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Application of Virtual Reality Technology in Human Anatomy Teaching

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ABSTRACT. *This paper expounds the connotation and characteristics of virtual reality technology, introduces the computer software and hardware necessary for the realization of virtual anatomy teaching, and discusses the application advantages of virtual reality technology in human anatomy teaching.*

KEYWORDS: *Virtual reality; Human anatomy; Human morphological structure; Teaching quality*

1. Introduction

The traditional teaching method of human anatomy is based on classroom teaching, combined with wall charts, models, specimens, systems and other auxiliary teaching tools, and with autopsy to deepen students' understanding. At present, the source of human body specimens for teaching in medical colleges and universities in China is scarce and urgent. The lack of specimens seriously affects the improvement of teaching quality. The emergence of virtual reality technology can enable students to carry out anatomical observation and learning on virtual system specimens, alleviate the state of the lack of cadaver specimens, reduce teaching costs, and make up for the lack of teaching conditions.

2. The Connotation and Characteristics of Virtual Reality Technology

Virtual reality technology is a combination of image technology, sensor technology, network technology, computer technology and human-computer conversation technology. It uses computers and other devices to produce a realistic virtual world of three-dimensional vision, touch, smell and other sensory experiences, so that people in the virtual world can have a sense of being in the real world. Through the natural interaction with the virtual world, and the use of people's own perception and cognitive ability to contact things, help inspire people's thinking, so as to obtain all kinds of spatial information and logical information of things in an all-round way. In this environment, learning can maximize the input of a variety of sensory functions, so as to obtain the best learning effect. Virtual reality technology

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has three obvious characteristics: ① immersion refers to the virtual reality system can completely immerse the participants in the environment created by the virtual reality system; ② interaction refers to people can interact with the surrounding objects in the virtual reality environment; ③ imagination refers to the user's manipulation and observation of the objects in the virtual environment. , deepen the understanding of things, so as to inspire new ideas. In short, the fundamental purpose of virtual reality is not only to enable people to simulate and model in multi-dimensional information space, but also to help people acquire knowledge and form new concepts[1].

3. Computer Software and Hardware Necessary for Virtual Anatomy Teaching

The software includes two parts: development platform software, virtual reality projection display software and system application software. In terms of hardware, it is mainly the combination of high-performance computer and peripheral equipment, which is manifested in data storage equipment with larger storage capacity, data central processing equipment, image input and output equipment, human-computer interaction equipment, etc. all components are organically combined to form a coordinated operation system to complete the virtual simulation function[2].

The traditional experimental teaching of human anatomy, mainly through the observation of cadaver specimens to get a conclusion, but the smell of specimens is very stimulating, students know the harm of formaldehyde, generally difficult to accept, there are conflicting emotions, students can take the initiative to observe specimens are fewer and fewer. In addition, in recent years, colleges and universities expand their enrollment, and the supply of cadaver specimens is limited, which leads to the shortage of cadaver specimens. The traditional teaching of human anatomy shows its limitations in many aspects. Such a situation is bound to have an impact on the teaching effect of human anatomy. The course of human anatomy is an important basic course of medical courses, which will affect the training of medical professionals. In order to change this situation, human anatomy teachers are constantly exploring the reform of human anatomy teaching mode, and the emergence of virtual reality technology provides a good opportunity for human anatomy teaching. Virtual reality technology and traditional human anatomy are combined to complement each other and complement each other[3].

The traditional teaching mode of human anatomy should adapt to the development of modern science and technology. At the third session of the Twelfth National People's Congress in 2015, Premier Li Keqiang first proposed the plan of “Internet +” action. The basic connotation of “Internet +” is the “Internet plus traditional industries”. But this is not a simple “1+1”. Instead, it makes use of modern information technology and network platform to make the Internet merge deeply with traditional industries and create new development. The “Internet + education” means using the Internet platform to complement each other with traditional education, making up for the deficiency of traditional education, and bringing new vitality to traditional education. That is to say, from this year on,

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virtual reality labs have appeared in Colleges and universities like stars. The Ministry of education proposes to make use of advanced network and information technology, promote the deep integration of information technology and higher education, innovate personnel training, scientific research organization and social service mode, and promote the overall improvement of education quality[4].

Virtual reality, also known as virtual reality technology or simulation technology, is the technology of imitating another real system with one virtual system. Using computer technology to create a realistic virtual environment, which can be perceived by a variety of senses, such as seeing, listening, touching, etc., and through the interaction between a variety of interactive devices and entities in the virtual environment, interactive visual simulation and information exchange can be produced, which is an advanced digital human-computer interface technology. At present, virtual simulation technology is constantly applied to various fields, and its application in the medical field is also constantly concerned, especially in human anatomy experiment teaching. It has become a trend to use virtual reality technology in human anatomy teaching, which can provide teachers and students with an intuitive, visual, highly simulated and repeatable learning environment, and enrich the teaching mode of anatomy experiment teaching[5].

4. Application Advantages of Virtual Reality Technology in Human Anatomy Teaching

4.1 Make Up for the Lack of Teaching Conditions

In the teaching of anatomy, there are many reasons, such as experimental equipment, experimental animals, cadavers for dissection, funds and so on. Especially in recent years, the enrollment of colleges and universities has increased, but the number of corpses that can make students do experiments by themselves has been decreasing. The application of virtual reality technology can make up for these deficiencies. For example, the anatomical “virtual marker muscle learning software” we made can be used by students for multiple times of repeated operations, can solve the practical problems such as the shortage of cadaver sources, the vulnerability of specimens, and can make up for the defects such as the non repeated use of specimens in teaching[6].

4.2 Stimulate Students' Interest in Learning

In traditional anatomy teaching, static pictures or specimens have always been used to show students. However, the static picture is a two-dimensional expression of the three-dimensional structure of the system organ, and the muscle specimen has no contraction function, which restricts the students' learning and understanding of the human body structure. In the design of “virtual sign muscle learning software”, 58 3D animation files, 32 sound files, 137 animation sequence pictures, 85 2D material files and other materials are connected to form an interactive platform by

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making full use of the interactive function of BB module, creating a learning environment with both sound and shape and rich pictures and texts, making the teaching process more vivid, vivid and interesting, greatly improving Students' perception level, understanding ability and memory ability. In particular, the three-dimensional animation demonstration function provides teachers with the tools of image expression to visualize abstract problems and improve the acceptability of knowledge. The software is used to assist the classroom teaching, enhance the intuitive, visual, interesting teaching, so as to improve students' interest in learning. It solves the boring problem of students' study of human anatomy[7].

4.3 Avoid Harmful Gases in the Laboratory

The traditional anatomy experiment course is combined with the teaching of cadaver specimens. Most of the specimens are fixed and antiseptic by formalin, which has certain carcinogenicity. The corneal, conjunctival and nasal mucosa of the eyes in the laboratory will feel irritation and discomfort. The application of virtual software for learning, do not contact the fixative “formalin”, reduce the harm to human body.

4.4 Improve Learning

The feature of virtual marker muscle is that it can be observed from all angles, and it is a controllable “dynamic display”, which is very helpful to train students' spatial concept. According to the actual needs of anatomy teaching, the software has “exercise” exercises. Students can not only preview and review through the software, but also use “exercise” self-test to test their learning efficiency. The application of the software in students' individual learning can maximize the input of various sensory functions, so as to obtain the best learning effect.

4.5 Construction of Network Anatomy Teaching System

“Virtual mark muscle learning software” can be packaged to generate executable files, which can be made into CD without installation and can be played automatically for students' individualized learning. Especially combined with the multimedia network teaching which is widely used in modern teaching, the software can be linked with excellent courses and network courses to realize self-study, distance teaching, resource sharing and digital human anatomy teaching system[8].

5. Conclusion

As a new type of teaching media, virtual reality technology has attracted great attention in the field of education. With the development of computer technology, the cost of hardware and software of virtual reality is gradually reduced. This new teaching media will be widely used in education and teaching, and eventually play

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an important role in the field of modern education. Especially in the field of medical education has a very broad prospect.

References

[1] Wang Qihao (2018). Research on the application of "virtual courseware" in the teaching of sports anatomy. Jilin: Yanbian University.
[2] Liang Keyuan (2015). Research on the application of 3D reconstruction model in human anatomy teaching. Henan: Henan University of science and technology.
[3] Ma qiongjie (2016). Construction of high-precision coronal section image data set of human head. Henan: Zhengzhou University.
[4] Li Xiaolong (2014). Design and implementation of virtual human anatomy teaching system based on Kinect gesture recognition. Beijing: Beijing University of technology.
[5] Wang Peng (2014). 3D model construction of pineal region and radiotherapy of pineal region tumor. Chongqing: the Third Military Medical University.
[6] Yang Yinong, Xiang Changhe, Rao libing, et al (2018). Building a virtual human body science museum using virtual reality technology. Journal of anatomy, vol.41, no.4, pp.488-489.
[7] Wang manna, Jia Xinyun, Yang Yanping, et al (2012). Research and application of digital medicine technology in human anatomy teaching. China Digital Medicine, vol.7, no.12, pp.6-8.
[8] Hou Zhenjiang, Wang Fengling, Li Hongyan (2014). Application value of virtual reality technology in medical education. Chinese medical equipment, vol.11, no.8, pp.70-72.