

## *Original Paper*

# Research on the Ideological and Political Teaching Mode of Civil Engineering Construction Course under the Background of Emerging Engineering Education

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### ***Abstract***

*The construction of Emerging Engineering Education (3E) imposes higher requirements on the training of engineering talents. Integrating ideological and political education into professional courses has become a key pathway to enhance students' comprehensive qualities. This paper, considering the learning characteristics of junior students majoring in civil engineering and the actual teaching situation of the Civil Engineering Construction course, proposes a three-dimensional ideological and political teaching mode of "Case Guidance - Project Driving - Ability Progression". This model uses real engineering cases as the carrier and project-based teaching as the driving force. Through a three-stage ability cultivation system of "cognition -- practice -- innovation", it achieves the organic integration of professional knowledge imparting, engineering ability training, and ideological value shaping. Teaching practice indicates that this model helps enhance students' professional identity, engineering ethics awareness, and practical innovation ability, providing an operable reform approach for the ideological and political construction of engineering courses.*

### ***Keywords***

*Emerging Engineering Education, civil engineering construction, course ideology and politics, case teaching, project-driven, ability progression*

## 1. Introduction

Higher education in the new era emphasizes the fundamental task of “fostering virtue through education”. Integrating ideology and politics into courses has become an important direction for professional teaching reform. Under the background of Emerging Engineering Education, the field of civil engineering is facing new trends such as intelligentization, greening, and interdisciplinary integration, which pose higher demands on talent cultivation. Civil Engineering Construction, as a core course in civil engineering, features strong practicality, high comprehensiveness, and close integration with engineering practice, making it a natural carrier for ideological and political education. However, current teaching of this course still faces issues such as the forced integration of ideological elements, monotonous teaching methods, and low student participation. How to construct a systematic and operable ideological and political teaching mode that combines student reality, course characteristics, and the requirements of Emerging Engineering Education has become an urgent teaching issue to be addressed.

## 2. Current Status and Challenges of Ideological and Political Teaching in the Civil Engineering Construction Course

Based on relevant research and teaching practice, the current ideological and political teaching in this course mainly faces the following problems:

### *2.1 Disconnection between Ideological Content and Professional Knowledge*

Ideological elements often appear in an attached or labeled manner, failing to deeply integrate with professional knowledge such as construction technology and engineering management.

### *2.2 Traditional Teaching Methods with Insufficient Student Participation*

Teaching still relies heavily on lectures, lacking interaction and practice in authentic contexts, failing to fully mobilize student initiative.

### *2.3 Lack of an Ideological and Political Evaluation System*

Assessment often focuses on knowledge and skills, lacking an effective mechanism to evaluate students' quality such as engineering ethics and professional spirit.

### *2.4 Need for Improvement in Teachers' Ideological and Political Teaching Ability*

Some teachers have a shallow understanding of ideological education and employ singular methods, making it difficult to achieve the “silent nurturing” educational effect.

### **3. Construction of the Three-Dimensional Ideological and Political Teaching Mode: “Case Guidance - Project Driving - Ability Progression”**

Based on the aforementioned problems, this paper proposes a three-dimensional ideological and political teaching mode of “Case Guidance - Project Driving - Ability Progression”. The specific framework is as follows:

#### *3.1 Case Guidance: Using Real Engineering Cases as Carriers to Strengthen Value Identification*

Select nationally significant contemporary projects (e.g., Hong Kong-Zhuhai-Macao Bridge, Huoshenshan Hospital, Qinghai-Tibet Railway) and historical classic projects (e.g., Dujiangyan, Zhaozhou Bridge) that are timely, typical, and educational as important carriers for course ideology. Through a three-stage teaching process of “Case Embedding -- Technical Analysis -- Value Extraction”, guide students to understand the technical challenges, innovative spirit, and national sentiments behind the projects, thereby enhancing professional confidence and cultural identity.

#### *3.2 Project Driving: Using Simulated Projects as the Link to Enhance Comprehensive Abilities*

Drawing on project-based teaching concepts, design teaching projects that run through the course based on real engineering backgrounds. For example, using the construction of a high-rise building as a backdrop, students work in groups to complete tasks such as construction organization design, BIM modeling, and virtual simulation construction. Integrate ideological elements like teamwork, regulatory awareness, and safety ethics into project practice, achieving “learning by doing, reflecting while learning, and comprehending through reflection”.

#### *3.3 Ability Progression: Constructing a Three-Stage Cultivation System of “Cognition – Practice – Innovation”*

Considering the characteristics of junior students transitioning from theory to practice, design a layered and progressive teaching path:

**Cognitive Stage:** Establish engineering awareness and professional ethics through case teaching and code interpretation.

**Practice Stage:** Conduct situational simulations and on-site observations relying on virtual simulation platforms and university-enterprise cooperation bases.

**Innovation Stage:** Encourage students to participate in disciplinary competitions and research projects to cultivate their ability to solve complex engineering problems and foster an innovative spirit.

#### **4. Teaching Implementation Path and Evaluation Mechanism**

##### *4.1 Teaching Implementation Path*

Pre-class: Feed case materials and micro-lecture videos to guide students in previewing and contemplating ideological questions.

In-class: Employ methods such as case discussions, project presentations, and role-playing to enhance interaction and experience.

Post-class: Assign comprehensive project tasks, organize field visits or virtual simulation training to strengthen practical reflection.

##### *4.2 Ideological and Political Evaluation Mechanism*

Establish a dual-dimensional evaluation system of “Process + Outcome” and “Knowledge + Literacy”, incorporating ideological performance into assessment:

Process Evaluation: Includes classroom discussion, teamwork, project participation, etc.

Outcome Evaluation: Assesses students’ understanding of engineering ethics and professional attitude through project reports, reflection journals, defense presentations, etc.

#### **5. Practical Reflection and Optimization Directions**

After implementation in pilot classes, this model showed improvements in student classroom participation, project completion quality, and ideological cognitive level. However, it also faces the following challenges:

Case resources need continuous updating to stay close to the engineering forefront.

Teachers need to strengthen their ability in interdisciplinary integration and ideological teaching design.

The depth of university-enterprise cooperation needs enhancement, with limited access to real project resources.

In the future, we should further build a school-enterprise collaborative education platform, developing modular ideological case libraries, promoting teachers’ research on course ideology teaching, and forming a sustainable course construction mechanism for continuous improvement.

#### **6. Conclusion**

The ideological and political construction of the Civil Engineering Construction course under the background of Emerging Engineering Education should be based on professional characteristics, student reality, and demands of the times, promoting systematic reform of teaching content, methods, and evaluation. The three-dimensional mode of “Case Guidance - Project Driving - Ability Progression” proposed in this paper aims to achieve the coordinated development of knowledge, ability, and value, providing a referential implementation path for the ideological teaching of engineering courses. Future exploration is still needed in areas such as resource construction, teacher training, and

mechanism innovation to truly cultivate civil engineering talents for the new era who possess both engineering quality and a sense of national commitment.

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