

Teaching Reform and Ability Cultivation of Experimental Courses in Applied Chemistry

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Abstract: The experimental course in the applied chemistry specialty should have the same important position as the theoretical course. In view of the problems existing in the current teaching process of the experimental course in the applied chemistry specialty in colleges and universities, the teaching content should be reformed and adjusted, and the teaching methods should be innovated, so as to establish a sound, unified and standardized experimental course teaching reform and ability training system for the applied chemistry specialty, so as to improve the quality and level of teaching, Cultivate students' practical operation ability. This paper studies and analyzes the teaching reform and ability cultivation of the experimental course of applied chemistry specialty.

1. Introduction

In the traditional process of applied chemistry experiment teaching, the school pays more attention to the study of theoretical knowledge, and only takes the experimental course as a teaching method to verify the basic theory, playing an auxiliary role in the applied chemistry specialty. Most teachers pay more attention to the training and education of the basic operation of the experiment, requiring students to be able to master various data processing methods skillfully, and have not developed students' deep potential. Colleges and universities should constantly reform and optimize the experimental teaching content, teaching methods, assessment system and laboratory management mode of the applied chemistry specialty, so as to establish a sound, unified and standardized experimental course teaching reform and ability training system of the applied chemistry specialty.

2. The Present Situation of Experimental Teaching in Applied Chemistry

2.1. Relatively few experimental teaching courses

Generally, most colleges and universities will pay more attention to the study of theoretical knowledge in the process of carrying out the experimental teaching of applied chemistry specialty. They do not recognize the importance of practice and experimental links, and generally only set the experimental course at about 25% of the total class hours.[1] At the same time, some colleges and universities set up imperfect classroom content in the course of applied chemistry experiment teaching, the proportion of class hours in the total length is relatively low, and there is no complete

experimental teaching facilities, resulting in the existing classroom setting is not scientific and reasonable.

2.2. The experimental teaching content is not perfect

The main contents of experimental teaching of applied chemistry specialty include esterification reaction, dehydration reaction of ether, synthesis of surfactant and other related contents. The experimental items usually include three types: confirmatory experiment, comprehensive experiment and design experiment. In the process of experimental teaching, students are required to have basic theoretical knowledge and master basic experimental skills and comprehensive skills. For example, in the process of separating pigment from tomato, it includes water bath reflux heating operation, extraction operation and other related contents, which has high requirements for students.[2] Although most colleges and universities will involve basic theoretical knowledge in all aspects and disciplines in the setting of experimental classes for applied chemistry majors, under the current situation, the proportion of verification experiments in the total class hours is relatively high, resulting in inadequate teaching content. Therefore, colleges and universities should integrate and optimize the teaching content of applied chemistry specialty, so as to ensure that the teaching content is designed and comprehensive.

2.3. The assessment method is relatively simple

At present, the content of experiment assessment for applied chemistry majors mainly includes the students' preview records, experiment records, the students' operation ability displayed in the experiment process, the students' ability of data processing and analysis and report production. In this process, the experiment operation usually accounts for 60% of the total score, the experiment record usually accounts for 20% of the total score, and the preview report and the experiment completion report usually account for 20% of the total score. According to the above data, in the traditional experimental teaching classroom, teachers pay more attention to students' experimental operation. Therefore, teachers should make classroom records in strict accordance with the operating specifications, and conduct comprehensive and multi-level evaluation on students, so that the final results of the experiment can be fair, fair and reliable. However, the traditional assessment method has certain disadvantages. It must ensure that the number of students is consistent with the number of experimental teachers. If there are too many students, it will lead to the inadequate supervision and evaluation of teachers on students, making the assessment have loopholes, and making the results of the assessment not credible and reliable.

3. The Basic Direction of the Teaching Reform of Experimental Courses in Applied Chemistry

3.1. Add use function

In the process of applied chemistry experiment teaching, comprehensive experimental items should be added while improving students' experimental skills and requiring students to verify the contents of the classroom. In the process of applied chemistry experiment teaching, just blindly carrying out chemical skill training and education will lead to the continuous reduction of learning efficiency and quality, making the experimental teaching classroom more boring and boring, and making students lose their learning enthusiasm and initiative. In this process, teachers can combine experimental research activities with experimental skill training, give full play to the positive role of both, guide students to integrate chemical experimental skills in the process of experimental research and inquiry, thus improving students' chemical experiment level and ability imperceptibly. In addition,

teachers should also recognize the importance of confirmatory experiment teaching. As a compulsory course for applied chemistry majors, confirmatory experiment needs to be completed through systematic planning, and then the efficient combination and organic integration of confirmatory experiment and research experiment can make the results of research experiment more reliable and authentic. At the same time, comprehensive experiments can be added in the process of experimental teaching, so that students can combine theoretical knowledge with practice, make full use of the technical and theoretical knowledge learned, improve their practical operation ability, and lay a good foundation for later work.

3.2. Combine with real life

Colleges and universities should combine the characteristics and advantages of the specialty of applied chemistry and integrate the reality of life in the process of experimental teaching. In social life, there are various contents related to applied chemistry, such as the synthesis of spices, the synthesis of medical drugs, organic chemical reactions, and the preparation of food additives. By combining the experimental teaching content with the reality of life, it can increase the interest and vividness of the classroom, attract the enthusiasm and initiative of students, and is of great significance to cultivate high-level and high-quality students.

4. The specific implementation plan for the teaching reform and ability training of the experimental course of applied chemistry specialty

4.1. Optimize the structure of experimental courses and improve the experimental content of applied chemistry

4.1.1. Optimize curriculum

At present, most of the experimental instruments and related equipment are updated rapidly, and the textbooks and teaching contents cannot be unified. In the application professional experiment teaching class, teachers need to set up different course experiment items, so that students can learn all the theoretical knowledge of chemistry. While training students' basic operation, students should also improve their practical ability. Therefore, teachers should integrate and optimize the items of the experimental course, clarify the professional training direction, and integrate and optimize the organic synthesis experiment and the inorganic synthesis experiment into a new chemical experiment course in the process of developing the professional basic course, and integrate the polymer chemistry experiment and the polymer material experiment into a new polymer material experiment course. Then students can learn the basic theoretical knowledge of various disciplines related to chemistry, play a positive role in experimental resources, and improve the utilization of experimental resources.

4.1.2. The experimental project adopts comprehensive experiments

Most colleges and universities are usually conservative and single in setting up experimental projects for applied chemistry majors, and will set up experimental courses according to the teaching progress of theoretical courses. Due to the lack of unity and closeness between the experimental course and the theoretical course, there is a certain gap between the actual experimental project and the social development, which makes the students lack the ability to develop new products and research new technologies, which leads to the reduction of students' learning enthusiasm and initiative, and the inability to cultivate students' innovation awareness and innovation ability. In this process, colleges and universities can clarify the emphasis of the experimental courses of applied chemistry, and improve comprehensive experimental projects through the penetration of interdisciplinary disciplines. For example, natural flavors extracted from plants, aspirin synthesis, etc. By setting up a

comprehensive design experiment, we can start with the production, structure, representation, composition and other aspects of materials, and use synthetic technology, test material performance means and other methods to cultivate students' learning awareness of independent learning, independent reference to literature, and independent design, so that we can analyze and process the data according to the actual conditions during the experimental operation process, fully mobilize students' learning enthusiasm and initiative, Improve the level and quality of teaching.

4.2. Establish a sound experimental teaching management guarantee system

The perfect laboratory management system determines whether the completion of the experimental project can be carried out smoothly, and can also ensure the life and property safety of all teachers and students. In the current environment of increasing experimental projects and experimental requirements, the traditional, single and backward manual management methods and class scheduling methods will lead to increased difficulty in laboratory management and instrument management, which will increase the loss of materials and articles, and at the same time, the traditional manual management methods cannot meet the basic needs of subsequent experimental operations. Therefore, by establishing a sound, unified and standardized laboratory teaching management guarantee system, the quality and level of teaching can be improved and the subsequent experimental operation can be guaranteed to proceed smoothly. In this process, colleges and universities can optimize and improve the existing laboratory management system, establish experimental databases, databases, and use the laboratory management system to record the daily maintenance and use of instruments and equipment in detail, and ensure the smooth development of experimental teaching courses through the standardized and information management of consumables, materials, and equipment. At the same time, colleges and universities should also improve and optimize the management methods of teachers and students, and strictly control the personnel entering the laboratory by establishing a sound, unified and standardized personnel access assessment system. Generally, the assessment of personnel access system mainly includes the assessment of laboratory safety management knowledge, the assessment of biological and chemical use knowledge, etc. All teachers and students should pass the assessment before they can enter the laboratory to carry out corresponding experiments and scientific research tasks, so as to ensure that the normal management and daily maintenance of the laboratory can be carried out smoothly.

4.3. Optimize and improve the experimental teaching method

The traditional experimental teaching classroom is mainly based on the teacher's explanation and the students' passive acceptance. It requires the teacher to demonstrate and explain the theoretical knowledge of the experimental items and the operating methods of the experimental instruments, and then the students need to complete the experimental items independently according to the content explained by the teacher. Over time, the students will have a serious dependence and laziness, and will not be able to analyze and learn independently, In the process of experimental teaching, we only complete the corresponding learning tasks according to the participation form of "taking medicine according to the prescription". In order to solve the above problems, we can improve the level and quality of experimental classroom teaching by optimizing and improving teaching methods, actively introducing advanced teaching methods and teaching concepts in the process of experimental teaching. Specifically, teachers can actively introduce advanced multimedia teaching methods to transform boring theoretical knowledge into vivid sound, text and video, and attract students' enthusiasm and initiative by enriching classroom content. At the same time, teachers can also use multimedia technology to record the process of experimental teaching. By making multimedia courseware and video, students can repeatedly taste the use of experimental instruments and equipment, and the specific process of experimental operation, so as to improve the quality and efficiency of teaching.

4.4. Strengthen the construction of innovative talents and teachers

Colleges and universities should cultivate innovative talent teachers. By building a high-level, high-quality and experienced teacher team, they can impart knowledge to students more efficiently and quickly, and set an example in the teaching process, so as to improve students' level and ability of applied chemistry experiments through innovation, optimization and research methods. First of all, colleges and universities should improve the professional level of teachers and require teachers to be good at observation, so as to solve the problems encountered in the current teaching process through innovative thinking according to the students' learning level and thinking changes. Secondly, colleges and universities should cultivate the innovative spirit of teachers, and require teachers to continuously accumulate materials in daily life, actively learn advanced business knowledge, and combine with the actual needs of the current society to improve their scientific research sensitivity, so as to timely discover the innovative points and flash points of students in the process of practical operation. Finally, colleges and universities should improve teachers' scientific research ability, and combine scientific research activities with students' graduation thesis design, so as to achieve the teaching goal of "teaching and learning are mutually beneficial and promote together". In this process, a sound, unified and standardized incentive system can be established. When students make significant progress and major scientific research achievements, students can be rewarded to improve their enthusiasm and initiative. Secondly, students can be encouraged to actively learn the excellent moral character of teachers, so as to restrict and cultivate students' thoughts and behaviors. Thirdly, teachers need to face a relatively large number of students. They should formulate targeted and personalized learning programs based on the students' strengths and advantages, so as to implement the teaching concept of teaching students according to their aptitude, and improve each student's professional and comprehensive qualities.

5. Conclusion

To sum up, colleges and universities should constantly reform and optimize the experimental teaching content, teaching methods, assessment system and laboratory management mode of the applied chemistry specialty, establish and improve a complete, unified and standardized experimental course teaching reform and ability training system of the applied chemistry specialty, thereby improving the quality and level of experimental teaching, and cultivating students' independent design ability, independent learning ability and innovative thinking.

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