

The Exploration and Teaching Integration Method of Ideological and Political Elements in the Course of Chemical Engineering Principles - Taking Fluid Flow as an Example

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Abstract:

The principles of chemical engineering are the fundamental content of professional education in chemical engineering, chemistry, environment, and other fields. At present, under the guidance of the education goal of cultivating morality and cultivating talents in the new era, the teaching of chemical engineering principles requires the transmission of basic knowledge of chemical engineering principles to help students grasp the deep content of chemical engineering principles, understand the essence of knowledge and the internal connections between different knowledge points under the guidance of course learning; On the other hand, it is necessary to pay attention to the overall quality education effectiveness of students, carry out ideological and political work in courses, so that ideological and political elements can be effectively integrated into the entire process of chemical engineering principle education, and provide advanced and correct theoretical and value support for high-quality chemical engineering principle education and the construction of comprehensive growth goals for student groups.

Keywords:

Course on Principles of Chemical Engineering, Ideological and Political Elements, Teaching Integration

1. Introduction

The integration of ideological and political elements into the teaching of chemical engineering principles is an important requirement for the development of China's education industry in the current era, and is the key to comprehensively promoting the pace of ideological and political construction in the curriculum. As a fundamental course, the principles of chemical engineering are the fundamental knowledge that students need to master in the study of chemical engineering, chemistry, environment,

and other related majors. At the same time, in order to enable students to simultaneously establish correct values, form good qualities, and truly grow into high-quality talents with both moral and academic excellence during the knowledge learning period, it is necessary to provide strong support for ideological and political elements in the education of chemical engineering principles courses. Therefore, it is currently necessary to combine the teaching situation, characteristics, and needs of the chemical engineering principles course, effectively introduce ideological and political elements in a targeted manner, and build a high-quality education plan. [1]

2. Teaching Methods of Ideological and Political Education in Courses

Firstly, the teaching objectives should be clear. The teaching objectives should be condensed into the curriculum standards and specifically reflected in the lesson plans, implemented in various stages of the teaching process, so that the teaching of professional knowledge in this course is closely integrated with ideological and political education. Only by grasping the timing and depth of the ideological and political curriculum can it be attractive, persuasive, and vibrant. Otherwise, it can easily create the impression of deliberate preaching among students and affect the effectiveness of education.

Secondly, the content of ideological and political lectures in the course is more focused on precision than quantity. If there is too much ideological and political education, it will not only cause students' disgust and fail to play the role of ideological and political education in the curriculum, but also affect the learning of professional knowledge and the completion of teaching tasks, making the results counterproductive. Therefore, the materials for ideological and political education should be carefully selected and prepared, and the key points should be grasped. If necessary, it is better to choose from scarcity than abuse, and the timing of entry should be found in the course teaching process, so that ideological and political education and the teaching of professional knowledge can be highly integrated and go hand in hand. [2]

Once again, the example of ideological and political education should be accurate and clever. High quality ideological and political examples help students understand relevant concepts, not only making students more passionate about learning, but also triggering spontaneous thinking and active discussion.

Finally, it should not be limited to "dedicated ideological and political education", nor should it be limited to classroom teaching. We need to break through the limitations of traditional teaching concepts, teaching space, and time. We need to shift from the traditional teaching concept of "dedicated ideological and political education" and "classroom ideological and political education" to the modern educational concept of "everyone ideological and political education" and "everyone can ideological and political education". Teachers should make full use of online teaching platforms such as "Learning Communication" and "Rain Classroom" to expand and extend the time and space of this course teaching. [3]

3. The Educational Objectives of Curriculum Ideological and Political Education

The fundamental goal of integrating ideological and political elements into the teaching of chemical engineering principles is to ensure the quality of chemical engineering principles teaching and ideological and political education. In this way, students can not only master professional knowledge through learning, but also unconsciously strengthen their beliefs and ideals, guided by more firm socialist core values, and display their own value in future work positions, making contributions to the country and the people. [4]

Firstly, integrating ideological and political elements into the teaching of chemical engineering principles is more conducive to helping students establish patriotism and recognize their job responsibilities. At the same time, it is also possible to cultivate students' sense of teamwork and dedication under the guidance of ideological and political elements.

Secondly, in the context of globalization, facing more severe international political, economic, and cultural exchange and competition, introducing ideological and political elements into the education of chemical engineering principles can also help students establish an international perspective, help students grasp the development history, laws, and competitive core between countries, and build students into better quality talents. [5]

Thirdly, introducing ideological and political elements into the education of chemical engineering principles is more conducive to cultivating students' resilient qualities, enabling them to bravely face various challenges and setbacks in their subsequent learning, work, and growth.

Fourth, through the introduction of ideological and political elements, we can help students establish dialectical materialism values under the guidance of ideological and political education, and then analyze and control problems in life through the perspective of dialectical materialism to improve students' ability to solve problems.

Fifth, in the context of the new era, higher standards have been set for talents, which not only require them to possess professional qualities in the field, but also comprehensive qualities, including but not limited to the concept of the rule of law, environmental awareness, safety concepts, etc. Under the guidance of ideological and political education, enhance students' sense of social responsibility and mission. [6]

4. Exploration of Ideological and Political Elements in Curriculum

4.1. *Integrate the philosophy of dialectical materialism into the teaching of "Principles of Chemical Engineering"*

There are some commonalities between different chemical unit operation, and all chemical unit operations involve three transfer phenomena or their combinations. The speed of the transmission process is equal to its driving force divided by resistance, reflecting the philosophical viewpoint of "understanding things, we must grasp the essence through phenomena"; In the Reynolds experiment, when the fluid flow rate is low, its flow pattern is laminar. As the flow rate gradually increases, the flow pattern of the fluid eventually develops into turbulence, which reflects the philosophical view of "quantitative change causes qualitative change".

The law of unity of opposites can be seen everywhere in the entire teaching process of "Principles of Chemical Engineering". In the calculation of the amount of absorbent used in the absorption process, if the amount of absorbent decreases (i.e. the operating cost decreases), the closer the operating line is to the equilibrium line, and the driving force of absorption also decreases. In order to achieve a certain absorption rate, it is necessary to increase the gas-liquid contact area (i.e. increase equipment costs). The smaller the operating cost, the greater the equipment cost; On the contrary, the higher the operating cost (the higher the amount of absorbent used), the smaller the equipment cost (the smaller the size of the absorption tower). Obviously, investment costs and operating costs are a pair of contradictions, they are both interdependent and interrelated. To reduce operating costs, investment costs will inevitably increase, and vice versa. Therefore, it is necessary to find a balance point and choose an appropriate amount of absorbent to minimize the total cost of the absorption process. [7]

4.2. Integrating patriotism into the teaching of the "Principles of Chemical Engineering" course

In order to strengthen students' patriotism, we will introduce some touching stories and major contributions of the older generation of chemical scholars in China during the teaching process of this course. For example, when we introduce the development history of the chemical industry in the introduction, we will explain the glorious deeds of Mr. Hou Debang, a famous pioneer in the chemical industry in China, and his three main contributions in the field of chemical engineering. Mr. Hou's contribution to China's chemical industry is worth remembering forever! [8]

Mr. Shi Jun is a famous chemical engineering scientist and educator in China. He went to the United States to study in 1935, and the next year he received a master's degree in papermaking from the University of Maine, and then went to MIT to specialize in chemical engineering. In 1938, he politely declined Professor Whitman, the dean of the Department of Chemical Engineering at the Massachusetts Institute of Technology, and gave up his superior research platform and living conditions in the United States. He resolutely returned to his country, which was deeply affected by the disaster, and devoted his life to the education cause of his country.

Mr. Shi Jun has been teaching courses such as "Principles of Chemical Engineering" for a long time, and has cultivated a large number of outstanding talents for our country (including 16 academicians from both academies). On the afternoon of February 16, 2001, when he was 90 years old, he joined the CPC. The firm belief in patriotism and love for the Party, the excellent style of rigorous academic research, and the noble spirit of being willing to serve as a ladder of people, will always be our role models to learn from! [9]

5. Exploration and Teaching Integration Method of Ideological and Political Elements in the Course of Chemical Engineering Principles

5.1. Reasonably design teaching content

In the process of integrating ideological and political elements into the teaching of chemical engineering principles, teachers should design the teaching content more reasonably, determine the ideological and political education goals in the chemical

engineering principles course, and then, on the basis of optimizing and adjusting the teaching design, innovate and improve multiple aspects such as teaching concepts, methods, and plans simultaneously. At the same time, introducing successful cases of ideological and political education in the course, combined with case analysis methods, provides reference and support for carrying out high-quality teaching of chemical engineering principles, and helps teachers grasp the various problems that exist. Afterwards, in the explanation of fluid flow content, further grasp the characteristics and core contradictions of the modified content, so as to form a more ideal integration effect with ideological and political elements. [10]

5.2. Accurately mining ideological and political elements

In the process of integrating ideological and political elements into the teaching of chemical engineering principles, teachers are required to be able to grasp ideological and political elements more fully and accurately. Ideological and political education is an important requirement for modern education in China. When introducing ideological and political elements into the teaching of chemical engineering principles, teachers should have a more comprehensive and detailed understanding of ideological and political education, recognizing its complex nature of politics, education, and ideology. Afterwards, on the basis of precise excavation of ideological and political elements, we aim to achieve a more ideal integration effect between ideological and political elements and chemical engineering principles courses.

Firstly, teachers are required to have a deep understanding of the concept of cultivating morality and cultivating talents, and then develop targeted ideological and political education plans based on the characteristics and needs of the Chemical Engineering Principles course. [11]

Secondly, fully grasp the knowledge system of professional courses and effectively enhance and sublimate the ideological and political elements involved.

Thirdly, focus on analyzing the knowledge points of the Chemical Engineering Principles course, and introduce more advanced technical support, including multimedia technology and information technology, to enable ideological and political elements to achieve more ideal results when applied to the education work of the Chemical Engineering Principles course. [12]

5.3. Enrich the ideological and political education methods of the curriculum

In the process of introducing ideological and political elements into the education of chemical engineering principles, teachers are required to continuously enrich the methods of ideological and political education in the curriculum. In practice, teachers should recognize that ideological and political education in the curriculum is a process of Europeanization, and only by continuously enriching and innovating educational and teaching methods can they achieve more ideal results in educational implementation. [13]

Firstly, in fluid flow teaching, teachers should grasp the pre class stage well, set relevant questions before the formal teaching of the course, guide students to engage in independent thinking and discussion, and familiarize themselves with the content of this lesson in advance; On the other hand, grasp the problems in this lesson in advance.

Secondly, fully grasp the key and difficult points in the fluid flow content of the Chemical Engineering Principles course, and then introduce targeted ideological and

political elements. During this period, teachers should adopt extended and heuristic education methods. [14]

Thirdly, in after-school teaching guidance, expand the course content to help students approach and solve problems from the perspective of professional knowledge; On the other hand, under the elements of ideological and political education, form correct values and professional spirit.

6. Conclusions

In summary, based on the development goal of moral education and talent cultivation, it is necessary to effectively integrate ideological and political elements during the current high-quality teaching of chemical engineering principles courses. By integrating ideological and political elements, we provide guidance on the implementation of concepts and values in the teaching of chemical engineering principles, so that students can not only master the professional knowledge but also establish correct cognition and thinking after completing their studies, and guide their subsequent learning work with better quality [15].

Conflicts of Interest

The author declares that there is no conflict of interest regarding the publication of this article.

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