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Experimental Course Reform of Applied Chemistry Specialty under the Background of "Double First-class" Construction

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Abstract: *In recent years, with the continuous promotion of the "double first-class" construction project in China, it has pointed out the direction for the future development of most universities in China. In this process, colleges and universities can optimize and improve the content, method and system of courses according to the development objectives of the specialty by increasing the proportion of practical courses, combining the characteristics and advantages of the specialty of applied chemistry, so as to cultivate a group of high-quality, high-level and high-capacity applied chemistry professionals for the society.*

Keywords: *Construction Background of "Double First-class"; Major in Applied Chemistry; Experimental Course Reform*

1. Introduction

Under the background of "double first-class" construction, colleges and universities should desalinate the boundary between the use of courses and theoretical courses, optimize the experimental content, add open experiments, create a laboratory information platform, and improve students' comprehensive and professional qualities. At the same time, colleges and universities should also adhere to the teaching principles of cultivating morality and cultivating people, and applying learning to practical use. Through the quantitative management of the learning process and strengthening the construction of the teaching staff, they should establish and improve the perfect, unified and standardized experimental curriculum system of applied chemistry, and then comprehensively improve the quality and level of teaching.

2. The significance of the experimental curriculum reform of applied chemistry specialty under the background of "double first-class" construction

As an application-oriented and interdisciplinary science major, the applied chemistry specialty will involve professional knowledge in other fields and need to be crossed and integrated with other disciplines. Compared with traditional chemical technology and chemical engineering majors, the basic theoretical knowledge system of applied chemistry majors will include basic knowledge of materials science, physics, electrochemistry, biology and other related disciplines; The research fields of applied chemistry mainly include medicine, chemical industry, environmental protection, metallurgy, light industry, etc. Compared with traditional chemistry majors, students majoring in applied chemistry should have higher theoretical knowledge level and practical operation ability. In order to meet the actual needs of today's society and make the trained talents adapt to the social development, colleges and universities should improve and optimize the current teaching content and teaching methods according to the requirements of "double first-class" construction, and formulate a more scientific and reasonable training plan for applied chemistry professionals through top-level design.

3. Current situation of experimental teaching in applied chemistry

When recruiting students majoring in applied chemistry in most higher vocational colleges, due to the differences in the quality level of students, if the traditional, backward and single teaching method is still adopted, it is impossible to impart multidisciplinary theoretical knowledge. At the same time, due to the lack of awareness of the importance of experimental course teaching, even if students can

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master basic theoretical knowledge, there is no way to make scientific and reasonable application of chemical knowledge, which makes students not have high practical operation ability and cannot cultivate students' innovative awareness and ability. The traditional teaching mode is mainly based on teacher's explanation and students' passive acceptance. Students need to complete the corresponding practical operation according to the teacher's explanation and demonstration.[1] After completing the experimental operation, teachers also need to guide and supervise them before they can complete the experimental report. In the whole practical teaching course of applied chemistry, students have been in a state of passive response and do not have high learning enthusiasm and initiative, Unable to participate in the experimental teaching activities efficiently, just for the sake of credit perfunctory completion of the task, so that students' observation ability, thinking ability, innovation ability and comprehensive quality cannot be effectively improved.

4. The specific implementation plan of the experimental curriculum reform of applied chemistry specialty under the background of "double first-class" construction

4.1 Dilute the boundary between experimental and theoretical courses and improve students' experimental ability

In this process, according to the teaching content of the applied chemistry specialty, the experiment can be divided into the following three levels according to the depth of the level, specialty characteristics, ability training and other directions: First, for the first level, students should be required to learn the basic theoretical knowledge of the applied chemistry specialty and carry out corresponding experimental teaching courses. Secondly, for the second level, experimental courses related to applied chemistry can be set up, usually including material chemistry, pesticide chemistry, environmental chemistry, instrument analysis and other relevant experimental courses. Finally, for the third level, we can set up comprehensive and design experimental courses to improve students' comprehensive quality and professional ability.

In this process, for the study of the first level of basic chemistry experiment courses, we should design more scientific and reasonable experimental projects based on the basic theory professional courses, and combine the characteristics and advantages of the applied chemistry specialty, and work with the head of the teaching and research department to develop the teaching content of the experimental courses, so as to dilute the boundary between theoretical courses and practical courses.[2] By deleting repetitive experiments and reducing the experimental operation process, the current experimental content and methods are continuously integrated, optimized and improved, and then the basic chemical experimental courses are integrated into different experimental courses, so as to establish and improve the interdisciplinary experimental teaching system and improve the experimental operation ability of students. For the study of the second level of applied chemistry courses, we can combine the two with the experimental teaching content of applied chemistry and the cutting-edge technology of social scientific research, so as to cultivate students' experimental technology level. At the same time, students' professional practical skills and practical operation abilities can also be cultivated by combining the research results of teachers and increasing the proportion of research experiments and design experiments. For the third level of comprehensive design experimental course learning, teachers can divide students into groups, simplify and improve the experimental steps by setting group goals and experimental tasks, let students design experimental items and routes through independent inquiry and independent learning, and then complete the corresponding experimental tasks, so as to improve students' scientific thinking ability and scientific and technological innovation ability.

4.2 Optimize the experiment content and pay attention to comprehensive and design experiments

Through continuous integration and optimization of experimental teaching content, the level and quality of practical teaching of applied chemistry can be improved. Because the experimental chemistry class will involve more confirmatory experiments, it can be optimized, selected and improved by selecting representative classical experimental items. At the same time, we can combine the scientific research achievements made by teachers in the current field, and transform them into comprehensive experimental content, so as to continuously enrich and improve the experimental teaching content, so as to cultivate students' experimental operation ability and experimental level in the experimental teaching process, and enable students to complete experimental projects independently. In this process, students can design more scientific and reasonable experimental objectives and design schemes by means of independent inquiry of literature and relevant materials, and give students more space to play,

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so that students can find their own shortcomings and defects in the experimental teaching process of applied chemistry specialty in time through continuous communication and learning, and then find their own methods to solve problems, so as to improve students' ability to find problems Ability to solve problems.

4.3 Add open experiments to stimulate students' learning consciousness and initiative

Under the background of the current "double first-class" construction, colleges and universities should reform and optimize the practical teaching, so as to stimulate students' enthusiasm and initiative, cultivate students' innovative thinking and innovation consciousness, and comprehensively improve students' experimental innovation ability by strengthening the construction of innovation and entrepreneurship experiment projects for college students. In this process, when adding open experimental teaching, colleges and universities should combine the students of different grades and the level of students, develop more scientific and reasonable experimental content, and then provide experimental instruments and places to meet the needs of students. In the process of open experimental teaching, teachers can provide experimental items and subject requirements, and students can complete corresponding experimental items through independent design and independent learning. For example, the organic chemistry experiment identifies the unknown solution or determines the nitrogen and phosphorus content in the sewage of the analytical chemistry experiment. At the same time, teachers can also set different experimental teaching contents, so that students can combine their own level and interests, freely choose experimental projects through independent analysis and independent access to information, and design more scientific and reasonable experimental programs through efficient communication and effective communication with teachers. Through the construction of open experiments, students can improve their ability of independent learning and innovation, so that students can experience the fun of learning in the process of experimental operation.

4.4 Take the laboratory as a platform to improve students' innovation ability

In the process of implementing the practical teaching concept of "scientific research feedback", through continuous innovation and optimization of the talent training model, we can base on the laboratory, let excellent students enter the laboratory to complete the corresponding experimental operation, and participate in the teacher's scientific research class, so as to improve students' innovation ability and practical operation ability. First of all, by increasing practical training on scientific topics, students can combine basic theoretical knowledge with practical operation, thus improving their professional and comprehensive qualities. Secondly, taking the laboratory as a platform can promote efficient communication and effective communication between students, teachers and classmates, and then fully integrate the scientific research achievements of teachers into the experimental teaching classroom, so as to cultivate students' innovation awareness and improve students' innovation ability.

4.5 Adhere to the teaching principle of cultivating morality and building people, and strengthen the ideological and political construction of the curriculum

Under the current circumstances, colleges and universities should adhere to the teaching principle of cultivating morality and cultivating people, combine professional theoretical knowledge with ideological and political education by digging out the ideological and political elements of the curriculum in the applied chemistry practical teaching class, and then be able to integrate ideological and political education in the curriculum in the current teaching class, so as to create a whole-process, all-dimensional, three-dimensional, ideological and political education system, and give full play to the characteristics of the development of applied chemistry specialty, Stimulate students' learning enthusiasm and initiative.

4.6 Insist on applying what you have learned and optimize the curriculum

Under the current background of "double first-class" construction, colleges and universities should implement the teaching concept of "morality first, people-oriented, and ability first", and build a more perfect and optimized practical teaching system of applied chemistry specialty according to the strategic goal of efficient development under the background of "double first-class" construction. While consolidating students' basic theoretical knowledge, they can also continuously improve students' practical operation ability and experimental level. By improving and optimizing the experimental teaching system, creating a group of practical training courses, and adhering to the teaching principles

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of applying learning to practice and combining learning with practice in the process, students can combine practice with theory, thus improving their comprehensive and professional qualities, and cultivating a number of high-quality, high-level and high-skilled compound talents for the society.

4.7 Innovate and optimize the teaching mode

Under the background of the construction of "double first-class", colleges and universities should innovate the traditional, backward and single teaching mode, transform the teaching mode of teachers' explanation and students' passive acceptance into a student-based teaching mode, and combine the actual needs of the current chemical industry, constantly deepen the integration of production and teaching, and then improve the students' chemical practice and operation ability in multiple ways. Specifically, teachers should be encouraged to enter the enterprise, constantly strengthen their practical operation ability, and accumulate rich practical experience, so as to create a group of double-qualified and double-mentored teachers. In addition, we can build an information-based teaching platform, and combine the characteristics of classroom teaching to continuously extend the teaching, so as to leave more space for students to think and practice, return the learning initiative to students, and highlight the main position of students in the practical teaching class of applied chemistry.

4.8 Quantitative learning process management

Colleges and universities should establish a more scientific and reasonable characteristic teaching management system based on the ISO teaching quality management concept, so as to manage and control the whole life cycle of students' learning. We should strengthen the management of students' learning process through diversified and multi-angle assessment methods. While taking into account students' year-end performance, we should also evaluate and analyze students' performance in the classroom at ordinary times, and increase the proportion of their performance in ordinary times. By quantifying and refining the assessment rules, we should increase the examination power to ensure that the assessment results are more scientific, reasonable and reliable. In this process, the information management platform can be used to sample and sample the data of the students' learning process, so as to comprehensively grasp the students' learning process, strengthen process supervision, and improve the quality and level of teaching.

4.9 Establish a sound quality assurance system

Colleges and universities can effectively combine college, school and specialty, so as to establish a sound, unified and standardized three-level education quality assurance system, and then conduct a comprehensive routine teaching inspection of the teaching process. Specifically, we can broaden the collection and analysis channels, actively listen to the suggestions of teachers, students and employers, strengthen the supervision and management of teaching work, and evaluate the current teaching quality and level through teacher mutual evaluation, professional construction evaluation and other ways. In addition, we can conduct comprehensive and multi-level consideration and analysis of the evaluation results both inside and outside the school through qualitative and quantitative evaluation methods, and continuously optimize and improve the existing quality assurance system through inspection reports, evaluation feedback quality reports and other methods, so as to improve the quality and level of the practical teaching class of applied chemistry.

5. Conclusion

To sum up, in the context of the current "double first-class" construction, we should take talent training as the fundamental teaching goal, constantly optimize and improve the teaching content, teaching methods and teaching methods, so as to establish a sound, unified and standardized teaching system of applied chemistry experimental courses, which can improve the teaching quality and level, but also cultivate a group of people with high quality and high level for the society Highly skilled applied chemistry professionals.

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School-level natural key project: research on oil-water separation performance of carbon nanotube composite polyacrylonitrile electrospun membrane, subject number: ZR2022Z4; Key teaching research

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