

Study on Ideological and Political Practice in Applied Undergraduate "Engineering Mechanics" Course

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Abstract: In today's world, the rapid development and widespread application of engineering technology have profoundly impacted social production and human life. As a fundamental aspect of engineering technology, Engineering Mechanics is not only a necessary knowledge system for engineers but also a significant indicator of a country's scientific and technological strength. In China's higher education system, the "Engineering Mechanics" course is a core subject for engineering majors, laying a solid foundation for students' subsequent professional studies and engineering practices. However, under the current educational backdrop, students often focus solely on mastering professional knowledge, neglecting the cultivation of ideological quality and moral cultivation. Therefore, integrating ideological and political elements into the "Engineering Mechanics" course and exploring its ideological and political practice are crucial for enhancing students' comprehensive qualities and cultivating well-rounded talents. Incorporating ideological and political elements into the "Engineering Mechanics" course not only cultivates students' engineering ethics and social responsibility awareness but also guides them to establish correct worldviews, meeting the new demands of today's society.

1. The Importance of Ideological and Political Education in Courses

As society evolves, so do its talent requirements. Traditional educational frameworks have often concentrated solely on knowledge transfer, overlooking the nurturing of students' ideological and moral compasses. This oversight can lead to students who, despite possessing professional knowledge, may lack in ethical standards and social consciousness. The integration of ideological and political education within academic curricula addresses these gaps, fostering more holistic development in students. Incorporating ideological and political education elevates the pedagogical skills of educators. In this enhanced role, teachers are not just disseminators of knowledge but also mentors shaping students' value systems. This integration requires teachers to deepen their comprehension of how their subjects interweave with ideological aspects, thereby augmenting their own ideological and pedagogical expertise. This process not only elevates their teaching proficiency but also contributes to their professional and personal growth. Furthermore, ideological and political education in academic courses fortifies the influence of ideological guidance. It plays a pivotal role in molding students' accurate ideological and value orientations. By weaving ideological themes

into their teaching, educators guide students to engage with national and social issues, thus fostering a heightened sense of national identity and communal responsibility. Such education is instrumental in instilling socialist core values and shaping sound moral principles among students, aligning their personal development with the broader societal and national ethos [1-2].

2. Characteristics of Applied Undergraduate Education

2.1 Emphasis on Practical Teaching

Practical teaching enables students to engage in hands-on operations, thereby enhancing their actual operational abilities. For engineering students, the cultivation of practical abilities is particularly important, as it aids in better understanding theoretical knowledge and lays a solid foundation for their future careers. In applied undergraduate education, practical teaching is of paramount importance. Compared to traditional theoretical teaching, practical teaching focuses more on cultivating students' hands-on abilities and practical skills. Through experiments, practical training, and practical activities, students can experience the application of knowledge firsthand, improving their practical operation level. Additionally, in practical teaching, students often encounter various real problems, requiring them to analyze and solve these issues using their knowledge. This process of problem-solving exercises students' thinking abilities, fostering their independent thinking and problem-solving skills.

2.2 Focus on Skill Development

Compared to traditional knowledge dissemination, skill development places a greater emphasis on students' practical operations and problem-solving abilities. This approach to teaching, which involves hands-on activities and case analyses, not only enables students to understand theoretical knowledge more effectively but also enhances their overall quality. Such a method encourages students to be more actively and proactively involved in their learning process. Engaging in practical operations and analyzing cases allows students to gain a deeper understanding of the material, thereby improving their learning outcomes. With the continuous advancement of technology and societal development, the market's demand for talent is also evolving. Applied undergraduate education, which focuses on skill development, helps students acquire the abilities and skills necessary for the workplace, enabling them to better meet market demands. Students who possess practical abilities and skills are more competitive in the job market. By emphasizing skill development, applied undergraduate education equips students with real-world experience and skills, thus enhancing their employability. The cultivation of skills is also crucial for students' personal career development. Applied undergraduate education, with its focus on skill development, provides students with better career opportunities and helps them achieve their professional goals. Skill development requires the accumulation of practical experience. Applied undergraduate education, with its emphasis on practical teaching, offers students opportunities for hands-on practice, enabling them to master the necessary abilities and skills through actual operation. This holistic approach prepares students not just for immediate tasks but also equips them with the competencies required for long-term career success and adaptability in a rapidly changing professional landscape.

3. Main Content of Ideological and Political Education in the "Engineering Mechanics" Course

3.1 Emphasis on Engineering Ethics and Professional Morality

Engineering ethics and professional morality hold a significant position in today's engineering practices. As technology advances and engineering projects become more complex, their impact on human society and the environment increases. Engineers with a strong sense of engineering ethics and professional morality can better consider the needs of various stakeholders and achieve sustainable development. Applied undergraduate education should strengthen education in engineering ethics and professional morality, including setting up related courses, introducing real cases, and organizing practical activities. This helps students deeply understand the importance of engineering ethics and professional morality, fostering their sense of social responsibility and moral consciousness.

3.2 Focus on Social Responsibility and Sustainable Development

In the process of cultivating students' abilities, applied undergraduate education also emphasizes social responsibility and sustainable development. As society develops and technology advances, there are increasing demands for corporate and organizational social responsibility. As future engineers and technicians, students need to understand their social and environmental impact and make responsible decisions. Emphasizing sustainable development, which is a current social trend due to worsening environmental issues, is integral. Applied undergraduate education's focus on sustainable development helps students understand how to achieve this in engineering practice, contributing to future ecological civilization construction. To achieve this goal, measures such as adding relevant content to the curriculum (e.g., corporate social responsibility, environmental engineering), analyzing real cases to understand how companies and organizations fulfill their social responsibilities and achieve sustainable development, and encouraging students to participate in practical activities (e.g., environmental projects, social welfare activities) should be taken. Collaborating with enterprises to promote education in social responsibility and sustainable development through internships and practical training allows students to experience and practice these concepts in actual work settings, as shown in Figure 1.

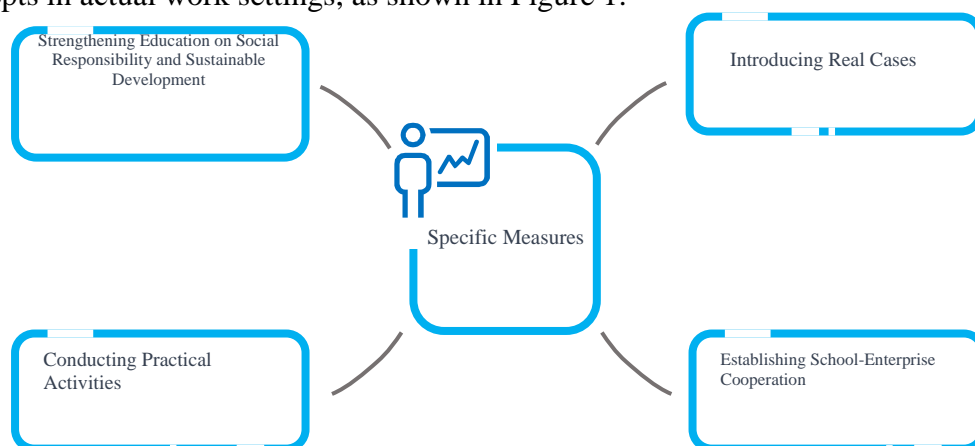


Figure 1: Measures Emphasizing Social Responsibility and Sustainable Development

4. Ideological and Political Teaching Methods and Means in the "Engineering Mechanics" Course

4.1 Application of Case Teaching Method

The application of the case teaching method enables students to make judgments and decisions in specific case scenarios, thereby enhancing their ability to analyze and solve problems by comprehensively applying various knowledge and experiences. In the ideological and political teaching of the "Engineering Mechanics" course, the application process of the case teaching method is as shown in Figure 2. The first step involves selecting real cases related to Engineering Mechanics, especially those involving engineering ethics and social responsibility. These cases help students better understand the practical application of Engineering Mechanics and the ethical and professional norms that should be followed in engineering practice. The second step, after introducing the case, is to guide students to analyze the problems within the case, think about solutions, and discuss the ethical and social responsibility issues involved. Teachers provide guidance and hints to help students delve deeply into the matter. The third step encourages students to express their views and insights, engage in in-depth discussions, and reflect on the case. This helps cultivate students' critical thinking and problem-solving abilities while also deepening their understanding of the importance of engineering ethics and social responsibility. The fourth step, based on discussion and reflection, involves the teacher summarizing and enhancing the key points, emphasizing the importance of engineering ethics and social responsibility in engineering practice. Additionally, this step can guide students to reflect on their career planning and values, fostering their sense of social responsibility and professional moral cultivation[3-4].

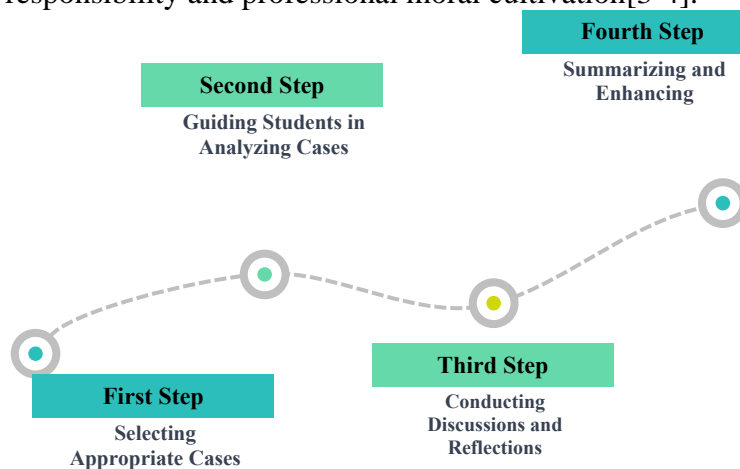


Figure 2: The Application Process of Case Teaching Method

4.2 Application of Task-Driven Teaching Method

The task-driven teaching method embeds learning content into practical tasks, allowing students to appreciate the real significance and value of learning while completing these tasks. This method sparks students' interest and motivation by emphasizing active participation and exploration. Students autonomously analyze tasks, find solutions, and solve problems. Teachers should set meaningful tasks based on Engineering Mechanics knowledge and ideological and political education requirements. Tasks could involve solving actual engineering problems or discussing social issues. Students analyze these tasks, clarify objectives, requirements, and constraints, and

think about the implications and values behind the tasks, such as social responsibility and engineering ethics. Teachers provide guidance and support while encouraging independent exploration and problem-solving. After task completion, students present their results, and teachers evaluate based on outcomes and collaborative skills like teamwork and innovative thinking. Both students and teachers reflect on and summarize the task-driven teaching method's effectiveness[5].

4.3 Application of Scenario Simulation Teaching Method

The scenario simulation teaching method, by mimicking real-life situations, allows students to learn and master knowledge through practical operations, enhancing their practical abilities and operational skills. This approach emphasizes students' self-directed learning, collaborative learning, and innovative learning, aiding in cultivating their comprehensive qualities. These include skills in problem analysis, problem-solving, communication, collaboration, and leadership. In practical application, it's necessary to first define the educational objectives of ideological and political courses, such as developing students' teamwork capabilities and awareness of engineering ethics. Based on these objectives, suitable scenario simulation themes are chosen. Real engineering scenarios are created in line with the key points of engineering mechanics and the requirements of ideological and political education, simulating actual engineering problems. These scenarios should as realistically as possible reflect real engineering situations, including aspects like engineering ethics and social responsibilities. Students are divided into small groups according to their developmental needs, with each student playing different roles such as engineers, workers, and managers. This role-playing enables them to think about problems from various perspectives, fostering their teamwork and communication skills. Students engage in simulated implementation based on task requirements, with teachers providing necessary guidance and assistance throughout the process. Students apply their knowledge and skills in engineering mechanics, also considering factors like engineering ethics and social responsibilities. Through prolonged and consistent practice in this teaching method, more engineers with good moral character and comprehensive qualities are cultivated, contributing positively to societal development.

5. Conclusion

As globalization and informatization accelerate, the collision and integration of various ideas become more frequent. In this context, ensuring engineering students master professional knowledge while possessing good ideological and moral qualities and firm ideals and beliefs is a significant challenge for higher education. This is where the concept of course ideology and politics emerges. It emphasizes integrating ideological and political education elements into professional courses, achieving an organic unity between knowledge impartation and value guidance. Through this integration, the "Engineering Mechanics" course transcends the mere transfer of professional knowledge, becoming a crucial medium for cultivating students' comprehensive qualities. This educational model guides students to establish correct worldviews, foster social responsibility, innovative spirit, and practical abilities, having a profound impact on individual growth and societal development. Moving forward, continued efforts to deepen the exploration of course ideology and politics will contribute significantly to cultivating high-quality talents with both moral and intellectual integrity.

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