

Thinking on Developing "Comprehensive Design Experiment of Medicine" Course by Virtual Simulation Experiment Technology

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Abstract. To summarize the problems existing in the application of virtual simulation experiment technology in "comprehensive design experiment of medicine" and give specific improvement measures, so as to promote the reform and development of the medical cause. By reviewing the problems that still exist in the project, teachers and students in the application of virtual simulation technology in the course of "comprehensive design experiment of medicine" in our school, and combining with the guiding ideology of the ministry of education as well as the latest progress of virtual simulation teaching, reasonable and feasible suggestions were put forward to solve the existing problems. it is urgent to improve the problems of project development, teachers' time consuming and students' ability when virtual simulation technology is applied to "medical comprehensive design experiment". The work improves the problems existing in the application of virtual simulation technology to the comprehensive design experiment of medicine by universities, which is helpful to provide new methods and means for training innovative talents, improving the quality of medical education and promoting the progress of medical education.

1. Introduction

Virtual simulation experiment technology is based on virtual reality, multimedia, human-computer interaction, database, network communication and other technologies. By constructing realistic experimental operating environments and experimental objects, students can carry out efficient, safe and economical experiments in an open, autonomous and interactive virtual environment, thus achieving teaching effects that real experiments do not have or are difficult to achieve[1]. Nowadays, with the deep integration of "education+technology", virtual simulation experiment technology is increasingly applied to the teaching field in order to better achieve the teaching purpose. Since 2017, our school has introduced virtual simulation experimental technology into the "Medical Comprehensive Design Experiment" and achieved good teaching effects. The teachers' teaching enthusiasm and students' learning enthusiasm have been greatly improved, but there are also more and more problems during its development process. How to improve or solve these problems so as to better improve the teaching quality is the top priority of our school's teaching reform at present.

2. Application of Virtual Simulation Experiment Technology

"Comprehensive Design Experiments in Medicine" is an experimental course that requires students to integrate the theoretical knowledge of Chinese and Western medicine and modern experimental technology under the guidance of teachers, and independently carry out research including topic selection, topic design, research preparation, experimental implementation, data analysis, writing of experimental reports, and reporting of research results [2]. Experimental design and experimental content are important components of this course, and the rich diversity of students in the process of independently designing experimental content determines the variety of required

technologies. Therefore, it is essential to construct an experimental teaching platform for "Comprehensive Design Experiments in Medicine" by using virtual simulation technology. The virtual simulation experimental teaching platform includes three processes: establishing a medical comprehensive platform and material library, developing a virtual simulation experimental process design, and carrying out the feedback of learning effects and interactive communication between teachers and students. Among them, the medical platform and material library include two major sections: lecture notes on experimental contents and virtual operating system, which integrate the documents, technical data and data needed for the experiment. Before the experiment is carried out, students can log into the system to preview the experimental process, get familiar with the theoretical basis and operating contents, so as to meet the needs of experimental teaching to the greatest extent and achieve the purpose of experimental teaching. The process design of the virtual simulation experiment is a formal exercise of the whole experiment process, which includes seven links: topic design, experiment scheme design, consumables declaration, pre-experiment, formal experiment, writing of conclusion report, and report and defense. Only the students who pass the examination in the previous link are eligible to enter the next link. This link-type entry method is helpful for the teachers to clearly understand the quality of each experiment process, and at the same time, it also trains the students' ability to solve problems independently and cooperate with the team. After the completion of the whole experiment, students can log into the system to feedback the learning effect and interact with the teachers. They can ask questions and leave messages for the doubts existing in the experiment. The teachers can reply and discuss the questions as soon as they see them. At the same time, the teachers can also use the interactive system to supervise and assess the students' normal learning situation, breaking through the limitations of traditional fixed time and fixed place and improving the teachers' guidance efficiency to a great extent.

3. Limitations of Virtual Simulation Experiment Technology

Since the state started the construction of the virtual simulation experiment teaching center in 2013, more than 300 national-level virtual simulation experiment teaching centers have been established in succession throughout the country [3]. Our school also constructed a unique simulation experiment teaching platform for "Comprehensive Design Experiments in Medicine" in 2017 using virtual simulation experiment technology. However, various problems have gradually emerged in the application process. There is no doubt that this will greatly slow down the improvement of medical education and teaching quality in our school and hinder the progress of education development. In view of the fact, this article summarizes the problems and difficulties highlighted in the application of virtual simulation experiment technology in the development process of "Medical Comprehensive Design Experiment".

3.1. High difficulty in technological research and development

The development and construction of medical virtual simulation experiment teaching projects require a combination of rich medical knowledge and experimental software operating systems. The basic medical knowledge and experimental operations used by students in the process of selecting topics are rich and varied. To develop these specific virtual experiment processes requires not only a long process but also exquisite skills and flexibility. Therefore, it also determines that it is very difficult to develop and construct virtual teaching projects.

3.2. Teachers Spend Much Time

In the process of virtual simulation experiment teaching, the uncertainty of students' self-determination of experiment topics determines that teachers need to have a basic grasp of general knowledge in order to better guide students to operate and learn. In addition, teachers also need to log in to the operating system from time to time at work or in their spare time to timely reply to students' questions and supervise and assess students' learning, which also virtually increases teachers' working time and intensity.

3.3. Students' Ability Requirement is High

Virtual simulation experiment teaching requires students to be familiar with and master the required theoretical knowledge before starting the experiment, rehearse the experiment process in

advance, consult and solve the problems encountered in the experiment process by themselves, and the examination contents include experiment operation, paper writing, report and defense, etc. It not only requires students to have a higher experimental level but also requires students to have strong autonomous learning ability, which also increases students' learning tasks and learning pressure to a certain extent.

4. Improvement of Virtual Simulation Experiment Technology

"Scientific planning, sharing resources, highlighting key points, improving efficiency and sustainable development" are the guiding ideology requirements of the Ministry of Education for the construction of virtual simulation experiment teaching centers in colleges and universities. The construction of virtual simulation experiment teaching center should take improving students' practical ability and innovative spirit as the aim, sharing high-quality experimental teaching resources as the core, and building information-based experimental teaching resources as the focus to promote the informatization construction and reform and innovation of experimental teaching in colleges and universities [4]. Therefore, in order to promote the sustainable development of virtual simulation experimental projects and greatly improve the quality of medical teaching, it is necessary to improve and solve the existing problems.

4.1. Universities Increase Support

The construction and completion of the medical virtual simulation experiment platform is the first step to improve the teaching content of the medical virtual simulation experiment. Colleges and universities should increase the funding for the virtual simulation experiment teaching project, and attract young people with knowledge, ability and motivation from colleges and universities to join the platform construction through the vigorous publicity of policy documents, so as to inject fresh blood into the platform construction. At the same time, colleges and universities should actively seek and effectively utilize social resources. Colleges and universities are the cultural carriers of knowledge dissemination and have advantages in professional theory. Enterprises are the practical carriers of developing virtual simulation projects and providing virtual simulation technical services and have advantages in the realization of experimental technical means. Therefore, colleges and universities should combine their professional knowledge guidance with the technological research and development practice of enterprises to achieve a win-win situation^[3]. At the same time, the construction of the medical virtual simulation platform is not achieved overnight, but a process that needs to be continuously improved and updated, which determines that colleges and universities need to continuously invest their funds. In the process of scientific research expenditure and reimbursement, green channels should be opened in due course to reduce unnecessarily complicated procedures and ensure that professional teachers and development teams have no worries.

4.2. Teachers Reasonable Planning of Teaching Time

As one of the subjects in the project teaching process, teachers play an irreplaceable role in the virtual simulation experiment teaching process. Different from the traditional teaching curriculum arrangement, virtual simulation experiment teaching has no fixed time and place restrictions, but requires teachers to log in to the teaching system from time to time to answer various questions and suggestions raised by students in a timely manner. At the same time, the virtual simulation experiment platform system covers a wide range of professional knowledge, so teachers need to know all kinds of professional knowledge before, during and after the experiment if they want to have clear control of the students' experiment content and process. Therefore, this also requires teachers to continuously enrich their own mastery of relevant professional knowledge of various disciplines. From these two aspects, teachers not only increase the working hours but also broaden the working depth to a certain extent. Therefore, teachers should improve their adaptability both physically and psychologically, adapt to the impact of this "professional and fragmented" teaching method on traditional daily work and life, reasonably arrange their teaching time, and avoid compressing or affecting other work or life arrangements as much as possible while completing the project teaching task efficiently.

4.3. Students Improve Self-study and Self-discipline Ability

The virtual simulation experiment teaching project has higher requirements for students. The project-based teaching experiment platform only provides students with the specified experimental steps and experimental options, and most of the rest work requires students to complete independently. For example, first of all, students are required to consult a large number of relevant documents and independently determine the topics of this group before starting the experiment, design the relevant experimental contents and procedures, and rehearse the experimental procedures before the formal experiment, find out the problems in the process and propose their own solutions, and write the final report and make a report and reply after the experiment is finished. During the whole process, students are required to implement independently, which also requires students to continuously improve their self-study and self-discipline ability and reasonably arrange the learning time to complete the learning tasks while continuously enriching and perfecting their own knowledge reserve. At the same time, the "Comprehensive Design Experiment of Medicine" is divided into group teaching. The knowledge level and individual ability of the group members are different, but the experiment needs the cooperation of the whole team. Therefore, it also requires the coordination and cooperation ability of each group member, and the maximum exertion of individual ability and collective wisdom can play the role of "all gather firewood and blaze high".

4.4. Establishing an effective evaluation and feedback system

Effective evaluation and timely feedback from users are the driving force and direction for the development of the virtual simulation experiment platform. Users' quality evaluation of the used resources can effectively test the used resources, at the same time, it is also conducive to the perfection and improvement of resources, and is the most effective way to improve the teaching quality and achieve the purpose of experimental teaching. During the construction of the virtual simulation experiment platform, it is also necessary to set up a special evaluation and feedback system to continuously collect the opinions and suggestions of teachers and students, and at the same time to integrate the collected suggestions, update their professional knowledge content, experiment items, experiment steps and feedback in time according to the suggestions.

5. Conclusion

Nowadays, the virtual simulation experiment teaching mode has become a new experimental teaching mode with rapid and vigorous development. The construction and development of the experimental teaching platform are of great significance for promoting the reform of experiment and practice teaching, improving the shortcomings of traditional experiments and improving the teaching quality [5]. With the development of computer science and technology and the improvement of the level of medical education, continuous improvement and construction of the "Comprehensive Design Course for Medicine" system will inject vitality and vigor into the sustainable development of virtual simulation experiment teaching. The continuous improvement and enrichment of the content of virtual simulation experiment will bring about continuous improvement of the teaching level of medical experiment, make up for the teaching function that cannot be completed by traditional experiment, provide advanced and efficient experimental platform for medical students to study before entering clinical operation, exercise and improve the innovation and practice ability of medical students, and promote the continuous reform and development of medical education.

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