

Research on Teaching Reform and its Innovation Model of College Chemistry Experiment

Wenfu Qu

Baicheng Vocational and Technical College, Baicheng, China

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Abstract: In chemistry teaching, chemistry experiment is a teaching mode that every student is willing to carry out, and chemical operation can enable students to deepen their understanding of chemistry theory knowledge, so that students can understand the chemical reaction between various chemical reagents. This paper analyzes the problems existing in the teaching of chemistry experiment in colleges and universities, and explores the reform of chemistry experiment teaching and its innovative mode in colleges and universities.

1. Introduction

College chemistry course is a course that emphasizes the combination of theory and practice. It not only has higher requirements for students' mastery of professional knowledge, but also has certain goals for the cultivation of students' practical ability. Therefore, university chemistry course is a theoretical one. A course that integrate with practice. This requires that college chemistry teachers not only teach students professional knowledge, but also develop students' practical ability and innovative ability. However, with the continuous development of social science and technology, some problems have appeared in the chemistry courses of colleges and universities [1]. These problems are mainly caused by the too old teaching methods, and the task objectives of chemistry teaching after the curriculum reform cannot be realized, resulting in a decline in the quality of chemistry teaching. Therefore, it is of great significance to explore the ways and methods of chemistry experiment teaching reform in colleges and universities to improve the quality of chemistry teaching and cultivate comprehensive talents.

2. The importance of experimental teaching

The experimental class in colleges and universities is the main means to cultivate students' scientific research ability and professional operation skills. Experimental teaching has a very important influence on strengthening students' understanding of theoretical knowledge and cultivating students' practical operation ability. Students can pass experimental courses [1]. Discover and solve the problems existing in the existing professional courses, deepen the understanding of the theoretical content of the theoretical courses, learn to use the existing experimental conditions to carry out in-depth professional research, enhance the research interest in the professional courses, and have positive development in the professional field of students. Promotion. Better implementation of experimental teaching can achieve the transformation of students from theoretical knowledge to practical ability, and build a good support platform for theoretical and practical education [1]. Therefore, experimental teaching is an effective way to cultivate innovative applied talents, and reform existing experimental teaching. The method is an inevitable requirement for cultivating high-quality talents.

3. Problems in the teaching of chemistry experiment

The teaching of chemistry experiment has important significance for the development of students, and has a positive effect on cultivating students' innovative thinking and consciousness. However, in the teaching of practical chemistry experiments, there are still a series of problems.

3.1 The content of chemical experiment is single.

In the teaching of chemical experiment, most of the experimental teaching is to make two or several chemical reagents react through certain operations, to achieve the goal of teaching and complete the teaching content. However, this teaching method is the operation of the students after knowing the results. The students have stereotypes about the teaching content in the mind, but the steps are to realize the established teaching content, which hinders the students' thinking and the new to some extent [2]. The lack of inquiry spirit is not conducive to the development of students' innovative consciousness and the ability to innovate.

3.2 The experimental teaching method is fixed.

In most colleges and universities, the process of chemical reaction and the result are the main teaching contents. Therefore, the teacher and the demonstration explain the procedures of the chemical experiment, and then the students will follow the steps demonstrated by the teacher to conduct the experiment [3]. This kind of teaching method has produced good results, but it is difficult to improve the students' innovative ability by cultivating students' thinking and lacking the cultivation of students' innovative spirit.

3.3 Serious waste of chemical resources.

Students in the experiment, due to insufficient understanding of chemical reagents, unskilled operation, or some students have great curiosity about chemical reagents; these will enable students to conduct chemical experiments, resulting in a serious waste of chemical reagents. Moreover, the cost of some chemical reagents is high, resulting in financial waste [2]. At the same time, the instruments and equipment used in the experiment, especially the relatively large equipment, have high acquisition costs. In actual use, they are basically idle, only used several times per semester, and some equipment not for students, the lab is not open to students, these devices are idle all year round, causing serious waste, and regular maintenance and repair of these devices is a big expense.

3.4 The method of testing students is single.

When testing the results of chemical experiments, most of the teachers base on whether the sequence of steps of the students' experiments is correct, whether the process is accurate, and whether the established results of the teaching obtained. Students only need to remember these steps and methods, and there will be no errors. However, this single detection method is only an assessment of the students' basic abilities [3]. The students do not focused on or supported by the new thinking and experimental teachers based on learning the old knowledge. This restricts the students to be active to a certain extent. Thinking, hindering the development of students' innovative spirit and ability.

4. The necessity of the reform of chemistry experiment teaching in colleges and universities

In recent years, with the development of social science and technology and the actual demand for talents, it is required that colleges and universities should not only pay attention to the mastery of basic knowledge, but also pay attention to the improvement of practical skills and skills and skills of chemical experiments [3]. It is also necessary to cultivate students' innovative spirit and innovative consciousness.

At present, there are still many problems that restricts the development of chemistry experiment teaching of colleges and universities in China. The effectiveness of chemistry experiment teaching still needs to be improved. How to improve students' interest in chemistry experiment, improve the efficiency of chemistry experiment course, and improve chemistry experiment course the operability and the evaluation and evaluation of chemistry experiment teaching need to be improved. Many universities' chemistry experiments still have the phenomenon of bound by the traditional thoughts of exam-oriented education and tool education [4]. Many colleges attach importance to theoretical teaching and attach importance to students' mastery of theoretical knowledge, but they do not pay much attention to the research of experimental teaching and the management mechanisms such as credits and examinations. As a result, the chemistry teaching process is superficial, students are less

motivated to teach chemistry experiments, the entire chemistry experiment is exhausted, and the quality of chemistry teaching is not high overall. Students can only gain verification theory in the process of chemistry teaching experiments, and innovation Sex and research are often impossible to talk about [4]. In order to improve the effect of chemistry experiment teaching in colleges and universities, improve students' comprehensive quality and professional skills, and cultivate high-quality talents with innovative thinking and innovative spirit, it is imperative to improve the effectiveness of chemistry experiments in colleges and universities through scientific and rational teaching reform.

Many problems still exist in the teaching of chemistry experiment in colleges and universities prove the necessity of the reform of chemistry experiment teaching in colleges and universities, and it is of great significance to deepen the reform and innovation of current chemistry experiment teaching. The basicity and research nature of the chemistry experiment course is unquestionable in the chemistry teaching. The scientific and rational chemistry experiment-teaching course is constructed to improve the experimental teaching of chemistry experiment, deepen the teaching content, innovative teaching methods and teaching themes, thus reforming the experiment. Teaching and innovative teaching effects are necessary [5]. The traditional chemistry experiment teaching courses are mainly divided into organic experiments, inorganic experiments, analytical experiments, physical and chemical experiments and other experimental teaching. These traditional experimental teachings show less research experimental courses in the teaching mode, and more deficiencies in the validated experimental courses. In addition, the lack of comprehensive experiments is not conducive to cultivating students' hands-on ability and independent thinking ability, which is not conducive to students' overall integration of various chemical systems and modules [5]. When some college students are doing university graduation design, because of the research and design of various aspects of chemistry experiments. It is difficult for students to integrate into the design of chemical experiment schemes, the preparation and use of experimental instruments and equipment, the use and reference of reference materials, and the overall the process of writing and answering ideas is clear and clear.

5. Research on the reform of chemistry experiment teaching in colleges and universities

5.1 Strengthening the guidance and summarization of students.

Conducting chemical experiments can make students more interested in chemistry, but some students are only interested in the process of the experiment, and do not pay attention to the results of the experiment. This requires teachers to pay attention to the experimental teaching [5]. The guidance and help of the students clear the purpose and content of the experiment, the teacher should give appropriate guidance and point, after the end of the experiment, summarize the experiment to find out the irregular behavior of the students in the operation, to the students the results of the study give an objective evaluation.

5.2 Innovative curriculum system.

First, the school should reform the system of chemistry curriculum, learn from the experience of chemistry experiment teaching in other universities, and innovate the curriculum system of its own school by combining the actual situation of the school [6]. Change the original chemistry experiment based on the set results, let students get some different conclusions through their own experiments and innovations, cultivate students' innovative spirit in the learning process, give play to students' thinking and imagination, create new conclusions and results.

5.3 Improve the teaching method.

Teachers should change the way of telling the experimental results and telling the results of the experiment when conducting laboratory teaching [6]. For example, when learning ethanol, teachers can use multimedia to play the use of ethanol in modern life, such as alcohol, beer, beer, etc.. Then the teacher guides students to explore, the chemical properties of ethanol, the reaction with active metals,

oxidation reaction, etc., let the students do the experiment themselves, through the actual operation, and the exchanges with the students to draw conclusions, on this basis, the teacher further deepens the clear conclusions and makes an objective evaluation of the students' operations [6]. Make students' interest in learning more intense and more willing to participate in the experiment.

5.4 Improve the relevant institutional regulations of the laboratory.

In the actual teaching process, students often have some waste or damage to the instrument due to limited knowledge and skills when conducting experiments. This requires the school to improve relevant management regulations. Moreover, equipped with professional staff to guide students' experiments and inform students about the relevant systems and management [7]. At the same time, schools should increase their use of the experiment and open up more students, which will help students develop their enthusiasm for chemistry learning and promote the formation and development of students' various abilities.

5.5 Improve the professional quality of teachers.

As a teacher, it is necessary to guide students to carry out experimental teaching. First, they must have a high professional foundation, and practical experience. The improvement of teachers' ability and ability has a great influence on the students' learning effect. Although the teacher is only an auxiliary role in the student learning process, the teacher should answer a variety of questions for the students in the course of the experiment, and need to cultivate students' innovative ability and innovate the course content and methods. This requires teachers to have better knowledge and ability [7]. For example, when explaining phenol, teachers can give different inquiry topics, so that students can choose their own, firstly to explore the weak acidity of phenol, and secondly to explore which hydrogen atoms on the hydroxyl groups in the phenol molecule and the ethanol molecule are more active. Students choose topics of interest to explore. According to the selected topics, the students develop different experimental schemes. After comparing the experiments of the hydrogen atoms on the hydroxyl groups in the phenol molecule and the ethanol molecule, the teacher guides the students to analyze the feasibility of different experiments. Finally, it is concluded that the hydrogen atom on the hydroxyl group in ethanol is more active. By designing different inquiry topics, it not only cultivates students' ability to ask questions and solve problems, but also helps students develop innovative spirit.

6. Innovation of the teaching model of chemistry experiment in colleges and universities

6.1 Improve the use and management system of the laboratory.

According to the survey results, many colleges and universities in China are unable to meet the corresponding standards due to their own economic conditions, and can only meet the teaching of the basic courses of chemistry. Some colleges and universities spend a lot of money to purchase some experimental equipment and establish a chemistry teaching center, but the utilization rate of the laboratory is low, and even the students are rarely allowed to enter the experimental operation [6]. Therefore, it is required that each university can improve the management system of the laboratory. Colleges and universities should open laboratory resources to students from time to time, so that interested students can use the spare time for experimental operations, and equip the laboratory with professional management personnel, which not only can greatly improve the students' experimental enthusiasm, but also make the students better. Know the experimental equipment to make the value of the laboratory fully reflected.

6.2 Standardize the process of students' chemical experiments.

Some chemical reactions may produce different products due to different reaction conditions and reactant concentrations, and some may even produce toxic substances. Therefore, teachers should pay more attention to these experiments and tell them in advance. The hazards that result from the operation, and the selection of some of the experiments that do not harm the human body even if the operation is wrong, let the students experiment, and remind the students of the correct operation after

the error [8]. This will enable students to remember to standardize their own experimental operations. While letting the students experiment with their own hands, they can experience the rich changes in chemical reactions through different experimental steps, so that students can think about why these differences are produced. The products are summed up according to their chemical and physical properties, and then the teacher concludes the correct conclusions, so that the students can remember these chemistry knowledge more deeply.

6.3 Improve the teacher's experimental level and improve the teaching ability.

With the continuous development of the modern economy, the teacher's training method for students' experimental operation ability should also keep pace with the times. In the old teaching mode, teachers have always occupied a dominant position. This kind of teaching method is often difficult to attract students' interest [8]. At the same time, the fixed experimental mode often means lack of innovation and it is difficult to cultivate students' innovative ability. Therefore, we should innovate experimental teaching methods.

The talents cultivated by teachers are often to meet the needs of the society. Therefore, the innovation of our teaching content should relate to the needs of the society. Teacher teaching should use high-tech teaching mode to arouse students' interest, especially in the current students' interest in network computers [8]. It can be expressed by using the network and computer for the experimental results and the data during the experiment. Moreover, teachers should pay more attention to students' own operation and innovation ability when guiding experiments.

7. Summary

The chemistry experiment in colleges and universities is mainly to train more talents that are professional and improve their skills and level. Therefore, relevant personnel of colleges and universities should strengthen management and attention to the teaching of chemical experiments, improve the management system, and teachers strive to improve their professional level and apply. Advanced teaching modes and methods focus on the cultivation of students' independent learning ability, promote students' innovative thinking and innovation ability, and enable students to learn more knowledge and cultivate more abilities in chemical experiment teaching.

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