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Application and Exploration of the Four in One Education Model in Building Materials Curriculum

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Abstract: This article first points out the many problems found in the teaching process of building materials, and then explores how to achieve the "four in one" education model of ideological and political education, cultural education, professional education, and practical education in the course of building materials. Through various means, the "four in one" education model has been achieved, and considerable results have been achieved.

1. Preface

The Building Materials course has the characteristics of a large knowledge system, diverse and scattered content, wide application scope, and complex engineering problems involved[1,2]. The teaching and learning effectiveness of the building materials course will directly affect the learning of subsequent professional courses. At present, research on the reform and innovation of building materials courses mainly focuses on the improvement of traditional teaching methods and teaching content.There is more research on professional and practical directions, and less research and reform on cultural and ideological education[3,4]. This article proposes the use of the "four in one" education model in the course of building materials to achieve the multi-faceted education goals of ideological and political education, cultural education, professional education, and practical education, meeting the national requirements for curriculum ideological and political education as well as application-oriented college education objectives.

2. Analysis of Problems in Teaching

Based on years of teaching experience, it is concluded that there are several main problems in the learning of building materials courses, including:

2.1. Lack Of Ideological And Political Elements

How to integrate "ideological and political" elements into professional courses has always been a basic requirement of the country's curriculum in recent years, and it is also a research hotspot in various universities. Building materials, like most engineering courses, have strong specialization and

lack ideological and political elements. How to explore ideological and political elements and enrich course ideological and political resources is the focus of curriculum reform and innovation[5].

2.2. Learning Of New Materials Lags Behind

In recent years, there has been an increasing amount of research on green building materials, and many new multifunctional materials have emerged and been applied. The textbook on building materials updates slowly and covers less about the new materials that have emerged recently. How to keep up with the development of new materials, expand students' understanding of new materials, enhance their interest in green building materials, and contribute to the "dual carbon" initiative is an important part of curriculum innovation.

2.3. Inappropriate Learning Objectives

The main purpose of education is to learn how to guide practice with theory, while students' current main purpose of learning is to take exams.The ability of theory to guide practice is relatively weak, which deviates significantly from the original purpose of education.How to cultivate students' ability to connect theory with practice during the teaching process, and how to use theoretical knowledge to analyze engineering cases and solve engineering accidents are important aspects that should be emphasized in future teaching processes.

3. The Application of the "Four in One" Education Model

In response to the problems discovered during the teaching process, this article conducts research based on the course of building materials. On the basis of improving professional and practical education research, the reform and innovation of course content and system are achieved from two aspects: cultural education and ideological and political education. Aim to strengthen ideological and cultural education, enhance understanding and learning of green new materials, and emphasize the combination of theory and practice. The cultivation of applied talents is achieved through the "four in one" education model of ideological and political education, cultural education, professional education, and practical education, providing reference for the reform and innovation of other courses.

3.1. Ideological And Political Education

In response to the overall environment of "ideological and political education in courses", we have carried out ideological and political education activities from the following aspects:

(1)Engineering case analysis: Using multiple channels to collect engineering cases, through case analysis and accident cause analysis, strengthening the ability to combine theory and practice, enhancing students' sense of work responsibility, and through cases, allowing students to understand industry characteristics in advance, have a preliminary understanding and judgment of industry nature and future employment direction, which is beneficial for students' career planning.

(2)Super Engineering Explanation: By watching videos of Super Engineering, on the one hand, we can experience that as a strong infrastructure country, our country has entered the world's advanced level in technology, management, personnel and other aspects, thus cultivating students' national confidence and pride; On the other hand, students can experience the spirit of craftsmanship in a great country, inherit the virtues and skills of craftsmen, and enhance the professional identity and sense of responsibility of construction practitioners.

(3)Learning History and Culture: Taking history as a node, students can understand the period when the building materials they are studying appeared, as well as the historical background at that

time, and the cultural elements involved, such as poetry, songs, and personal stories, to enhance students' cultural identity and confidence.

(4)The reward mechanism of exchanging stars for red flags: During regular teaching, students can accumulate stars by answering questions. If they accumulate five stars, they can exchange them for a red flag. At the end of the semester, combining the number of stars and red flags can earn different degrees of bonus points, which can stimulate students' interest in learning.

(5)Establishment and improvement of course resource library: All project members will integrate the ideological and political elements of the course, establish a sound ideological and political resource library, lay the foundation for the future development of ideological and political education in the course, and provide reference for the development of ideological and political education in other courses.

3.2. Cultural Education.

Each type of building material appears at a specific historical node and corresponds to a specific historical period. By understanding the historical background of the time and the characters, allusions, poems, songs, etc. related to the material, we can have a deeper understanding of our traditional culture, enhance cultural identity and cultural confidence, and also reflect the ideological and political education of the course. For example, when teaching about lime, the poem "Ode to Lime" tells the story of the discovery of lime and the historical background at that time, as well as the poet's use of objects to express emotions. At the same time, students also learned about the production process of lime through this poem.

3.3. Professional Education

Traditional building materials, due to their long development time and scientific and comprehensive information, are studied through online preview and offline teaching methods. For new materials, especially emerging building materials such as "energy-saving and emission reduction" and "green and low-carbon" that are in line with the historical background, their development time is relatively short and the textbook content covers less. To this end, we have set up an open learning session where students and teachers can access information and collect data through various channels, engage in "sharing" learning, keep up with the pace of professional development, and improve the professional education model.

3.4. Practical Education

The main goal of application-oriented undergraduate colleges is to cultivate professional talents with strong practical abilities[6]. Efforts should be made to correct students' erroneous cognition of "learning as an exam", combine theory with practice, improve the practical education model, and make learning serve practice:

(1)Teachers collect and update engineering cases, and combine them with teaching to consolidate students' theoretical knowledge and enable them to understand the current industry development and problems faced. At the same time, by analyzing the causes of engineering accidents, cultivate students' ability to apply professional theoretical knowledge to guide practice.

(2)Experimental course reform: The building materials experimental course adopts a basic experiment+extended experiment model to carry out experimental teaching, fully utilizing the experimental class time, expanding students' experimental skills, and enhancing students' hands-on ability.

(3)Reforming the assessment mechanism of the experimental stage: During the experimental

process, due to the independent guidance and evaluation of the teaching hours by the supervising teacher, there is a tendency for unfairness in the grades. Therefore, the assessment mechanism of the experimental stage has been reformed. The use of the "three averages" method among the subject teacher, experimental teaching assistant, and student leader to determine the experimental results increases the fairness of the results.

4. Current achievements

Starting from the characteristics of the building materials course, this article summarizes the existing experience in response to identified problems, and carries out the reform and practice of the "four in one" education model, mainly achieving the following goals:

(1)Combining cultural education with ideological and political education, truly achieving the goal of "cultivating virtue and nurturing people".

Firstly, by exploring ideological and political elements and establishing an ideological and political resource library, the smooth implementation of ideological and political education in the curriculum can be ensured. In addition, by tracing historical footprints, understanding historical backgrounds, learning about people's deeds, appreciating poetry and songs, and other cultural methods to carry out ideological and political education in the curriculum, the means of ideological and political education in the curriculum are more diverse, thus truly achieving "moral character" in talent cultivation.

(2)Integrating the learning of new materials with current developments and policies to cultivate students' innovative spirit.

Open learning sessions have been added to the course learning, adopting a "sharing" learning mode for the study of new materials, keeping up with the pace of professional development, compensating for the time difference between textbook content and real-time materials, guiding students to combine material learning with the development of the times, and cultivating students' innovative spirit.

(3)Correcting students' learning objectives and cultivating their ability to guide practice with Theory.

Efforts should be made to correct students' erroneous cognition of "learning as an exam", by improving the practical education mode, combining theoretical teaching with practical guidance, truly allowing professional theory to guide engineering practice, while consolidating theoretical knowledge through engineering practice.

5. Conclusion

Through the application of the "four in one" education model in building materials, it can be seen that this education system can help teachers guide students in the curriculum, enhance students' interests, achieve ideological and political goals, professional goals, practical goals, and cultural goals, cultivate applied talents suitable for social development for schools and the country, truly realize the "four in one" education model, and also provide reference for curriculum innovation in other similar engineering majors.

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References

[1] Gao Jie, Yang Jiangang, Yu Li, et al. Reform of Road Building Materials Curriculum under the Guidance of Ideological and Political Education [J]. Western Quality Education, 2022,8 (21): 61-64
[2] Li Xiaolong. Research on Teaching Reform of "Building Materials" Course in Vocational Colleges [J]. Education and Teaching Forum, 2023, (50): 77-80
[3] Chen Rong, Jin Hesong, Yang Shiyu et al. Exploration and Application of the Reform of the "Six in One" Teaching Mode in Building Materials Course [J]. Journal of Southwest Normal University (Natural Science Edition), 2021, 46 (10): 146-152.
[4] Bu Jingwu, from Zhouji, Xu Bo Teaching Reform of Building Materials Course for Post-2000 College Students [J]. Education and Teaching Forum, 2020, No. 478 (32): 177-178
[5] Lin Pingting. Exploration of Classroom Teaching Design for "Building Materials" Course under Curriculum Ideological and Political Reform [J]. Science Fiction Pictorial, 2022, No. 316 (02): 112-113
[6] Da Zexiaoli. A Preliminary Study on the Teaching Reform of the Applied Undergraduate Course "Building Materials" [J]. Ju She, 2019 (28): 173