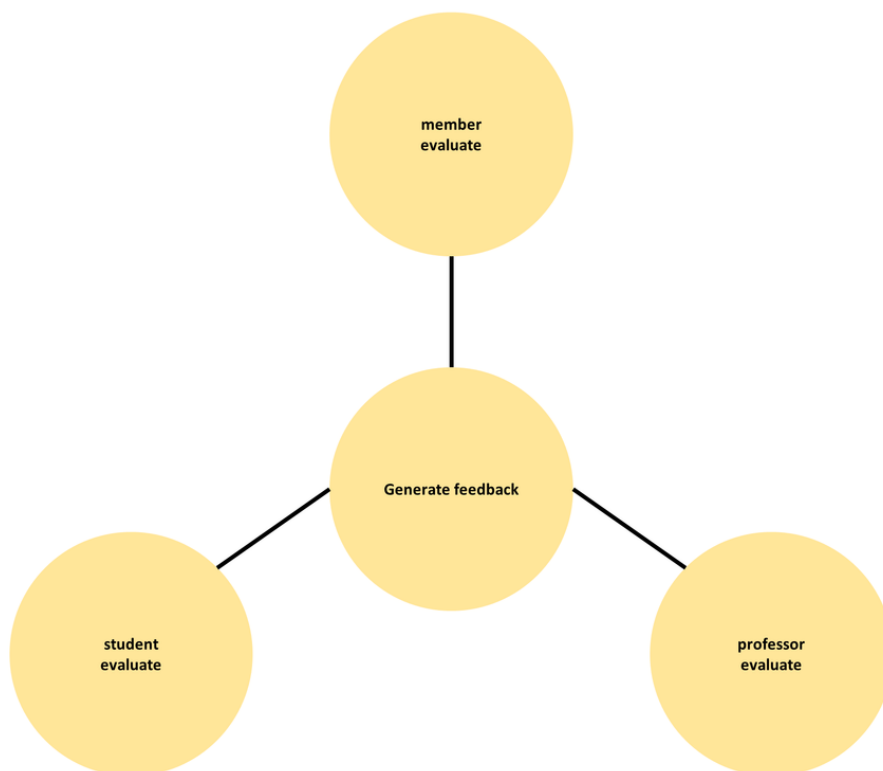
The construction of a virtual scene is the core content of virtual reality. The model cannot exist independently from the scene, and an excellent scene can directly determine the final effect and experience of the model to a large extent. In addition to the fact that the virtual scene itself should be as detailed and realistic as possible, it should also be coordinated with the virtual model. For example, in the restoration model of the Shang Dynasty city wall site, the city and the surrounding area of the city wall were destined not to be overgrown, because it was the capital of that time and had a certain population scale. The vegetation in the distance (according to historical research) should also be of a southern variety from a humid climate. There are specific requirements for the number of VR surfaces (for example, too many may lead to congestion). Therefore, when creating the model, the unnecessary faces must be minimized so as not to exceed the specified number of faces.

The overall modeling of the city wall ruins of the Yin Dynasty is relatively simple, it is made of earth, and the surface is rough. In principle, the design only needs specific visual effects. In this case, it is especially important to create textures in order to make simple models have specific effects. Vray is the most commonly used and practical plug-in, with various built-in material maps and lighting effects. Users can adjust the texture and lighting according to their needs. The focus of preparation is to imagine the most intuitive and effective form of pursuing an immersive experience. The model cannot exist independently of the scene. Besides the virtual scene itself needs to be as detailed and real as possible, it also needs to be adjusted in the virtual model. For example, in the restoration mode of the ruins of the city walls of the Yin Dynasty, the city and its surrounding areas are the capital cities, with a prosperous economy and large population, and some of the city walls have many lush plants. Besides this, the climate is humid. In the process of scene construction, the work of this module must start with the whole picture in mind, not separate objects.

Evaluation and Improvement

To combine virtual simulation technology with history teaching, we need to combine the two concepts to form a new concept of history teaching. In the process of continuous change and progress of higher education mode, the combination of virtual simulation technology and history teaching can fully display the characteristics and advantages of immersion learning. The introduction of virtual technology makes history teaching more novel and richer. As far as the present situation is concerned, the biggest shortcoming of general history teaching is the lack of supervision of students, which will greatly reduce its learning effectiveness. Virtual simulation technology can strengthen the supervision of students' learning states. Therefore, the creation of virtual history teaching environment based on virtual simulation technology can make students concentrate on learning in the virtual environment and accept supervision at the same time. In addition, virtual simulation technology can be used to automatically generate experimental steps, calculation results, data models, etc., so as to improve learning efficiency and solve problems in traditional teaching. The evaluation diagram is shown in Figure 4.

Figure 4. Schematic diagram of evaluation



VIRTUAL SIMULATION TECHNOLOGY AND HISTORY TEACHING

In order to solve some problems in traditional teaching, it is necessary to divide the learning content step by step according to the actual teaching situation and student learning needs. In the initial stage of building the platform, students' enrollment situations should be recorded, including students' learning interests, academic achievements, and other information. In subsequent use, it can also be adjusted according to real-time student learning situations to ensure that the learning platform can meet student learning needs.

Virtual classroom uses a VR head display, monitor, computer, and other external devices to integrate students' hearing, vision, and touch into a virtual historical emptiness, forming a brand-new virtual historical space, so that students can feel the historical background and culture. Virtual classroom means that teachers can be invited to the virtual classroom from other spaces. For example, inviting relevant experts, other classroom students, well-known social enterprises, etc., will create a richer virtual space that students can better understand. Therefore, we should enrich the teaching situation, diversify the teaching subjects, expand the teaching resources, and improve the teaching content, which requires the establishment of a new teaching system and evaluation system. That is, based on the learning process and learning records of virtual simulation technology, the future learning process is evaluated and learning feedback is carried out. Therefore, it is necessary to design a new evaluation system and improve the evaluation according to the needs. The content of the evaluation system helps teachers to find out students' learning situations, re-examine the curriculum and improve the teaching quality.

As a history teaching course is combined with virtual simulation technology, we should not only learn technological innovation but also continue to learn and update teaching concepts. While adhering to the traditional doctrine, we should also innovate the doctrine. It is necessary to make full use of virtual simulation technology to improve teaching methods, enrich teaching methods, optimize teaching content, and improve teaching effectiveness. Make the real classroom a high-quality history teaching course with the characteristics of the times. In the teaching process, the main purpose of using virtual simulation technology is to abide by the student-centered teaching concept unswervingly, adhere to the teaching based on virtual simulation technology, and constantly implement curriculum reform and advocate history teaching reform. Give students the power to become the protagonist of the class, and strive to make students complete the learning, understanding, and mastery of knowledge.

PRACTICAL RESULTS

The combination of virtual technology and history teaching can fully stimulate student enthusiasm for learning. Students are always interested in new things, but their interest will naturally decrease with time. The combination of virtual simulation technology and history teaching depends on the bidirectional and imaginative nature of virtual simulation technology itself, so students can get a steady stream of freshness in the virtual simulation environment, thus maintaining long-term concern. The application of virtual simulation in history teaching must be flexible and diverse, not limited to restoring or restoring historical plots, characters, or things. If only historical plots and roles are presented in teaching, then this mode is only a simple inheritance of the original teaching mode, lacking innovation and interest. The use of virtual simulation technology is not only to present historical plots and characters but also to create a vivid historical scene through the products of virtual simulation technology so that students can truly experience the occurrence of historical events and the atmosphere of historical culture.

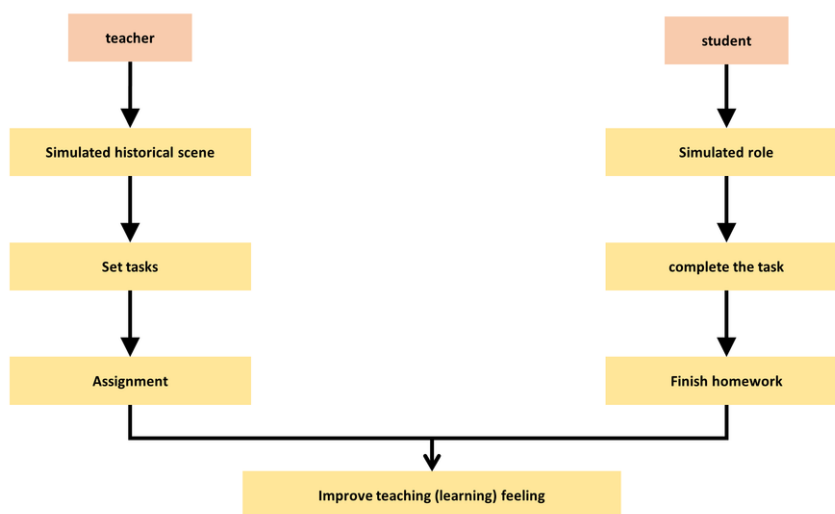
The application of virtual technology in general history and culture courses has increased students' interest in participation and improved the teaching effect. First of all, after constructing the historical scenes required by different chapters, the teacher will design the roles and questions that students need to play and record them in the background according to student answers in the virtual scenes. Teachers reflect on feedback to improve teaching activities. At the same time, based on student performance in the virtual scene, teachers will create a special evaluation record, including learning attitude, task completion, homework completion, learning experience, etc., and gradually form a three-dimensional simulation curriculum evaluation system. From assessment management to truly substantial process assessment, improve student attitudes towards virtual teaching, experience, and serious research. Therefore, the classroom based on virtual simulation technology is deeply loved by students because of its characteristics of reality, experience, and interaction, and it also helps teachers to enrich the classroom. Make all classes unforgettable for teachers and students. The practical effect of virtual technology in history teaching is shown in Figure 5.

According to the above analysis, we can see that the effect of history teaching assisted by virtual reality technology is obviously higher than that of traditional classroom teaching. Based on this, we can draw a conclusion that the use of virtual teaching technology to assist teaching in history class has a good effect and has a significant impact on improving student academic performance, which can promote the optimization of student academic performance to a certain extent.

CONCLUSION

This paper discusses the application of virtual reality technology in history teaching. Starting from the objective requirements of the history curriculum, this paper analyzes the current situation of school history teaching and further understands the feasibility of virtual reality technology application in school history curriculum teaching. Firstly, the VR virtual teaching platform was designed based on the

Figure 5. Practical effect of virtual simulation technology in history teaching



theory of constructivism. Then, 3D modeling software was used to build the human and environment models needed in the design of virtual scenes. After experiencing VR virtual teaching, students found that the classroom based on virtual simulation technology was deeply loved by students and achieved good results with its authenticity, experience, and interactivity.

To sum up, the simulation world of virtual reality can provide strong interaction of multiple senses and bring new experiences to educators and students. The application of virtual reality technology can help improve the teaching design of deep learning. The improvement of the requirements of virtual reality assisted teaching in the teaching environment, the accumulation of teaching software resources, and the inheritance and transformation of the relationship between teachers and students in a virtual environment will be the direction and focus of future research.

DATA AVAILABILITY

The figures and tables used to support the findings of this study are included in the article.

CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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