Research on the Application of Computer Virtual Simulation Teaching Platform in the Training of Medical Examiners

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Abstract. With the rapid development of computer and network technology, and education are also profound changes, medical test of an experimental subject, its theory is based on medical experiments, the experiment is also a medical students learning and deepen to master the important way of medical knowledge, but the world development trend of the animal protection consciousness makes the students experiment animals in less and less, the inevitable need to replace another kind of means, the virtual simulation teaching platform in medical inspection personnel training will play a more and more important role. Based on this, this paper discusses the application of computer virtual simulation teaching platform in medical laboratory personnel training.

Keywords: Computer Simulation, Teaching Platform, Medical Examination, Talent Training, Application

1. Introduction

Along with the rapid development of Internet virtual reality technology and popularization, to medical test teaching of training the dramatic effect, expanded the larger world for medical faculty teaching, virtual simulation experiment teaching in medical colleges also hot, and major medical colleges spent a lot of work in the virtual simulation experiment teaching, in order to popularize the technology applied in the teaching, hoping to get better effect of teaching evaluation, countries also support and encourage the technology promotion and application in medical teaching, to improve the quality of medical teaching, train more medical talents for the society, for the country's medical career. Use Internet teaching technology to change or improve the whole society medical teachers teaching quality and medical students learning quality. Medical interactive 3 d simulation software from the medical college students learning, assessment and training of professional analysis design medical virtual laboratory experiment, students' learning dimensions, course system, teachers' teaching methods and skills to take multiple means (Internet information technology, medical simulation experiment teaching and
laboratory Settings, teachers and students cultivate) for high quality teaching auxiliary function between teachers and students.

2. Development implementation and operating environment

Virtual simulation teaching system is based on graphics workstation for mathematical calculation and system operation, Using 3 DMAX. ViVO of small panoramic photography, flash animation design, Adopt B/s architecture, running on the Windows 2008Server. Unity3D is a powerful (1) MAX integrated game engine and editor developed by American Unity Technologies, It can quickly and efficiently create objects and guide external resources through simple user interfaces, And through the simple drag and drop action to achieve the variable assignment, Connect scripts and other operations. The new version of the Unity4.0 engine will be able to release software Windows MAC(s)x. 10 platforms, including Android IOS, Its operating environment is simple, intuitive, And friendly. The user base is increasingly widespread.

3. Construction content

Figure 1. Construction content

3.1. Virtual Laboratory System

Virtual clinical teaching laboratory is divided into roaming version, learning version and examination version, and the operation mode of web page and CD is realized by WEB service protocol. 3D virtual clinical laboratory roaming version mainly includes laboratory layout, rules and regulations, operational matters needing attention, as well as the introduction of instrument structure and function, so that students can understand the basic situation of laboratory biosafety and so on. The learning version is the specific application of virtual laboratory system in the practical teaching of medical laboratory. It can be used to learn and understand the relevant knowledge of various inspection instruments and equipment, including instrument overview, instrument structure and testing principle, boot, shutdown, quality control, calibration, sample detection, reagent replacement, maintenance, alarm processing and case analysis. The examination version assesses the students' virtual experiment operation through slide animation, sound loading, model rendering and so on, and finally achieves the goal of mastering (Fig.1 and 2). Furthermore, in 3 D virtual clinical laboratory, with the help of the characteristics of accurate reality, strong visualization effect and high degree of information integration of two-dimensional animation technology, the author also set up some virtual experimental projects to show the basic experimental principles and basic skills operation process of medical laboratory specialty. For example, using Flash and other techniques to make microbial inoculation technology, Gram staining technology,
clinical immunology test enzyme linked immunosorbent assay, electrochemical spectrophotometry and so on.

3.2. Virtual laboratories and other resource integration

VR virtual clinical laboratory is suitable to show the real scene of the laboratory, the details of the instrument. However, there is also a very important other hand is the browsing and learning of relevant knowledge points, as well as a lot of fine operation of the instrument, such as the maintenance of the instrument, the preparation and mixing of sample reagents, and so on, which are not suitable for 0-dimensional technology. Therefore, the author combines the virtual simulation system with the subject website and the video resource base to form the virtual simulation experiment teaching center to realize the teaching purpose together.

The virtual simulation system has integrated 1 professional community website (Southern Laboratory Medicine Network), 2 national quality resource sharing course websites (medical parasites and biochemistry), 3 provincial quality resource sharing course websites (experimental diagnostics, clinical immunology testing and clinical testing basis), 3 school level quality course websites, 4 special topic learning websites and many other websites. The atlas learning system of online learning website includes clinical blood cell morphology map 5 More than 3,000 morphological maps of body fluids and 1 atlas of medical parasites More than 1,000. There are more than 50000 professional questions in the existing online professional question bank. Besides, Using the strength of laboratory interns to build video interest groups, Quickly accumulate a batch of professional video for virtual simulation system call. In 2009, the Medical Laboratory Technology Virtual Simulation Experimental Teaching Center of the Department of Medical Laboratory of Southern Medical University applied to obtain the National Key Audiovisual Publishing Plan of the Eleventh Five-Year Plan, Combined with the basic operational skills and relevant theoretical knowledge needed in the practical work of clinical examination, Compile a series of audio-visual teaching materials a total of 4.

4. Teaching features and innovations

The virtual experimental teaching system can assist the traditional experimental teaching, as an important supplement to the existing laboratory functions, it has multi-perception, immersion, interaction and conception. These are shown in figure II below:

![Figure 2. Supplementary Role of Virtual Experimental Teaching System](image-url)
4.1. Scientific and systematic

In accordance with the law of medical science for medical students, this paper expounds all aspects of technology from various disciplines of clinical laboratory medicine, based on the basis of cases. The combination mode of clinical practice breaks the conventional discipline boundary, integrates the long-span discipline, and constructs a complete knowledge system.

4.2. Advanced technology, with the times

With the cooperation of software and network enterprises, the latest scientific research results of 3 D roaming are integrated, which is in line with the international popular problem learning (problem-based learning),PBL case learning (case-based learning,CBL) and resource learning (resources-based learning,RBL) teaching. And with the international medical education.

4.3. Increase interest, connect with practice, contact with clinic as early as possible

Taking the case as the bridge, take the teaching material as the control, through the practice, explains the case, enhances the study interest, contacts the clinic as soon as possible, causes the student to firmly establish the clinical thought which uses the study to use.

4.4. Popular science education

Can be used as online science resources, so that the benefit of the population leapfrog expansion.

4.5. Application of Scientific Research in Teaching

Make full use of the latest scientific research achievements of medical laboratory specialty to serve experimental teaching. For example, scientific research laboratories have developed various new biosensing technologies that can be used as new technologies for clinical rapid testing, which are demonstrated and explained through virtual laboratory platforms. To provide digital platform and visualization means for undergraduate innovative experimental teaching and graduate research technology training.

5. Teaching efficiency

After the initial success of the research and development of the virtual clinical laboratory, the author uses the virtual laboratory for pre-job training. Students can enter the real laboratory scene, understand the laboratory layout, rules and regulations, operation matters needing attention, and face the virtual realistic 3 instruments. Keyboard operation is used to learn the related knowledge of blood cell analysis pipeline, large automatic biochemical instrument, including instrument overview, instrument structure and testing principle, boot, shutdown, quality control, calibration, sample detection, reagent replacement, maintenance, alarm processing and case analysis. Relying on the virtual experimental teaching system, the related teaching results of reforming the practical teaching of medical laboratory have also won the first prize of the seventh teaching achievement of Guangdong Province in 2014, and have won two national software copyrights.

6. Conclusion
According to IDC forecast, the average growth rate of domestic AR/VR industry in the next 5 years (2020-2024) can reach 47.1%, which basically indicates that the domestic market will continue to maintain the AR/VR industry "the world's first large-scale". VR brings opportunities, motivation and challenges to the development and reform of medical laboratory education and personnel training. It has a far-reaching influence on the improvement of educational technology level, the improvement of teaching and experimental training environment, the optimization of teaching process, the improvement of teaching efficiency, the saving of teaching cost, and the acceleration of the training of modern medical professional and technical personnel. With the rapid development of science and technology, VR, as a technical means in the new era, has blossomed in teaching applications and effectively solved many problems in actual teaching. At present, there have been many virtual simulation training systems on the market. Nursing is an applied technical subject, which not only requires students to master theoretical knowledge, but also puts forward high requirements for students' operation and practical ability. Through VR, Fantasy Technology has developed medical virtual simulation training software to help medical students conduct systematic and professional training and explore a new mode of education and teaching in the future.

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