Research on the Teaching Pathways of Integrating Curriculum Ideological and Political Education into Geotechnical Engineering Disaster Prevention and Control

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Abstract: Based on the professional characteristics and educational objectives of the course Geotechnical Engineering Disaster Prevention and Control, this paper systematically analyzes the ideological and political education resources embedded in the course, including patriotism, engineering ethics, ecological civilization, scientific spirit, and awareness of the rule of law. It proposes a three-stage progressive teaching pathway consisting of pre-class introduction integration, in-class case-based penetration, and post-class practical extension, and constructs a teaching design framework featuring the deep integration of ideological and political elements with professional knowledge. The study shows that this teaching pathway can effectively enhance students' professional competence and ideological and political qualities, providing a practical reference paradigm for the development of curriculum ideological and political education in geotechnical engineering-related professional courses.

***Keywords*:** curriculum ideological and political education; geotechnical engineering disaster prevention and control; teaching pathway; ideological and political elements; teaching design

1. Introduction

As a core professional course, Geotechnical Engineering Disaster Prevention and Control focuses on the formation mechanisms, evolution patterns, and prevention and control technologies of geological disasters such as landslides, collapses, debris flows, ground collapses, and land subsidence. The course integrates both theoretical and practical aspects and is closely connected with social realities, with its content itself carrying resources related to ideological and political education. At present, in teaching practice, ideological and political education is often presented in an additional or decorative manner, lacking organic integration and systematic design with professional knowledge [1]. The approaches to exploring ideological and political elements, the design concepts for integration pathways, and the operation modes of evaluation mechanisms all represent practical issues faced in the teaching process. This study focuses on the synergistic relationship between professional teaching and value guidance, and examines the specific forms of integrating curriculum ideological and political education into the teaching of this course.

2. Internal Logic of Integrating Curriculum Ideological and Political Education into the Teaching of Geotechnical Engineering Disaster Prevention and Control

2.1 Compatibility between Course Characteristics and Ideological and Political Education

The teaching content of the course Geotechnical Engineering Disaster Prevention and Control covers professional modules such as disaster type identification, formation condition analysis, stability evaluation, prevention and control engineering design, and monitoring and early warning. These modules have multidimensional correlations with ideological and political education. At the level of disaster cognition, the reality of frequent geological disasters in China corresponds to the value orientation of a people-centered awareness of disaster prevention and mitigation. At the level of disaster analysis, the study of disaster mechanisms under complex geological conditions corresponds to the scientific spirit and systematic thinking orientation characterized by rigor and pragmatism [2]. At the level of prevention and control design, prevention and control engineering is directly related to the safety of people's lives and property, corresponding to the awareness of engineering ethics and social responsibility. Within the specific content of each course module, there exist inherent connections between professional knowledge and ideological and political education.

2.2 Practical Dilemmas in the Integration of Curriculum Ideological and Political Education

During the process of developing curriculum ideological and political education in the course Geotechnical Engineering

Disaster Prevention and Control, most teachers focus primarily on macro-level values such as patriotism and social responsibility, while a refined correspondence between ideological and political education content and specific knowledge points has not yet been established. Ideological and political content is mostly presented through oral explanations in the classroom, resulting in a relatively fragmented overall structure, with insufficient coherent design among pre-class, in-class, and post-class teaching stages. The main basis for course assessment remains the mastery of professional knowledge, while ideological and political content has not been incorporated into the existing assessment system, and quantitative evaluation methods are generally lacking.

3. Systematic Exploration of Ideological and Political Elements in the Course Geotechnical Engineering Disaster Prevention and Control

3.1 Classification Framework of Ideological and Political Elements

The ideological and political elements of the course Geotechnical Engineering Disaster Prevention and Control can be classified from five dimensions. The dimension of patriotism and national sentiment involves major geological disaster prevention and control projects in China and national disaster prevention and mitigation strategies, corresponding to the value orientation of emotional identification at the national and people-oriented levels. The dimension of engineering ethics covers the quality and safety of prevention and control projects, professional ethics, and industry standards, corresponding to the value orientation of responsibility awareness and professional integrity. The dimension of ecological civilization focuses on the relationship between disaster prevention and ecological protection, corresponding to the green development orientation of harmonious coexistence between humans and nature. The dimension of scientific spirit includes the pursuit of truth and pragmatism, critical innovation, and teamwork in disaster mechanism research. The dimension of legal awareness involves laws, regulations, and industry standards related to geological disaster prevention and control, corresponding to the value orientation of rule awareness and legal thinking.

3.2 Precise Identification of Ideological and Political Elements in Each Teaching Chapter

The ideological and political elements of different chapters in the course Geotechnical Engineering Disaster Prevention and Control vary, and the correspondence between different chapters and ideological and political elements is shown in Table 1.

Table 1. Correspondence between Ideological and Political Elements and Teaching Chapters of the Course Geotechnical Engineering Disaster Prevention and Control

Teaching Chapter	Core Professional Knowledge	Dimension of Ideological and Political Elements	Specific Points of Ideological and Political Integration
Introduction	Disaster definition, characteristics of disaster development in China, and disaster prevention situation	Patriotism and national sentiment	People-centered concept, understanding of national conditions, awareness of disaster prevention and mitigation
Unstable slopes	Slope stability analysis and prevention and control engineering design	Scientific spirit, confidence in the path, theory, system, and culture	Academic contributions of scientists such as Academician Chen Zuyi, and the Three Gorges Reservoir bank treatment project
Landslides	Landslide formation mechanisms, transfer coefficient method, and prevention and control design specifications	Engineering ethics, legal awareness	Awareness of industry standards and methodological innovation by engineering professionals
Collapses	Stability of unstable rock masses and prevention and control technologies	National pride	Typical domestic engineering cases such as unstable rock treatment in Longzhua Pagoda Scenic Area
Debris flows	Formation conditions and biological prevention measures	Ecological civilization, patriotism	Rescue and disaster relief efforts during the Zhouqu debris flow disaster, and ecological restoration concepts
Ground collapses	Karst collapse mechanisms and prevention of mining-induced collapse	Green development, safety awareness	Relationship between mining activities and geological environment protection, and engineering safety responsibilities
Land subsidence	Analysis of subsidence causes and hazard assessment	Ecological civilization	Groundwater resource protection and water conservation awareness
Ground fissures	Causes and prevention technologies of ground fissures	Scientific spirit	Research achievements in ground fissure prevention and control in China

4. Teaching Path Design for Integrating Curriculum Ideological and Political Education into Geotechnical Engineering Disaster Prevention and Control

4.1 Ideological and Political Preparation in the Pre-class Introduction Stage

The pre-class introduction stage serves as the initial link for integrating curriculum ideological and political education. At the beginning of the course, teachers introduce students to the overall situation of geological disasters in China and relevant strategies for disaster prevention and mitigation, presenting the deep connection between course learning, national development, and people's lives. Pre-class research tasks are assigned simultaneously, requiring students to collect information on typical geological disaster cases in their hometowns or across China. Relevant documentaries and news reports, including cases such as geological disaster management in the Three Gorges Reservoir area and post-earthquake reconstruction after the Wenchuan earthquake, are delivered through online teaching platforms. Before formal classroom instruction, students are exposed to these materials, forming preliminary perceptions of the course content and emotional responses at the value level.

4.2 Ideological and Political Penetration in the In-class Teaching Stage

During classroom teaching, different types of knowledge correspond to different approaches for ideological and political penetration. In the process of theoretical instruction, the explanation of disaster formation conditions involves perspectives of systems theory and dialectics, while the interaction between natural factors and human factors is analyzed simultaneously, incorporating elements of systematic thinking and dialectical thinking [3]. The teaching of prevention and control engineering technologies is accompanied by an introduction to technological progress in related fields in China. Contents such as the transfer coefficient method for slope stability analysis and bank slope treatment technologies for large-scale hydropower projects are integrated into the teaching process, naturally presenting elements related to professional confidence and national pride.In the case-based teaching section, typical disaster cases such as the Shenzhen Hengtai Industrial Park landslide and the Zhouqu debris flow are incorporated into the teaching content. The analysis of landslide causes and prevention measures, as well as the explanation of debris flow formation conditions and prevention technologies, are carried out simultaneously, with engineering ethics, safety responsibility, patriotism, and social responsibility intertwined with case analysis.In the virtual simulation and experimental teaching stages, digital resources such as virtual simulation experiments for slope emergency rescue and TBM excavation safety control simulation experiments are introduced. Students complete operations including disaster identification, scheme design, and emergency response in simulated scenarios. During the operational process, the risks and responsibilities involved in engineering decision-making, as well as the requirements for precision and rigor in disaster prevention and control work, are presented simultaneously.

4.3 Ideological and Political Extension in the Post-class Practice Stage

In the post-class practice stage, classroom teaching content is extended to social contexts. As an important component of the course practice, field internships enable students to conduct on-site investigations of typical geological disaster sites and prevention and control projects under the guidance of teachers, allowing them to directly experience the impacts of disasters on people's production and daily life, as well as the actual conditions of prevention and control projects. Students summarize their observations and experiences from the perspectives of social responsibility and professional mission, with professional knowledge and value concepts being addressed simultaneously [4].Activities such as geological disaster science popularization and community lectures on disaster prevention and mitigation knowledge are incorporated into students' practical activities. Through participation, students are exposed to professional-related social contexts, while policy developments and technological frontiers in the field of geological disaster prevention and control are simultaneously introduced into their learning vision [5].

5. Conclusion

The development of curriculum ideological and political education in the course Geotechnical Engineering Disaster Prevention and Control represents a two-way interaction between the professional knowledge system and the value guidance system. There are multidimensional correspondences between various course modules and ideological and political elements, which are presented through the coherent design of teaching stages including pre-class introduction, in-class penetration, and post-class extension. The systematic exploration of ideological and political elements and the specific design of integration pathways should be carried out in combination with the professional content of each course chapter and actual teaching conditions. The five dimensions of ideological and political elements, namely patriotism and national sentiment, engineering ethics, ecological civilization, scientific spirit, and legal awareness, have different focuses corresponding to different teaching

chapters. As an integral component of the teaching system, the evaluation mechanism for curriculum ideological and political education still requires continuous exploration in terms of its operational methods and implementation pathways through subsequent teaching practices.

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