

Original Paper

Exploration of Integrating Ideological and Political Education into the Curriculum of “Road Survey and Design” from the Perspective of Moral and Intellectual Education in the New Era

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Abstract

In the context of the new era and the goal of moral and intellectual education, the design of ideological and political education in curriculum holds significant importance for civil engineering majors. By incorporating ideological and political education into the curriculum, students' political awareness, comprehensive qualities, innovative spirit, social responsibility, environmental consciousness, attention to social development, and technological innovation can be cultivated. After integrating ideological and political content into the “Road Survey and Design” course, there have been significant improvements in students' political awareness, comprehensive qualities, innovative spirit, social responsibility, environmental consciousness, career development awareness, and teachers' instructional capabilities.

Keywords

moral and intellectual education, curriculum design, applied talents, road survey and design, curriculum development

1. Introduction

Moral and intellectual education in the new era and the integration of ideological and political education into curricula are pivotal concerns in higher education today. Cultivating moral and intellectual virtues is the fundamental mission of universities in terms of ethical construction and talent development. The establishment of various courses should be rooted in the goal of fostering moral and

intellectual virtues, incorporating the concept of ideological and political education throughout teaching processes to unleash the educational potential of each subject. The design of ideological and political education holds particular significance within engineering disciplines, as it can cultivate correct ideologies and values among students, bolstering innovative and problem-solving capabilities, teamwork, communication skills, and fostering concern for societal development and sustainability, along with instilling social responsibility and professional ethics. This multifaceted cultivation profoundly influences the comprehensive qualities and career development of engineering students.

“Road Survey and Design,” as one of the core courses in civil engineering, imparts systematic knowledge and practical skills, fostering students’ professional and practical capabilities. Integration of students’ moral qualities, value systems, and social responsibility can further enhance their professional literacy and innovation awareness. By infusing the spirit of ideological and political education into the curriculum’s teaching processes, and innovating curriculum design and teaching methodologies, the resources of the Party’s major policies and socialist core values are seamlessly integrated. Methods like case analysis, discussions, and project-based practices prompt students to contemplate the relationship between road construction, societal development, environmental protection, and sustainability. This approach nurtures a sense of responsibility and innovative thinking.

2. Key Points in the Design of Ideological and Political Education within the Framework of Moral and Intellectual Education in the New Era

In the perspective of moral and intellectual education in the new era, the design of ideological and political education in the curriculum should be oriented towards fostering moral virtues. This involves integrating ideological and political education with disciplinary expertise, enhancing students’ innovative and practical abilities, guiding their focus on societal and sustainable development, and cultivating professional ethics and social responsibility. These key points contribute to students’ comprehensive development, enabling them to become well-rounded socialist builders and successors in morality, intelligence, physical health, aesthetics, and labor.

2.1 Objective of Cultivating Moral Virtues

The design of ideological and political education should closely revolve around the objective of cultivating moral virtues, nurturing students’ moral qualities, value systems, and social responsibility. Through the selection of curriculum content and teaching methods, students should form correct outlooks on life and values, foster their character development and social responsibility, and cultivate well-rounded socialist builders and successors who embody morality, intelligence, physical health, aesthetics, and labor.

2.2 Organic Integration of Disciplinary Expertise and Ideological and Political Education

In curriculum design, ideological and political education should be seamlessly integrated into the teaching content and practical aspects of the discipline, allowing mutual permeation and promotion of professional knowledge and ideological and political education. Through methods such as case

analyses, discussions, and project-based practices, students are guided to explore the relationship between professional issues and ideological and political matters, nurturing their comprehensive thinking abilities and problem-solving skills.

2.3 Strengthening Innovative and Practical Abilities

Curriculum design should emphasize cultivating students' innovative and practical abilities. By introducing innovative teaching methods and practical activities, students' creativity and problem-solving capabilities can be stimulated. Through project-based practices, internships, and practical training, students apply acquired knowledge and ideological and political literacy in real-life contexts, fostering innovative thinking, practical skills, and teamwork spirit.

2.4 Guiding Focus on Societal Development and Sustainability

Curriculum design should guide students to pay attention to societal development and sustainability issues, nurturing their sense of social responsibility and environmental awareness. By teaching the concepts of social responsibility and sustainable development, students gain an understanding of the role and responsibilities of their profession in societal progress, cultivating environmental protection awareness and a mindset oriented toward sustainability.

2.5 Cultivating Professional Ethics and Social Responsibility

Curriculum design should emphasize cultivating students' professional ethics and social responsibility, guiding them to establish correct professional principles and ethical standards. Through case-based teaching, practical activities, and more, students' professional ethics, teamwork abilities, and innovative awareness can be nurtured, equipping them with excellent professional ethics and a sense of social responsibility, enabling them to actively contribute to societal development.

3. Implementation of Ideological and Political Education Objectives in “Road Survey and Design”

Through incorporating ideological and political education objectives into the “Road Survey and Design” curriculum, students can not only master professional knowledge and skills but also develop correct ideological and political awareness, possessing social responsibility, innovative spirit, and practical capabilities, thereby making positive contributions to societal and sustainable development.

3.1 Guiding Students to Develop Correct Ideological and Political Awareness

By clarifying teaching objectives, establishing connections between real-life cases, promoting thinking and discussions, emphasizing professional ethics and social responsibility, and demonstrating proper behavior by instructors, these objectives can be integrated into curriculum design and teaching content, ensuring the infusion of ideological and political education into the teaching process. This approach allows students to comprehend the significance of road construction for transportation development, economic prosperity, and social stability. It nurtures their sense of social responsibility, prompting them to contemplate the impact of engineering construction on the environment, society, and people's lives, thus fostering correct value systems and ideological and political awareness.

3.2 Cultivating Students' Comprehensive Qualities and Innovative Spirit

Within the curriculum, instructors can guide students to understand and analyze professional ethical issues within road survey and design projects through case analysis and discussions. Through classroom lectures and practical activities, students develop professional qualities like responsibility, diligence, teamwork, and innovative thinking in the process of road survey and design. As road survey and design encompass comprehensive engineering practices, methods like practical case studies, simulated design, and project-based training can stimulate students' innovative thinking and problem-solving abilities. In practical activities, students apply acquired knowledge and ideological and political literacy to real-world scenarios, nurturing their practical capabilities, teamwork, and innovation.

3.3 Nurturing Students' Social Responsibility and Environmental Awareness

Road survey and design involve issues related to land utilization, environmental protection, and sustainable development. Instructors can utilize methods such as explaining relevant policies and regulations, analyzing cases, and conducting field visits to help students understand the impact of road survey and design on the environment and society. This approach fosters environmental protection awareness and social responsibility in students, guiding them to emphasize the preservation of ecological environments and sustainable development during the design process.

3.4 Guiding Students' Focus on Societal Development and Technological Innovation

Road survey and design are closely linked to societal development and technological innovation. Instructors can introduce students to relevant industry dynamics, cutting-edge technologies, and successful cases, guiding them to pay attention to the development trends and important technological achievements in the field of road transportation. Additionally, instructors can organize students to participate in practical projects, nurturing their research capabilities, innovation awareness, and pursuit of technological progress.

Table 1. Implementation Plan for Ideological and Political Education in the Road Survey and Design Course

Course Chapters	Ideological and Political Education Objectives	Educational and Teaching Methods
I. Introduction	Through course learning, cultivate students' love for their country and nation, instill a correct sense of patriotism, and stimulate their awareness of contributing to the country's development and prosperity.	Class discussions, multimedia presentations, and interactive teaching methods
1.1 Main Tasks of Road Survey and Design		
1.2 Road Functions and Classification		
1.3 Controlling Elements of Road Design		
II. Planar Design	Based on traffic safety and civilized driving, cultivate awareness of civilized traffic	Class discussions, case analyses,
2.1 Straight Lines		

2.2 Circular Curves	behavior, guide students to focus on societal	practical activities,
2.3 Transition Curves	issues, understand the significance of road	multimedia
2.4 Calculation of Circular Curves	construction for transportation development,	presentations, and
	economic prosperity, and social stability, and	interactive methods
	cultivate their sense of social responsibility	
	and social commitment.	
III. Longitudinal Section Design	Based on ecological conservation principles,	Class discussions,
3.1 Concepts of Longitudinal Sections and Slopes	guide students to consider the impact of road	case analyses,
3.2 Vertical Curve Design	construction on the environment, cultivate	practical activities,
3.3 Combination of Horizontal and Vertical Alignments	their environmental awareness, promote	multimedia
3.4 Methods of Longitudinal Section Design	environmental design and sustainable	presentations, and
	development thinking, and promote	interactive methods
	coordinated development between road	
	construction and environmental protection.	
IV. Cross-Section Design	Emphasize the importance of land and	Class discussions,
4.1 Components of Road Cross-Sections	environmental protection, enhance safety	case analyses,
4.2 Widening Design for Circular Curves	awareness, increase awareness of land	practical activities,
4.3 Super Elevation Design for Tangent Curves	resources, and cultivate the ability to protect	multimedia
4.4 Climbing Lanes	farmland and the environment, promoting	presentations, and
4.5 Driving Sight Distance and Ensuring It	sustainable development and building a	interactive methods
4.6 Methods of Cross-Section Design	beautiful China.	
4.7 Calculation and Allocation of Earthwork Quantities		
V. Road Overall Design	Through real cases, project practices, or	Class discussions,
5.1 Requirements and Steps of Road Overall Design	simulated designs, stimulate students' creativity and problem-solving skills,	group debates, case analyses,
5.2 Examples of Road Overall Design	cultivate innovative thinking, and encourage teamwork spirit.	multimedia presentations, and interactive methods
VI. Route Selection and Alignment	Through case analysis and discussions, guide	Class discussions,
6.1 Main Tasks of Route Selection and Alignment	students to contemplate the impact of road	group debates, case analyses, practical activities,
6.2 Key Points of Route Selection in Mountainous Areas	construction on the environment, society, and people's lives, helping them form correct worldviews, life perspectives, and value systems.	multimedia presentations, and
6.3 Mountainous Road Alignment		

Methods		interactive methods
6.4 Alignment Methods (Including Curve Types)		
VII. Planar Intersections	Cultivate teamwork and communication skills through team projects and collaborative learning, fostering teamwork, communication, and collaboration abilities so that they can effectively work with others and solve complex problems.	Class discussions, case analyses, multimedia presentations, interactive methods, group debates
7.1 Traffic Characteristics and Design Requirements of Planar Intersections		
7.2 Types and Characteristics of Planar Intersections		
7.3 Traffic Management Methods for Planar Intersections		
7.4 Channelization of Planar Intersections		
7.5 Ensuring Visibility at Planar Intersections		
7.6 Roundabout Intersection Design		
7.7 Elevation Design		
VIII. Computer-Aided Road Design	Guide students to recognize the importance of technological innovation in road survey and design, nurture their sensitivity to and awareness of technological innovation, stimulate their interest and enthusiasm for technological innovation, and enhance their competitiveness and creativity in the field of technology. Additionally, provide students with broader development prospects, promoting them to become civil engineering talents who can drive technological progress and industry development.	Case analyses, subject competitions, practical activities, role-playing, and case simulations
8.1 Computer-Aided Road Design - Planar Design		
8.2 Computer-Aided Road Design - Longitudinal Section Design		
8.3 Computer-Aided Road Design - Cross-Section Design		
8.4 Computer-Aided Road Design - Road 3D Design		

4. Exploration and Effects of Ideological and Political Education in the Course “Road Survey and Design”

Through the exploration of ideological and political education in the course “Road Survey and Design,” significant achievements have been attained. Students’ ideological and political literacy has been enhanced, their comprehensive qualities nurtured, awareness of professional development strengthened, and teachers’ instructional capabilities elevated. These achievements not only benefit students’ personal growth but also play a positive role in the sustainable development of both society and the industry.

4.1 Enhancement of Students’ Ideological and Political Literacy

By integrating ideological and political education into the “Road Survey and Design” curriculum,

students simultaneously receive education in professional knowledge and ideological and political principles. They develop a deeper understanding of professional ethics, social responsibilities, and cultivate accurate life perspectives, values, and moral standards. This elevation in ideological and political literacy is evident as students engage in targeted questioning during classes, recognizing their roles and responsibilities as civil engineers and comprehending the significance of engineering projects for societal advancement. They focus on values such as technological innovation, environmental protection, and social contribution. Students consciously adhere to professional ethics, embody a spirit of expertise, and strive for the realization of engineering quality, safety, and sustainability.

4.2 Enhancement of Students' Comprehensive Qualities and Innovative Spirit

The exploration of ideological and political education encourages students to not only concentrate on learning specialized knowledge but also on cultivating comprehensive qualities. Through methods such as case analysis, teamwork, and practical projects, students' innovative capabilities, problem-solving skills, and teamwork abilities have been exercised and improved. Through course design and case analysis, students demonstrate the application of acquired knowledge and skills by proposing innovative solutions and conducting creative research and design work. They exhibit independent thinking, courage to experiment, and innovative spirit, thus contributing new ideas and approaches to industry development. Students learn to collaborate, manage conflicts, and work together effectively in teams, fostering a positive team atmosphere and collaborative capabilities. They effectively contribute their expertise within teams, successfully cooperating with others to achieve tasks and projects. When confronted with complex engineering issues, they synthesize various methods and tools to propose effective solutions.

4.3 Enhancement of Students' Sense of Social Responsibility and Environmental Awareness

The enhancement of students' sense of social responsibility and environmental awareness is reflected in their consideration of environmental factors during course design, undertaking environmental assessments and impact analyses, cultivating sustainable development thinking, and adhering to environmental regulations and norms. These demonstrations reveal students' concern for environmental protection, their proactive measures to minimize negative impacts on the environment, and their commitment to achieving harmonious development between road construction and environmental conservation.

4.4 Strengthening of Students' Awareness of Professional Development

The exploration of ideological and political education guides students to comprehend the evolving dynamics and cutting-edge technologies within the road survey and design industry. It cultivates their sensitivity to industry trends and stimulates their innovation consciousness. Students realize their responsibilities and mission within the industry, establish clear professional development goals, and lay a solid foundation for their future career paths. Through guided ideological and political education, students gain a clear understanding of their career directions and goals. They align their interests, capabilities, and values with industry demands, formulating distinct career plans and objectives.

Possessing excellent professional qualities ensures their ability to collaborate, solve problems, and tackle challenges, enabling them to display professional competence and a strong vocational image within the workplace.

4.5 Enhancement of Teachers' Instructional Competence

The exploration of ideological and political education within the curriculum necessitates teachers to incorporate ideological and political education content into their instruction. Consequently, teachers require theoretical knowledge of ideological and political education and pedagogical skills. Through the practical experience of integrating ideological and political education into their teaching, teachers' instructional capabilities have been enhanced. They more effectively guide students, nurturing their ideological and political literacy and comprehensive abilities. Through learning and training, teachers have improved their instructional competencies, becoming proficient in various teaching methods and strategies such as case analysis, discussion-based teaching, and teamwork facilitation. These methods enhance student engagement, stimulate their interest, and encourage thoughtful consideration and participation. Teachers also actively seek and develop teaching resources, such as real-world cases, practical projects, multimedia aids, enriching course content to facilitate students' intuitive comprehension and application of acquired knowledge. Simultaneously, teachers utilize innovative teaching approaches, leveraging the internet and information technology to design online learning activities and discussion platforms, thereby providing personalized learning support.

5. Conclusion

Through the exploration of ideological and political education within the "Road Survey and Design" course, students' ideological and political literacy has been elevated, their comprehensive qualities cultivated, awareness of professional development strengthened, and teachers' instructional capabilities enhanced. This exploration not only fosters students' holistic development but also contributes positively to the sustainable development of society and the industry. In the face of challenges and demands in the new era, the soft landing of ideological and political education in the "Road Survey and Design" curriculum becomes a critical task. By seamlessly integrating ideological and political education resources into curriculum content, improving instructional methods, and nurturing students' sense of social responsibility and innovative spirit, the objectives of ideological and political education within the "Road Survey and Design" curriculum can be achieved, making a positive contribution to nurturing well-rounded socialist builders and successors adept in morality, intelligence, physical fitness, aesthetics, and labor skills.

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