Discussion on the Value Logic and Application Strategy of Vr Technology in the Medical Education Field in Colleges and Universities

Hongyang Yu, Dongliang Xing, Jiexin Chen, Linli Tian*

The Second Affiliated Hospital, Harbin Medical University, Harbin, 150001, China

*Corresponding Author

Keywords: Virtual reality technology, Medical college, Teaching

Abstract: This article mainly introduces the value logic of the application of virtual reality technology in medical education in colleges and universities, and analyzes the types of virtual reality technology, so as to effectively make up for the shortcomings of the traditional teaching model, make the teaching costs be allocated reasonably, and improve students' independent learning ability. Through the exploitation of the advantages of virtual reality technology, the practice of virtual reality technology is promoted to ensure that virtual reality technology plays a better effect in medical education in colleges and universities.

1. Introduction

At present, virtual reality technology has been widely developed in all walks of life. Medical education is very different from other education. It not only requires teachers to teach theoretical knowledge, but also combines the latest developments to improve students' practical ability. Medical education should provide students with a large number of practical opportunities in combination with existing practical resources and clinical opportunities. Medical teaching content has abstract characteristics, and through the use of virtual reality technology such as virtuality, immersion, and interaction, it provides students with real situations , Visually display the teaching content, enhance the students' subjective initiative, improve the students' perception ability and imagination in medical knowledge learning, students can independently control their own learning rhythm, and improve the effectiveness of teaching.

2. The Value Logic of Vr Technology in Medical Education in Colleges and Universities

2.1 Increase in the Share of Education

Nowadays, virtual reality technology has been widely promoted in many fields, and the share of pre-job training and teaching experiments is gradually increasing.

2.2 Improve the Effect of Practical Teaching

On the basis of learning theoretical knowledge, medical students should also pass a lot of practice. In traditional practice teaching, they should occupy a lot of space and consume a lot of materials. When teachers lead students to practice, they are limited by external factors. Students The practical ability cannot be effectively improved. For example, in surgical training, students will rupture blood vessels due to careless operation or mistakes, and blood will splash on the operator. If the method of human experiment is adopted, it will also cause ethical and moral problems. In order to effectively avoid the damage caused by various restrictive factors and physical experiments, virtual reality technology should be used to enhance the effect of practice. Students can experience the real experimental effect through virtual reality technology and simulate human organs. To improve their practical ability.

2.3 Vr Technology Has Obvious Advantages in Medical College Education

Virtual reality technology can shorten the teaching cycle in medical college education. Medical

  DOI: 10.25236/icembe.2020.016

education requires five years for undergraduates, three years for graduate students, and at least three years for doctoral students. Compared with other occupations, medical students have to spend a long time. If you use virtual reality technology for your study time, you can shorten the course period and improve the efficiency of medical education. Students complete their studies in a shorter period of time, and the school also appropriately reduces human and material costs. Taking cardiovascular surgery as an example, the learning time of anatomy courses is shortened by 80%, and students' knowledge development ability will also be greatly improved. Virtual reality technology can effectively make up for the lack of resources in the school's practical teaching. Due to the constraints of training equipment and venues in practical teaching, many projects cannot be carried out smoothly, resulting in the effectiveness of practical teaching cannot be fully exerted. The use of virtual reality technology, combined with practical training steps to improve program operations, organic combination of electronic components and equipment Together, students complete practical training under various virtual conditions and get a real experience. Students will be more autonomous in future practical training, enhance the perceptual knowledge of medical knowledge, and deepen their understanding of theoretical knowledge. Virtual reality technology provides students with a virtualized environment. Through practical training equipment, students realize the recycling of various types of equipment without any physical consumption, which greatly saves teaching resources and makes up for the traditional teaching environment. Limitations. Medical colleges effectively save resources and costs through virtual reality technology, and realize repeated use in case and scenario design, for example, in the analysis of the same case and clinical performance, simulate different causes and cases, allowing students to propose in a virtual and real environment The solution is that students carry out various practical trainings at a low cost to improve their practical ability, and their professional skills are greatly improved. Medical colleges use virtual reality technology to save a lot of costs, and also improve the effectiveness of teaching. When the training content changes, the data is updated in a timely manner. The school only needs to change the software program to create various real The environment allows students to train in real scenes. Virtual reality technology makes the practice training of students break the limitation of time and space, and shortens the practice cycle. For example, in the cultivation of pathogens, students have to wait a week or even weeks to get the results in traditional training. Research on the law of chromosome genetic inheritance Complex tests are also required, and surgical procedures cannot be synchronized. Through virtual reality technology, students only need to get all the experimental results in one or two lessons. Virtual reality technology provides students with a full range of multi-angle display effects. Students can broaden their horizons and integrate various types of knowledge. Virtual reality technology breaks the limitation of time and space, making traditional teaching a breakthrough and effectively reducing the harm caused by human error.

3. Features and Types of Virtual Reality Technology

3.1 Desktop Virtual Reality

Desktop virtual reality technology uses computer image technology to construct a three-dimensional space model, and displays a three-dimensional three-dimensional drawing model on a two-dimensional plane. Human-computer interaction can be achieved through the operation of a keyboard and a mouse. The desktop virtual reality system is very mature, and the separation of space is realized, and users will not be disturbed by any external environment when using it. In the interaction of the virtual model, it is only through simple selection and rotation operation to provide real operation scenarios for medical students.

3.2 Immersive Virtual Reality

Immersive virtual reality technology mainly uses computer three-dimensional image processing and sensor technology. Students use the above technology to complete various operations in specific input devices. Through the operation of virtual reality gloves and virtual reality handles, various realistic operations are realized. Complete various interactions in the virtual space through

the output device. Through the application of 3D image processing technology, medical students can produce a three-dimensional feeling when wearing a helmet. Through audio processing, students feel the stereo sound at different stages. The virtual gloves make students feel the virtual items in real way. In the use of immersive virtual reality technology, medical students feel a more real experience. Through visual, auditory and tactile simulations of various senses, students can obtain personalized experience in the study of medical knowledge. With the help of virtual reality handles, students can independently complete all practical training operations. Through the position sensor, they can track students' operations in real time, change students' perspectives in time, and acquire and master the gestures of students' hands through virtual reality gloves in time. Student's operation direction. When using the mechanical feedback device, combined with the students applying different forces to feel the shape changes of the object, the immersive virtual reality technology brings the students into a virtual world, and the students seem to interact in the real environment during the virtual surgery operation.

3.3 Augmented Reality Technology

Augmented reality technology is realized in the development of immersive virtual reality technology. Augmented reality technology provides students with a more realistic situation. Students wear helmets and virtual reality gloves and other equipment. Through the combination of virtual and real, interactive and real-time operations are produced. Combined with virtual operations, immersive virtual reality creates a virtual three-dimensional space for students. Students cannot touch the real world. However, using augmented reality technology, students integrate into the real world and interact with virtual objects. Augmented reality technology has good real-time and interactive nature. It integrates reality and virtual world to accurately analyze the real world situation. Students use virtual reality technology to carry out various operations to obtain a real-time experience. Augmented reality technology simulates the real world, ensuring a high degree of unity between virtual objects and real intelligence, and bringing students a real experience through the registration of three-dimensional coordinates.

4. The Value Logic and Application Strategy of Vr Technology in the Field of Medical Education in Colleges and Universities

Medical education has many professional terms, the structure is very complex and has abstract characteristics. Traditional medical teaching uses theoretical and practical methods, and teaching resources are limited. Students only learn through courseware, textbooks, and atlases. The traditional teaching mode has certain limitations, which results in students not fully understanding the abstract knowledge in medicine. Textbooks and atlases can only show knowledge to students in two dimensions, and cannot bring students a three-dimensional effect or real-time interaction. . Using virtual reality technology to effectively overcome the limitations of traditional medical teaching, and provide students with a good learning environment.

4.1 Application of Desktop Virtual Reality Technology

The desktop virtual reality system is of great significance in the teaching of basic medicine and traditional Chinese medicine. In the basic medical teaching, the virtual anatomy of the human body is provided to provide students with virtual software for human anatomy. Through the software, students improve the anatomy of the virtual human body. The limitation of insufficient corpse specimens also enhances the teaching effect of teachers. In an intuitive and flexible way, students carry out various kinds of practice outside the classroom. Desktop virtual reality technology integrates basic medical experiments into it. Through the establishment of simulation software, students can learn more about acupuncture points of traditional Chinese medicine and conduct various degrees of study on the simulation system. These applications provide effective guidance for students’ practice. In the simulation experiment, students realize repeated operations. Through effective guidance, teachers have improved the accuracy and proficiency of student operations and reduced the risk of actual operations.

The desktop virtual reality system is used for teaching in the medical field of colleges and universities, and only one computer is needed to demonstrate the three-dimensional effect, which is convenient for teachers to implement targeted guidance for students. Construct a three-dimensional scene through a three-dimensional and intuitive software method. In the anatomy experiment, students intuitively saw the location and structure of various tissues and organs and the distribution of neurovasculature. Through the movement and segmentation of various organs, they learned about various organs. When the desktop virtual reality technology is implemented, it provides students with multiple perspectives to help students better understand the human body structure, grasp the connections between various organs, and enhance students' memory effects on human body structure nouns. Students carry out repeated exercises after class to improve their practical ability. The development difficulty of the desktop virtual reality system is relatively low, the teaching effect is good, and the teaching cost is effectively saved.

4.2 Application of Immersive Virtual Reality Technology in the Field of Medical Teaching in Colleges and Universities

With the continuous improvement of virtual reality technology hardware equipment and the maturity of computer technology, immersive virtual reality technology is widely used in medical teaching in colleges and universities. In various medical practices, students wear helmets and immersive operations. Effectively prevent all kinds of interference to students from the external environment. Students are fully devoted to virtual operations, using immersive virtual reality technology in neuroanatomy courses. Teachers use software to make hippocampal body models and show them to students through 3d interactive videos. After learning the theoretical foundation, students Immersive virtual reality technology is used in the experimental operation to help students effectively remember the names of various structures. Another example is the application of immersive virtual reality systems in clinical surgery training. Students perform virtual operations in ophthalmic surgery, minimally invasive surgery, and endoscopic surgery. The immersive virtual reality system uses mechanical feedback motion, table and other simulation methods to make the clinical experiment scenarios more realistic. These simulated scenarios are used many times to effectively make up for the limitations in clinical practice. Through image processing technology, students improve the simulation of laparoscopic surgery, improve the basic operations such as surgical suture and cutting. The graphics rendering effect of the system is very good, students can feel more realistic scenes, and the shape of various organs can be grasped in time through the change of direction and size during the operation. Under the guidance of ultrasound, a prostate biopsy simulator is established through simulation software, and students perform real operations through the simulator.

4.3 Application of Augmented Reality Technology in the Field of Medical Education in Colleges and Universities

Augmented reality technology can enable students to interact with the real world, enhance students' perception of the real world, and help students build knowledge systems through virtual objects. Augmented reality technology is used in medical visualization surgery simulation to help students improve their proficiency in surgery. For example, in the simulation of spinal surgery, augmented reality technology is used, and the 3D image is used to display the length of the surgical area and the screw in three dimensions. In the surgical simulation, the fluoroscopy robot software analyzes the patient's condition and combines the patient's ct image to find the location of the screw. Augmented reality technology reduces the learning difficulty of students to a certain extent, helps students establish the concept of the spine, improves the surgical skills of students, and shortens the learning cycle of students. For example, in the simulation of knee replacement surgery, augmented reality technology is used to complete the 3D view through the ct data. Students use the mouse and keyboard to operate the personalized prosthesis during the operation to achieve the precision of the operation.

5. Conclusion

The application of virtual reality technology in the field of medical education in colleges and universities has significantly improved the quality of teaching, and the teaching methods are more abundant. Combined with different virtual reality technologies, they can give full play to their advantages and set different learning difficulties to enable students to conduct in real situations. Various operations to improve students' practical ability. This article analyzes the value logic of virtual reality technology, and expounds the characteristics and types of virtual reality technology, and applies virtual reality technology well in the field of medical education in colleges and universities. With the continuous development of virtual reality technology, it will play a more prominent value in future medical education.

References

[1] Tan Jibin, Luo Jun, Tang Sunru, Chen Zhongquan. Research status and hotspots of virtual reality technology in medical education--Visualization analysis of knowledge graph based on CNKI[J]. Chinese Medical Education Technology, vol. 2, no. 34, pp. 153 -159, 2020.

[2] Hong Yang, Zhu Xinyi, Ji Haining. Application of virtual reality technology in the practice teaching of stomatology in medical colleges and universities[J]. China Educational Technology and Equipment, vol. 2, no. 20, pp. 29-31, 2019.

[3] Sun Mingqi, Guan Haibin. Briefly describe the significance of medical education model based on virtual reality technology in orthopedics teaching practice[J]. Inner Mongolia Education, vol. 12, no. 7, pp. 43-44, 2019.