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Reform of Ideological and Political Education in Asphalt and Asphalt Mixture Experimental Course

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Abstract. In order to promote the deep integration of ideological and political courses and professional course teaching and cultivate high-quality applied engineering and technical talents with comprehensive development, the research is conducted from the perspective of asphalt and asphalt mixture experimental courses. Based on the characteristics of the course and the combination of professional knowledge points, the educational goals of ideological and political education in the course are determined. Through multiple aspects of ideological integration: deeply explore ideological elements, optimize teaching content containing ideological elements, deepen the design of the teaching process of ideological education, and innovate teaching models and methods. This paper summarizes and analyzes the practice and thinking in teaching reform, which has great significance in promoting students' patriotic awareness, improving learning motivation, and clarifying the direction of efforts. It also provides reference for the reform and construction of ideological education in university courses.

Keywords. Asphalt and asphalt mixture testing; Course ideology and politics; Teaching method; Teaching reform.

1. Introduction

General Secretary Xi Jinping points out that he foundation of establishing a university lies in cultivating morality and cultivating talents. Comprehensively promoting the ideological construction of courses is a strategic measure to implement the fundamental task of cultivating morality and cultivating talents. Colleges and universities should effectively improve their political stance and ideological awareness, fully leverage the role of the teaching staff as the "main force", Course construction as the "main battlefield", and classroom teaching as the "main channel", and integrate values into knowledge transmission and ability cultivation, so that various courses and ideological courses run in the same direction, forming a synergistic effect, and constructing a pattern of educating people from all aspects throughout the entire process [1, 2].

Asphalt and asphalt mixture testing is a professional basic course for students majoring in transportation engineering, mainly studying the composition, performance testing, and application of asphalt pavement materials [3, 4]. By mastering the technical

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characteristics, indicators, and evaluation methods of asphalt pavement materials, practical engineering problems can be solved, while also laying the foundation for the subsequent study of relevant professional courses. Asphalt and asphalt mixture testing is not only a necessary basic knowledge for learning professional courses, but also an applied technology [5,6].

Through the reform of the ideological integration experimental Course, it helps students establish a correct outlook on life and values [7]. This paper mainly integrates ideological elements such as national responsibility, craftsmanship spirit, patriotism, legal awareness, and cultural confidence into the experimental teaching of asphalt and asphalt mixture, so that students can understand the importance of road engineering in national infrastructure construction, as well as China's independent research and development strength and achievements in road engineering technology. In the context of new engineering, high-level applied talents should not only possess strong professional skills and the ability to solve complex problems, but also firmly hold a political stance in order to adapt to the new situation.

2. Course Construction Objectives

The fundamental issue of education is to cultivate what kind of people, how to cultivate them, and for whom to cultivate them. The fundamental standard for testing all work in universities is to cultivate virtue and cultivate effectiveness [8]. The construction of ideological education in the Course aims to integrate values into knowledge impartation and ability cultivation, helping students shape correct worldviews, outlooks on life, and values. This is an essential part of talent cultivation and an essential content. The objectives of this course construction mainly include the following two aspects.

2.1 Course objectives

Combining the transformation, transformation, and upgrading of the transportation major in the context of new engineering, we aim to enhance professional vitality, keep up with industry development, and cultivate a group of outstanding scientific and technological talents with innovative and entrepreneurial abilities and high quality in road engineering.

Enrich teaching resources: Through resource construction and the combination of virtual and real methods, stimulate students' interest in learning, help them deeply understand the basic characteristics and requirements of mix design, and establish intuitive and perceptual understanding from the whole to the parts of the experiment, improving students' understanding ability of basic professional knowledge.

Enhance innovative practical ability: By reproducing experimental scenarios and studying the impact of multiple parameters on experimental results, promote students' exploratory and autonomous learning, and improve their comprehensive professional practical ability.

2.2 Goals of educating people

Integrating the education of Marxist standpoint, viewpoint, and method with the cultivation of scientific spirit in curriculum teaching to improve students' ability to correctly understand, analyze, and solve problems. Integrate the relevant content of

ideological education into the asphalt and asphalt mixture experimental course, express the purpose of ideological education through subject integration, and achieve the goal of "curriculum education" through value guidance. Integrate learning and thinking, unify knowledge and action, and enhance students' innovative spirit of exploration and practical ability to solve problems. At the same time, it subtly allows students to receive the influence of mainstream values, strengthens students' engineering ethics education, cultivates students' spirit of striving for excellence as a great craftsman, and inspires students' patriotism and mission responsibility in serving the country through technology.

3. Course Construction Plan

How to coordinate the relationship between professional training and ideological guidance? General Secretary Xi Jinping pointed out at the National Conference on Ideological and Political Work in Universities that various courses should go hand in hand with ideological theory courses to form a synergistic effect [9]. Considering the relationship between the above courses and ideological education, based on the same direction and synergy, a teaching concept of mutual integration and promotion between courses and ideological education has been established, that is, to explore and integrate ideological elements in professional courses to achieve the goal of ideological construction; The combination of ideological elements with the basic laws of professional knowledge promotes professional teaching and better achieves professional knowledge goals. On this basis, a curriculum ideological teaching model has been formed as shown in Figure 1.

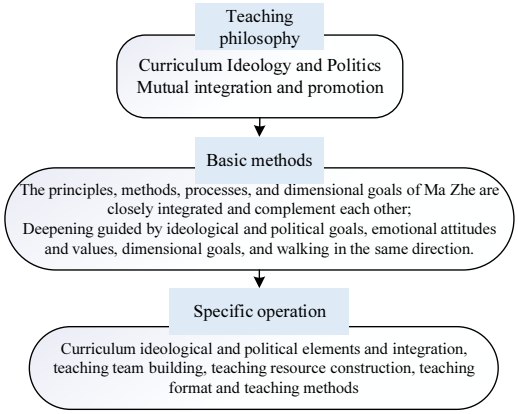


Figure 1. The teaching model of "curriculum" and "ideological and political" integrating and promoting each other

4. Key Points of Ideological and Political Education in the Course

4.1. Integration of Ideological and Political Elements in the Course

The basic methods of ideological education in the curriculum are determined as follows: at the rational level, the curriculum knowledge is closely combined with the principles

of Marxist philosophy, complementing each other; At the emotional level, guided by ideological goals, the unified goal of emotional attitude and values is clarified, and we work together in the same direction. The logical relationship is shown in Figure 2.

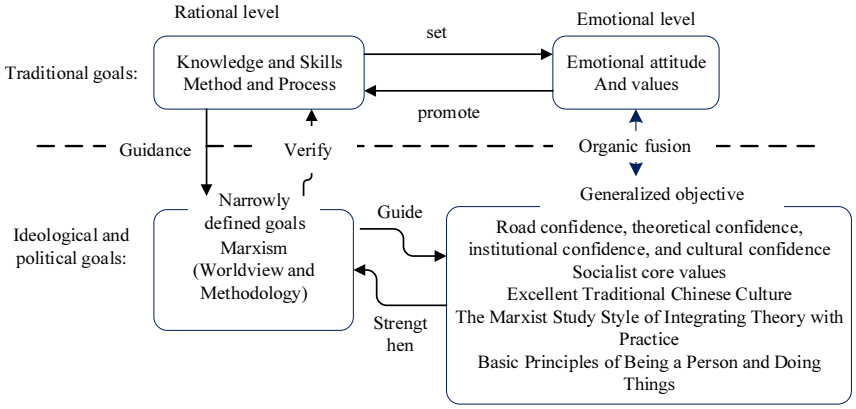


Figure 2. Schematic diagram of basic methods for integrating and promoting traditional curriculum goals and ideological and political goals

The exploration of ideological factors in the teaching content of asphalt and asphalt mixture experiment course mainly involves the following aspects.

1) The Great Country Project Inspires National Pride and Responsibility

In the teaching of asphalt and asphalt mixture experimental courses, teachers need to use the disciplinary thinking of ideological theory education to organize the teaching content. According to the teaching outline, cross the textbook, introduce the positive energy content of society into the classroom, introduce the significant progress and breakthroughs made in road construction in China, stimulate students' sense of social responsibility and patriotism, and correctly understand the development level of various disciplines in the domestic road industry, stimulate national pride and sense of concern, stimulate their sense of social responsibility, stimulate students' interest in the field of civil engineering, and promote their comprehensive development.

In the past 40 years of reform and opening up, China's highway infrastructure construction has achieved leapfrog development. To become rich, first build roads. As of the end of 2020, the total mileage of highways in China reached 5.198 million kilometers, with a highway density of 54.15 kilometers per 100 square kilometers.

On August 21, 2021, the 295 kilometers section of the G6 Beijing Tibet Expressway from Naqu to Lhasa was fully opened, increasing the total mileage of high-grade highways in Tibet to 1105 kilometers. The snowy plateau is crisscrossed by heavenly roads, bringing hope for prosperity to the people of all ethnic groups. On August 23, 2021, the Tianshan Shengli Tunnel on the Xinjiang Wuwei Expressway successfully crossed the largest and most dangerous fault zone in the project and entered the construction "fast lane". After completion, it will become the world's longest highway tunnel [10]. Figure 3 lists engineering projects related to asphalt mixture courses.

(a) Mountain asphalt pavement

(b) Hong Kong-Zhuhai-Macao Bridge Deck Pavement

Figure 3. Major Country Projects Related to Curriculum

2) Promote the spirit of craftsmanship and uphold the professional spirit of loyalty to duty and tenacious struggle

Interpret and guide students to learn the revolutionary spirit of perseverance, self-improvement, and dedication demonstrated by road engineering builders. Professional teachers will introduce advanced figures full of positive energy and a sense of the times into the classroom, such as Chen Gangyi, a Tibetan aid cadre who is loyal to his duties and still leads the project team to overcome the harsh natural environment despite suffering from cancer. Cao Guanghui, the "model of the highway director" who passed away at an early age due to accumulated labor and illness. Xu Zhenchao, who possesses noble sentiments, innovative spirit, and professional spirit, made a glorious sacrifice for rescuing flooded highways and was awarded the title of "Model of the Director of Transportation" by the Ministry of Transportation, including Zhao Jiafu.

The Sichuan Tibet Highway and the Qinghai Tibet Highway have harsh geographical and climatic environments, and many sections are prone to geological disasters. Sudden disasters such as landslides and mudslides are frequent, and the construction and maintenance techniques are complex. They are known as the most dangerous highways in the world. In order to promote the development of the southwest frontier and national unity and progress, in 1950, with the revolutionary heroism belief of "one is not afraid of hardship, and the other is not afraid of death", 110000 Tibetan and Han military people used pickaxes, shovel, hammers, and steel chisels to "break through mountains and build bridges when facing water", crossed 14 mountains, including Erlang Mountain and Queer Mountain, and crossed Minjiang River, Dadu River, Lancang River, and other major rivers; Through 8 major fault zones, spanning countless permafrost areas, swamp areas, earthquake areas, gravel collapse areas, primitive forests, and large glaciers -3000 martyrs sacrificed their lives on the plateau [11].

3) Learn The Spirit Of Liberating The Mind, Daring To Innovate, And Being The First

In the 1980s, the construction of highways in China, such as Shenda, Beijing Tianjin Tang, and Shanghai Jia, was under exploration. The builders adhered to the spirit of "being brave in innovation and daring to be the first" and continuously made breakthroughs in technology, making China's highway construction one of the world's major powers in just 30 years.

The Shenda Expressway is the first long-distance expressway designed and constructed independently in China. Except for a small number of imported key equipment, all equipment and materials are made of domestic products. The construction began in June 1984, when there were no technical standards or practical experience for highways in China. Since 1979, the project team has invited the United States and Japan

multiple times for highway related technical exchanges, and sent technical personnel to developed countries to investigate and learn technology. While translating and learning relevant national technical standards, we have also formulated technical standards that are suitable for the actual situation in China. During the construction process, the construction personnel adhere to a scientific attitude and strictly manage, improve the system, and improve the management level. The successful completion of the Shenda Expressway reflects the spirit of road engineering builders in liberating their minds, actively innovating, and daring to make breakthroughs.

4) Using Marxist Leninist Ideology to Cultivate Students' Awareness of Seeking Truth from Facts and Their Ability to Analyze and Solve Problems

Buildings such as roads and bridges are exposed to the natural world for a long time and often suffer from the alternating effects of sunlight, rainwater, and environmental temperature. These natural factors have a significant impact on the performance of materials. Therefore, the dialectical relationship between internal and external factors, inevitability, and contingency in Marxist philosophical principles is introduced to guide students to analyze the influencing factors of material properties from both internal and external factors, and understand the inevitability and contingency of materials possessing this engineering characteristic. Taking the performance and influencing factors of asphalt materials as an example, asphalt materials are subject to environmental temperature, traffic loads, sunlight exposure, and the influence of rainwater. Good asphalt material performance should include good high-temperature stability, strong low-temperature crack resistance, and strong adhesion to stone under the action of rainwater. Therefore, when analyzing its performance, the first step is to analyze it from the internal factors, which depend on the basic component composition and elemental composition of the asphalt material. From the perspective of external factors, it depends on the impact of traffic load, environmental temperature, as well as the influence of sunlight and rainwater. Through the analysis of this example, students can be guided to flexibly apply the principles of Marxist philosophy to analyze and solve problems in their daily life, work, and study in Rizhao. In general, it is necessary to dialectically view the problems encountered in learning, life, and work, establish a correct worldview and outlook on life, and have important practical significance for students' own growth and character shaping.

5) Taking experimental courses as the starting point, integrating elements of legal and regulatory education

Based on material experiments and engineering practices, it is important for students to adhere to the principle of seeking truth from facts when writing experimental reports, and to ensure the authenticity of experimental data. In future work, experimental data often has legal validity and even arbitration, which determines the acceptance results of the construction process and construction quality. The importance of this is self-evident. Therefore, students must always remember and abide by national laws and corresponding rules and regulations, as well as various national regulations and norms. They should be responsible for the experimental testing reports issued, ensure the seriousness of the experimental data, and not engage in favoritism and fraud.

6) Establish the concept of "cultural highway", advocate for humanistic integration, and enhance students' humanistic literacy and cultural confidence

Since the Silk Road over 2000 years ago, roads have not only served as entities responsible for transportation functions, but also as cultural symbols that connect different ethnic civilizations and cooperate and exchange. With the rapid development of China's highway industry, highways have evolved from their initial functions of transportation, greening, and soil and water conservation to integrating elements such as

culture, art, science, landscaping, ecology, aesthetics, etc., organically integrating highways with the humanities, history, and natural landscapes along the line. This not only provides infrastructure with transportation functions, but also becomes a carrier that embodies harmonious natural beauty, imbued with cultural connotations, and humanistic colors, Enable pedestrians to perceive the local natural scenery and appreciate the local culture during their journey [12]. Figure 4 shows cases of different cultural highways.

(a) Hemao Highway Culture

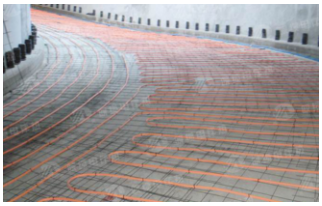
(b) The Most Beautiful Rural Highway in Shaanxi: Anlan Road

Figure 4. The Case of "Cultural Highway"

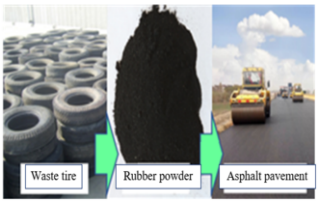
7) Establishing the concept of "environmentally friendly highways"

In response to the negative impact of highway construction on the natural environment, China's highway industry is accelerating the promotion of new environmental protection concepts, proposing the new concept of "no damage is the best protection, maximum protection of the ecological environment in design, minimum damage and maximum restoration of the ecological environment in construction". In the design, it is necessary to fully consider the terrain and topography, save land resources as much as possible, and avoid environmentally sensitive areas such as natural reserves, drinking water source protection areas, scenic spots, geological parks, and residential areas as much as possible; During construction, use temporary land as required to effectively control environmental pollution.

China has achieved a series of scientific research results in the field of energy conservation and emission reduction in highway engineering. Jilin Heda Expressway effectively utilizes the tunnel waste generated during highway construction, not only as a material for roadbed filling and pavement base, but also developed molding equipment to process tunnel waste into concrete components for use in concrete retaining walls and ecological waste. Not only does it reduce the occupation of land resources by tunnel waste, but it also protects the ecological environment and land resources along the highway.



(a) Electric melting ice and snow road surface



(b) Waste tires, rubber, asphalt pavement

Figure 5. Environmental friendly road construction

In addition, waste tire rubber asphalt pavement materials [13], old cement concrete pavement recycling technology, warm mix asphalt technology, and environmentally friendly ice melting and snow melting technology [14] have all been promoted and

applied in engineering, achieving good results in resource conservation and environmental protection, as shown in Figure 5.

4. Teaching Resources and Methods

Closely integrating the teaching reform objectives and teaching content design of the course, fully adopting various teaching methods, highlighting the cultivation of students' knowledge acquisition, ability improvement, and quality improvement. Table 1 summarizes the specific content of teaching resource construction and teaching methods.

Table 1. Construction of Teaching Resources and Teaching Methods

Serial Number	Teaching method	Teaching materials	Ideological points	Teaching resources
1	Online and offline blended teaching; Group learning, compete between groups to obtain scores, and conduct assessments	Special report website	The Great Country Project Inspires National Pride	Micro video
2		Special report Record data	Promote the spirit of craftsmanship	Micro videos
3		Special report website	Learn the spirit of liberating the mind, daring to innovate, and being the first	Role Model Story
4		Record data	Integrating elements of rule of law and regulatory education	Cases
5		Scientific research achievements	Establish the concept of "cultural highway", advocate for humanistic integration	Social practice
6		Scientific research achievements	Establishing the concept of "environmentally friendly highways"	Scientific research paper

5. Conclusion

The ideological and political construction of courses is an important component of the moral education function of courses, and it is the specific implementation of the fundamental task of cultivating morality and cultivating people.

1) This article explores and practices the ideological teaching reform of asphalt and asphalt mixture courses, integrating the scientific spirit of national confidence, craftsmanship, seeking truth and practicality, and energy conservation and environmental protection into the curriculum system through case studies. While studying professional courses, it cultivates students' political thinking and moral qualities.

2) Integrating ideological education into the teaching of professional courses, making teaching diverse and three-dimensional, and promoting students' patriotic awareness, improving learning motivation, and clarifying the direction of efforts, are of great significance. At the same time, lay a solid foundation for students to adapt to social needs after graduation, and achieve the teaching goal of cultivating morality and talent.

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