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Research on the Construction of Innovation Ability Training System for Students Majoring in Applied Chemistry in Colleges and Universities

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Abstract: Under the background of innovation and entrepreneurship, new requirements are put forward for the curriculum teaching of applied chemistry in colleges and universities. We should pay attention to the cultivation of students' innovative ability. Therefore, colleges and universities should take this as the goal and constantly update the professional teaching system to meet the requirements of the new era. Based on this, this paper analyzes the current teaching situation of applied chemistry in colleges and universities, and puts forward the ways to build the cultivation system of students' innovative ability for reference.

Keywords: Colleges and Universities; Applied Chemistry; Innovation Ability; Cultivation System

1. Introduction

The development of society needs innovation, and the cultivation of innovative talents is a very important content. As the main place for talent training, colleges and universities should effectively grasp the trend of the times, scientifically according to the characteristics of chemistry, optimize the talent training system, and strengthen the training of innovative talents in applied chemistry in the new era.

2. Teaching status of applied chemistry in colleges and universities

First, the setting of applied chemistry specialty is not scientific enough, which has an impact on the cultivation of students' innovative ability. Applied chemistry covers a lot of contents. If the professional curriculum is unscientific or too detailed, students will be bound in a narrow professional scope, ignoring the understanding and learning of adjacent disciplines and other knowledge, limiting students' thinking development and students' innovation ability.

Second, the teaching contents and methods are too single. The teaching of professional courses is mainly based on teachers' classroom knowledge. The teaching does not pay too much attention to students' personalized development and adopts the fixed teaching mode. In this case, students' knowledge structure is incomplete, their mode of thinking is not prominent, and lack of initiative. Students' interest in learning is not high, let alone cultivates students' innovative thinking.

Third, the experimental teaching instruments and equipment are insufficient, and the experimental teaching effect is poor. Applied chemistry itself is a highly practical specialty, and experimental teaching is essential. Although teachers will carry out experimental teaching in the teaching process, it generally focuses on confirmatory experiments, and the whole experimental process is relatively simple. There is little content about social production practice in the experimental teaching system, and the improvement of students' practical operation level and innovation ability is ignored. It cannot stimulate students' enthusiasm to participate in the experiment. In addition, the experimental class hours are few and the relevant experimental instruments and equipment are insufficient. Many students are often required to operate a set of equipment, which makes the independent operation ability of the students of the first department cannot be improved and the innovation consciousness is difficult to form.

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Fourth, the evaluation and assessment mechanism is not perfect. At present, the evaluation of students is generally focused on their academic achievements. The purpose of students' learning is to deal with the assessment, which is limited to the mastery of theoretical knowledge and ignores the cultivation of innovation ability and other abilities. In addition, the evaluation of teachers is mainly formative evaluation, and does not pay attention to process evaluation. Some teachers do not have much time to pay attention to students for scientific research. The evaluation of teaching results only focuses on the level of curriculum teaching progress, and does not understand the problems existing in teachers' teaching.

3. Approaches to the construction of innovation ability training system for students majoring in applied chemistry in colleges and universities

3.1 Innovating the training program and adjusting the course structure

The cultivation of innovation ability is inseparable from solid basic knowledge and high quality. It is impossible to achieve a good effect only by mastering a certain knowledge point. Therefore, it is very important to enrich the connotation of basic education, broaden the knowledge structure and establish a scientific curriculum system. The adjustment of curriculum structure should adhere to the principle of "less but better", scientifically design the basic courses of applied chemistry and public basic courses, and consolidate students' basic knowledge. This content usually starts from the first to the fourth semester; The design of professional courses should not only ensure their independence, but also consider the relevance between courses, which generally starts in the fifth semester; After the sixth semester, students choose the corresponding professional direction according to their own interests and characteristics, focusing on the corresponding courses. In addition, we should also set up some optional courses of this major, so that students can choose according to their own needs and take enough credits. In the course structure, the proportion of elective courses should be appropriately increased. Students can choose courses across majors, so that students can choose discipline training related to the specialty based on the specialty of applied chemistry, enrich students' knowledge reserve and master the overall trend of discipline development.

3.2 Optimizing classroom teaching contents and updating teaching forms

Classroom teaching is the main teaching form of professional courses, and the cultivation of students' innovative ability also needs classroom teaching. Teachers are not only the transmitter of knowledge, but also the implementer of innovative talent training. They should create effective teaching situations, introduce new courses and mobilize students' desire for knowledge learning according to students' achievements and life experience. In the classroom, we should create a good atmosphere conducive to innovative education for students, and adopt a variety of classroom teaching forms, so as to encourage students to question boldly and let students learn consciously. At the same time, we should strengthen the connection between the knowledge of various disciplines and expand students' thinking. In addition, we should integrate the frontier knowledge and high and new technology, enrich the experimental content with scientific research achievements, and realize the transformation from confirmatory experiment to comprehensive experiment. Teachers majoring in applied chemistry should carefully consider, optimize the experimental content, and integrate theory and practice, in order to transform the typical content of scientific research projects completed by scientific research teams into the professional experimental content of college students. For example, "preparation of phosphor for LED lamp" and other experimental projects are closely related to teachers' scientific research. In this way, it can not only mobilize students' enthusiasm for learning professional knowledge, but also enable students to master cutting-edge knowledge and cultivate students' scientific research and innovation ability.

3.3 Scientific arrangement of experimental teaching hours, school enterprise cooperation and innovation experimental base

Applied chemistry is a science that studies substances and change laws through experiments. The quality and level of experimental teaching will have a direct impact on students' learning ability, problem analysis ability, innovative thinking ability and so on. Under the condition of fully understanding the important role of experimental teaching, how to improve the quality of experimental teaching is the key problem to be solved. In order to achieve this goal, we can divide the experiment of applied chemistry into basic chemistry, professional chemistry and comprehensive chemistry experiment. Among them, basic chemistry experiments are implemented from the first to the fifth semester, and comprehensive chemistry experiments are generally implemented in the sixth semester, so that students can improve their ability to use chemical theoretical knowledge to solve practical problems after basic skills training. Professional experiments are generally set up after the completion of basic and comprehensive chemical experiments in order to consolidate students' learning situation. Generally, starting from the sixth and seventh semesters,

corresponding experimental projects are set up according to the contents of each course of the specialty. It should be noted that when designing or selecting experimental projects, we should not only consider expanding the knowledge, but also consider the operation difficulty, and appropriately increase the opening hours of the laboratory to students, so as to increase students' experimental opportunities. In addition, we can also strengthen the cooperation between schools and enterprises, jointly build a special experimental base, and formulate experimental teaching plans, so as to build a bridge between universities, students and enterprises, so that enterprises can more fully understand the actual situation of the applied chemistry specialty of the university, join in the talent training process, and strengthen the exchange and cooperation between scientific research and technical personnel of colleges and universities and technical personnel of enterprises, and lay a foundation for improving students' practical and innovative ability.

3.4 Innovating the evaluation system and building a perfect innovation incentive mechanism

The disadvantages of the traditional training system are reflected in the use of a single way, which can not reflect the students' real ability. The evaluation of students should not be limited to the investigation of basic theoretical knowledge, but also pay attention to the investigation of students' abilities, especially their innovation ability. The ways of investigation should be diverse, and special reports can be organized and written. Academic papers or participate in scientific research and various forms of competition activities to evaluate the learning effect of students. At the same time, we should also build an incentive mechanism for the cultivation of students' innovative consciousness and ability. For example, implement innovation credits, scientific research incentive, reward and punishment system, etc. In addition, the evaluation of teachers should not only look at how much knowledge teachers teach students and classroom progress, but also focus on whether to pay attention to the cultivation of students' innovative ability, use incentive mechanism to make teachers realize the importance of cultivating students' innovative ability, and run the cultivation of students' innovative ability through all links of teaching.

4. Conclusion

In a word, in the teaching of applied chemistry in colleges and universities, the cultivation of students' innovative ability is a complex project, which covers more contents, and needs an innovative teaching system different from the traditional training mode. At the same time, students' cooperation and teachers' scientific guidance are also necessary. In this way, students' vision can be broadened through professional teaching, so that they can understand the most cutting-edge information and the most advanced technology of their major. Only by constantly improving the professional training system, enriching teaching contents and innovating teaching means can students' professional knowledge be consolidated, improve students' professional skills and innovation ability, and cultivate more practical and innovative talents for the society.

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