

Analysis on the Construction of Internet-based Chemical Virtual Experiment Teaching Mode

Zhun Guo, Yuzhen Zhao*, Yang Zhao, Yongming Zhang, Cheng Ma

Xi'an Key Laboratory of Advanced Photo-electronics Materials and Energy Conversion Device, School of Sciences, Xijing University, Xi'an 710123, Shaanxi, China. E-mail: zyz19870226@163.com

Abstract : Virtual experiments rely on multiple technologies such as computers and virtual simulations to create simulation environments and objects, and implement experimental operations on computers. With the help of the Internet, it can break through the limitations of time and space, make up for the problems of traditional experimental teaching, and adapt to the needs of new curriculum reforms. Based on this, this article analyzes the important role and existing problems of Internet-based chemical virtual experiment teaching, and puts forward the construction method of virtual experiment teaching mode for reference.

Keywords : Internet; Chemistry; Virtual Experiment; Teaching Mode; Construction

Compared with other disciplines, chemistry is more difficult and practical, and the acquisition of knowledge needs to be verified by chemical experiments. However, some micro-knowledge or relatively abstract concepts involved in chemistry cannot be demonstrated through macro-chemistry classes or experiments. Simply put, simply relying on ordinary experiments in imagination is unable to deeply understand the connotation and connotation of chemical knowledge. In addition, some chemical experiments are inherently dangerous, energy-consuming, and limited by factors such as insufficient experimental resources in schools, making it difficult for chemical experiments to exert a good effect. Therefore, in the Internet environment, it is necessary to use training experimental teaching mode to improve the effectiveness of experimental teaching.

1. The important role of Internet-based chemical virtual experiment teaching

Nowadays, many colleges and universities have relatively few teaching hours for experimental courses and are restricted by various conditions such as laboratories. They cannot meet the needs of experimental teaching to the greatest extent. Usually, they are simply conducted experimental teaching or completed in manufacturing enterprises. Although, as colleges and universities pay more and more attention to the practical ability of students' training and practice, students' experimental training hours have also increased. However, because of the increase in the responsibilities that enterprises have to bear, the ability to accept students to participate in the practical training and practice of enterprises also increases. It is reduced. At the same time, the experimental teaching center set up by the school is also faced with the problems of inability to experiment in the experimental process, large cost input, and high risk factor. In addition, in traditional experimental teaching, the teacher's explanation of experimental principles is usually written decomposition teaching, and the application of experimental equipment is limited to the observation of the external structure or the simple description of the operation process, and the quality of teaching is difficult to improve. The application of virtual simulation technology can put students in a simulation environment, which can effectively stimulate students' learning motivation, activate students' thinking, allow students to intuitively feel the process of the experiment, and show the whole process of the experiment to the students. For example, in the teaching of chemical experiments, students do not understand some chemical formulas, principles and phenomena, but after using virtual technology, they can reflect the chemical phenomena. Using this technology can arouse the enthusiasm of students to participate in knowledge learning, allowing students to have a clearer

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understanding of experimental principles, equipment and structure under visual impact while learning relevant knowledge.

2. Current problems facing the teaching of chemical experiment courses

At present, the teaching of chemistry experiment courses in colleges and universities faces the following problems: First, the teaching problems of teachers. At present, some teachers generally use traditional experimental teaching methods in teaching chemistry experiments, and only talk about the experimental process, and will not talk too much about the problems in the experiment. There are also some teachers who are not able to use modern technical means to implement teaching, and they are not able to effectively carry out chemistry training experiment courses, which leads to low interest of students. Even if they are conducting experiments, there are still some students who cannot understand the experimental problems or cannot completely master the experimental operation without going. Second, the problem of teaching conditions. Although most schools have specialized computer teachers, they are restricted by various factors such as economics and cannot update computer equipment in time, and the computer performance is not high. Even if some teachers can use computers to carry out virtual chemistry experiments, the performance level of related equipment such as computers is not very high, and they cannot meet the requirements of virtual chemistry experiment teaching. In addition, the development of virtual chemistry experiments is inseparable from a virtual simulation platform, and some schools do not have a virtual simulation platform that meets the requirements, or even none, which restricts the development of virtual simulation experiments. Thirdly, there are problems in laboratory related system and supervision system. The level of laboratory construction will directly affect the competitive advantage of universities. Whether the supervision mechanism of university laboratories is scientific or not, and the level of management, etc., will have an impact on teachers or technicians carrying out chemical virtual experiments. Because the current chemistry experiment teaching has not yet claimed to be a system, the experiment teaching has been stagnant. The ability and quality of experiment teachers vary. Some colleges and universities feel that the supervision of laboratories is mainly to keep and store all kinds of equipment. This is the work of equipment management personnel and has little to do with them. Although some colleges and universities have also targeted a series of institutional systems for the laboratory, the practicality is not high.

3. Internet-based chemistry virtual experiment teaching mode construction method

3.1 Construction of virtual simulation experiment teaching resources

This article takes a chemical virtual simulation laboratory of a university as an example. This laboratory integrates experimental teaching resources and sets up several major modules of chemical experiment and safety, basic chemical experiment, chemical engineering and chemical simulation experiment teaching. In the actual teaching process, the teacher shows the multimedia material library to the students, and reduces the difficulty and pressure of the students' learning with the help of real and intuitive simulation diagrams. In the laboratory virtual platform, students can simulate experiments, do a good job of data analysis, and get experimental results. During this period, teachers can set or modify student experiment content, set assessment content, or record experimental results on the teacher control platform. In the chemical experiment and safety module, we should focus on strengthening the education of students' experiment safety. Because in the usual experimental teaching, there is very little content about experimental safety, and there is a lack of a safety assessment system. Therefore, in the simulation experiment teaching, it is necessary to strengthen students' safety awareness and improve their ability to prevent accidents. In the basic chemistry experiment module, it is necessary to reflect the internal structure of the instrument and equipment, the operating principle and how to design the experiment. Students have a comprehensive understanding of the experimental principles and procedures through human-computer interaction, and then participate in the simulation experiment. Enhancing the enthusiasm of students to participate in experimental activities. In the chemical simulation experiment teaching, students can be organized to carry out chemical engineering principle unit simulation experiments, and various equipment structures such as valves can be visually displayed in front of students, so that students can be placed in a real chemical environment to observe and experience how various chemical equipment is in progress. For example, in a synthetic ammonia simulation plant, students can use simulation technology and simulation platform software to train operations, master chemical process skills, and improve their operational capabilities and levels.

3.2 Construction of teaching mode

Combining the teaching requirements of the course and the advantages of the network, this laboratory has built a teaching model integrating "virtual simulation experiment + real experiment" and "virtual simulation experiment + extracurricular innovation experiment" to strengthen students' basic training and improve their professional skills and innovation. For some harmful or risky experiments, colleges and universities should arrange for teachers to provide guidance on site when conducting basic experiments, and organize students to practice through professional simulation experiment classes; In chemical engineering training

simulation experiments, in teaching activities. It is necessary to effectively integrate the teaching content of chemical technology skills to build a second classroom for students' practical training and training; In innovative simulation experiments, it is mainly extended experimental teaching, with a good chemical foundation, high interest, and strong practical ability. Under the guidance of professional teachers, students can independently design innovative simulation training projects, aiming to improve students' modern technology and chemical practice capabilities.

3.3 Strengthen the construction of teaching and management teams

The teaching and management team is a very important part of the chemistry virtual experiment teaching model. As a virtual simulation experiment teaching teacher, not only need to have professional knowledge, but also need to have a strong ability and level of information technology application. This requires colleges and universities to pay attention to this issue and strengthen the education, training, and construction of teaching and management teams. Schools can encourage teachers to participate in the process of chemistry experiment teaching reform and virtual experiment teaching training to improve their teaching skills.

4. Conclusion

All in all, in the Internet age, colleges and universities are facing new opportunities and challenges in chemical experiment teaching. Colleges and universities must effectively grasp the advantages of the Internet, innovate the chemical experiment teaching model, and build a perfect chemical virtual experiment teaching model based on students' professional foundation, interest and experiment teaching content and requirements to carry out experimental teaching in order to achieve the teaching objectives of chemistry experiment courses.

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