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Application of Medical Morphology Virtual Simulation Experiment Teaching Platform

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Abstract:
Virtual simulation technology breaks the shortcomings of traditional experimental teaching and it is widely used in morphological experiments. It is a new and efficient teaching method. This paper discusses the current situation and shortcomings of virtual simulation experimental teaching platform in medical college.

1. Introduction

Virtual Reality (VR) is a new technology developed based on computer technology. It refers to the use of multimedia technology combined with simulation technology to create a Virtual simulation world integrating vision, hearing, touch and smell, so that users can feel as if they are on the scene. Technology that allows users to naturally feel and interact with objects in virtual space [1].

Medicine is a highly practical subject, and experiment is an important link of medical education. As a medical student, precise and rigorous operation ability and complete clinical skills are the guarantee for him to become a qualified doctor. Through medical experiment and clinical practice, enhancing students' practical ability is the only way to make students' theoretical knowledge finally get application. The United States is one of the countries that introduced virtual simulation technology into the classroom earlier. As a new subject, the application of virtual simulation in the medical field has attracted much attention.

The national education informatization strategy has positioned education informatization as "the profound revolution of reforming education concept and mode", which involves various fields, especially basic medicine, clinical medicine, Traditional Chinese medicine and medical distance education in the field of medical education. Virtual simulation experimental teaching has always been a research hotspot [2]. This paper discusses the present situation and deficiency of morphology virtual simulation experiment teaching platform in medical specialty education.

2. Virtual Anatomy

The most significant application of virtual anatomy is the virtual human body. The Institute of Medical Mathematics and Computer uses artificial intelligence technology to make virtual human. The most obvious application of virtual anatomy is the virtual human body. Virtual human body refers to the digital virtual human body through computer processing of human morphology, biology, physics and other information, which can replace the real human body for experimental research [3]. It is through the visualization and digitization of the structure and function of the human body from micro to macro, and then completely describe the form and function of genes, cells, proteins, organs and tissues, and finally achieve accurate simulation of human information. The United States was the first country to start researching virtual bodies. Learners can perform coronal and sagittal dissection of the visible person on a computer screen, and zoom in and out of local images. This is of great significance for the teaching of anatomy. The 3d anatomical visualization research virtual human atlas is carried out by the Institute of Medical Mathematics and Computer of University of Hamburg, Germany. The spatial model is established by using CT and MRT cross section images or histological sections of subjects, and artificial intelligence technology is used to fill the spatial model with knowledge of various parts of the human body in different fields. Learners can operate freely in three-dimensional human space and corresponding text data. In the mid-1990s, experiments with virtual frog dissections began making the rounds on the Internet. In this virtual experiment, the operator can dissect the frog by hand on the computer, and can even pick up the layers of tissue of the simulated scalpel to peel off the frog to observe its muscles, blood vessels, organs and other tissues. It is almost the same as the real anatomy experiment. The viewer can also adjust the observation Angle and zoom in the image at will. After the experiment, operators can communicate on the Internet, express their opinions and suggestions.

3. Surgery Teaching

Virtual surgery teaching system is the most significant application of virtual simulation technology in clinical medicine teaching. The Pre-surgery Planning System at Clemson University in the US uses virtual simulation technology, which not only shows a THREE-DIMENSIONAL image of the patient, but also allows doctors to perform a virtual simulation of the operation beforehand, so that precise surgical plans can be made before surgery. Surgery teaching is the key and difficult content of medical education, because it needs not only theoretical teaching but also clinical practice Practice. The clinical practice of surgery is mainly performed on animals or humans, so it requires great care and precision Force feedback and rich clinical experience, if the lack of practical surgical training will increase the rate of surgical error. Virtual reality Technology addresses the challenge of clinical practice by simulating and replicating real-life surgical scenarios or procedures and allowing learners to learn [4]. Continuous repeated training, but also reduce expensive animal experiments, saving educational resources. The virtual surgical system has zero Risk, repeatable operation, saving educational resources and other advantages, experimenters can use it to complete cutting, hemostasis, separation, disease. Every step from stove treatment to suture can also be timely analyzed and evaluated for every step and result of simulation process. Corrected the errors in the operation and experienced the various emergent actual situations in the clinical operation, accumulated clinical skills and practice Check.

At present, there are many examples of successful application of virtual surgical system into medical teaching. A computer has been developed in Tsinghua University Assisted stereotactic neurosurgery system, which first uses brain scans to reconstruct and map the patient. The three-dimensional tissue structure of the brain can provide reference for doctors to adjust and determine surgical planning. Xiamen University launched the "liver virtual hand Surgical system" helps doctors to establish the most accurate surgical plan, and learners can simulate the process of liver surgery and accumulate practical results Practice experience; Virtual knee arthroscopic surgery simulation by computer School of National University of Defense Technology and PLA General Hospital The system has been successfully put into use, learners or doctors can hold a simulated scalpel, by observing the computer screen, there The knee arthroscopic surgery can be completed in a perfect way, and the process of puncture and holding free matter is lifelike, just like being on the scene.

4. Stomatological Education

Virtual simulation technology has been preliminarily tried and applied in stomatological education in China. Some well-known colleges and universities in China have gradually adopted virtual simulation technology to achieve specific teaching functions in the teaching process of various professional courses, improving or replacing the traditional teaching methods. The teaching effect has been recognized and praised by teachers and students, and the teaching quality has been improved. At present, the virtual simulation experimental teaching center of West China Oral Experiment Teaching Center includes digital 3D virtual oral anatomy practice platform, Moog digital virtual oral skill training system and oral medicine robot training machine, etc. The virtual simulation experimental teaching center can realize the teaching functions that traditional experiments do not have or are difficult to complete. To provide reliable, safe and economical experimental programs for medical personnel training in situations involving high-risk or extreme environments, inaccessible or irreversible operations, and high cost, high consumption, large or comprehensive training.

5. TCM Clinical Teaching Practice

Acupuncture and moxibustion is an important aspect of TCM clinical teaching practice Select the best acupuncture point and determine the best stimulation method, the most appropriate amount of stimulation, so as to obtain the most effective acupuncture treatment effect. However, the acupuncture points, stimulation and effects involved in acupuncture research are in a complex dynamic relationship, except with the receiving needle Besides the state of the prick and the technical ability of the acupuncturist, they are also affected by the regional structure of acupoints and the feeling of receiving stimulation. The study and research of acupuncture and moxibustion are complicated by the diversity of devices and individual differences. Virtual reality technology uses real human body data set and information technology to build digital human body computer model, providing image and real model for acupuncture research and teaching. Under the guidance of the teacher, learners can simulate the virtual learning environment. Out of a variety of clinical diseases of the virtual human body for diagnosis and treatment, personal experience collection of data, four diagnosis, disease diagnosis, formulation.The principles of acupuncture and moxibustion treatment, combined with the complete and standardized prescription of the diagnosis and treatment process, enable learners to master the clinical way of

thinking and acupuncture about the law. In this way, the knowledge learned by learners is no longer separated from each other, avoiding knowledge in the learning process.Individual isolated, mechanical memory [5]. From etiology and pathogenesis, symptoms and signs, diagnosis and syndrome differentiation to acupuncture point selection, a coherent thinking process enables learners to integrate theory and practice into one furnace, forming a benign process from theory to practice and feedback to theory. To promote their "assimilation" and "adaptation" to their own knowledge structure.

6. Shortage

As a bridge subject, pathology plays an irreplaceable role in training medical students' practical ability, innovative ability, problem-solving ability and rigorous working style. In this process, experimental teaching of pathology and morphology plays an important role. The educational system of medical specialty education is 3 years with limited hours. Students generally reflect that the course is difficult to learn and the teaching effect is poor. Second, students' basic medical knowledge is weak. The basic cultural knowledge, understanding ability and learning ability of junior college students are weak compared with those of undergraduate students. Third, the traditional teaching methods lack effective motivation, can not mobilize students' initiative, and the training of their clinical thinking ability is limited. The traditional mode of medical teaching has been far behind the speed of knowledge updating, which seriously affects the effect of medical education. The development of computer technology, especially the application of virtual simulation technology, will have a great impact on the traditional medical teaching model [6]. With the constant extension and popularization of education informatization, the virtual experiment system can timely dynamic community, and the latest development of clinical and improve the efficiency of the experiment teaching quality and alleviate the pressure of the experimental teaching, is the current effective alternative and necessary supplement of the university experimental teaching resources, is to realize the optimization of teaching resources configuration and cultivate students' autonomous learning an important way for liberalisation, it is also one of the important development directions of experimental teaching reform and strengthening laboratory construction in many universities [7].

7. Conclusions

To sum up, medical virtual simulation education is beneficial for students to obtain more effective learning in a short time. However, currently undergraduate medical education is mostly concentrated. Due to the platform resources, students' quality and learning hours, specialty medical students have their own characteristics. It is of great significance to construct a distinctive and bright virtual simulation experiment teaching platform and its application in medical specialty education.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Author Contributions

Conceptualization: H.J.H.; F.X.H.; Investigation: T.L.; F.X.H.; Writing – original draft preparation: H.J.H.; H.Z.B.; Writing – review and editing: H.X.J.; H.Z.B

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