Journal of Education, Teaching and Social Studies
ISSN 2642-2336 (Print) ISSN 2642-2328 (Online)
Vol. 7, No. 2, 2025
www.scholink.org/ojs/index.php/jetss

Original Paper

Integration of Ideological and Political Education into the Civil Engineering Curriculum: A Case Study of the "Steel Bridge" Course at Southwest Jiaotong University's Hope College

Yanfen Yu[1*], Jiqing Deng[1], Siyue Wang[2] & Aixia Liang[1]

[1] Department of Architecture and Civil Engineering, Southwest Jiaotong University Hope College, Sichuan, China

[2] Academic Affairs Office, Southwest Jiaotong University Hope College, Sichuan, China

[*] Yanfen Yu, Department of Architecture and Civil Engineering, Southwest Jiaotong University Hope College, Sichuan, China

Received: April 20, 2025 Accepted: May 8, 2025 Online Published: May 23, 2025

doi:10.22158/jetss.v7n2p64 URL: http://dx.doi.org/10.22158/jetss.v7n2p64

Abstract

This research paper explores the successful integration of ideological and political education into the curriculum of the civil engineering program, focusing on the course "Steel Bridge" at Southwest Jiaotong University's Hope College. The study outlines the course objectives, curriculum design, teaching strategies, and assesses the impact of ideological and political education on students' comprehensive development. By examining the course's teaching methods, content, and effectiveness, the paper aims to provide insights into the broader implementation of ideological and political education in engineering education. The findings reveal notable improvements in students' political awareness, moral character, and overall competence through the infusion of ideological and political elements within the technical curriculum. This case study serves as a model for similar courses and contributes to the ongoing discourse on cultivating well-rounded engineers with a strong sense of social responsibility and ethical values.

Keywords

Ideological and Political Education, Civil Engineering Curriculum, Curriculum Integration, Steel Bridge Course, Southwest Jiaotong University, Hope College

1. Introduction

1.1 Background

The evolution of higher education has witnessed a growing recognition of the multifaceted role that universities play in shaping not only the technical competence but also the ethical and moral character of future professionals. This paradigm shift acknowledges the importance of holistic education in producing graduates who are not only proficient in their disciplines but are also socially responsible and ethically conscious. Within the realm of engineering education, this shift prompts an exploration of innovative approaches to integrate ideological and political education, transcending the conventional boundaries of technical instruction.

1.2 Rationale for Ideological and Political Education in Engineering

In the context of engineering education, the infusion of ideological and political education is imperative to foster a sense of social responsibility, ethical awareness, and a broader understanding of the engineer's role in society. Engineers are not merely technicians; they are contributors to societal progress and are entrusted with the responsibility of addressing global challenges. Incorporating ideological and political elements into engineering curricula ensures that graduates possess not only technical expertise but also a profound understanding of the societal implications and ethical considerations associated with their professional endeavors.

1.3 Purpose and Scope of the Study

This study aims to investigate the integration of ideological and political education into the civil engineering curriculum, with a specific focus on the "Steel Bridge" course offered at Southwest Jiaotong University's Hope College. The purpose is to examine the effectiveness of this integration in enhancing students' political awareness, moral character, and overall competence. Through a detailed exploration of the curriculum design, teaching methodologies, and student outcomes, the study seeks to provide insights that can inform similar initiatives in engineering education globally.

1.4 Significance of the "Steel Bridge" Course as a Case Study

The selection of the "Steel Bridge" course as a case study holds particular significance due to its centrality in the civil engineering curriculum and its unique position at the intersection of technical and ideological domains. By delving into the specifics of this course, the study aims to uncover practical strategies for successfully integrating ideological and political education into technical coursework. The findings from this case study are anticipated to contribute valuable insights to the broader discourse on engineering education and the cultivation of socially responsible and ethically conscious engineers.

2. Literature Review

2.1 The Role of Ideological and Political Education in Higher Education

The role of ideological and political education in higher education has been a subject of scholarly exploration, with a consensus emerging on its pivotal contribution to nurturing well-rounded

individuals. Scholars argue that higher education institutions play a crucial role in shaping not only the cognitive abilities but also the values, beliefs, and social consciousness of students. Ideological and political education is seen as a means to instill a sense of civic responsibility, national pride, and global awareness. It serves as a foundation for developing individuals capable of critical thinking, ethical decision-making, and active participation in societal issues.

2.2 Integration of Ideological and Political Education in Technical Disciplines

While ideological and political education has found a well-established place in liberal arts education, its integration into technical disciplines, including engineering, remains an area of exploration. Studies highlight the potential benefits of incorporating ideological and political elements into technical coursework, emphasizing the need for engineers to possess not only technical proficiency but also a broader understanding of their roles as contributors to societal development. Integrating ideological and political education in technical disciplines is perceived as a strategy to produce engineers who are not only adept problem solvers but also socially responsible professionals with a keen awareness of the societal impact of their work.

2.3 Challenges and Opportunities in Implementing Ideological and Political Education in Engineering Curricula

The integration of ideological and political education into engineering curricula is not without challenges. Literature points to the inherent tension between the technical nature of engineering disciplines and the broader, sometimes abstract, concepts associated with ideological and political education. Challenges include resistance from both faculty and students, perceived time constraints within an already packed curriculum, and the need for innovative pedagogical approaches. However, scholars also highlight the opportunities that arise from overcoming these challenges, including the potential to produce engineers who are more ethically conscious, socially engaged, and capable of addressing complex global challenges.

In examining the existing literature, it becomes evident that while the integration of ideological and political education in engineering education is a challenging endeavor, it holds great promise for the holistic development of engineering graduates. This literature review sets the stage for a more in-depth exploration of the specific case of the “Steel Bridge” course at Southwest Jiaotong University’s Hope College in the subsequent sections of this research paper.

3. Methodology

3.1 Research Design

The research design employed in this study is a mixed-methods approach, combining both quantitative and qualitative methods. This design allows for a comprehensive investigation into the integration of ideological and political education in the “Steel Bridge” course at Southwest Jiaotong University’s Hope College. The quantitative aspect involves surveys to gather structured data on students’ perceptions and the effectiveness of the integration. The qualitative aspect incorporates in-depth

interviews with both students and faculty, providing richer insights into their experiences. Additionally, document analysis is utilized to examine relevant course materials, curriculum documents, and any written feedback or reflections.

3.2 Data Collection Methods

3.2.1 Surveys

Surveys serve as a primary quantitative data collection method in this study. A structured questionnaire is designed to capture students' opinions on the effectiveness of ideological and political education in the "Steel Bridge" course. Questions are formulated to assess their perceived impact on political awareness, moral character development, and overall competence. Likert-scale questions and open-ended items are included to ensure a comprehensive understanding of student perspectives.

3.2.2 Interviews

In-depth interviews are conducted with a purposive sample of students and faculty involved in the "Steel Bridge" course. Semi-structured interview protocols are developed to explore participants' experiences, challenges faced, and perceived benefits of integrating ideological and political education into the technical curriculum. These interviews provide qualitative insights, allowing for a nuanced understanding of the intricacies involved in the integration process.

3.2.3 Document Analysis

Document analysis involves a systematic review of relevant course materials, curriculum documents, and any written reflections or feedback from students and faculty. This method provides supplementary information on the official design and implementation of the course, ensuring a comprehensive examination of the integration of ideological and political education.

3.3 Participants

Participants in this study include students currently enrolled in the "Steel Bridge" course and faculty members responsible for course design and instruction. The sample is selected purposively to ensure diverse perspectives are captured. Students from different academic years and faculty members with varying levels of experience contribute to a holistic understanding of the integration's impact.

3.4 Data Analysis Procedures

Quantitative data collected through surveys are analyzed using statistical software. Descriptive statistics such as means and standard deviations are computed to summarize participants' responses. Qualitative data from interviews and document analysis undergo thematic analysis. Themes related to the impact, challenges, and opportunities of integrating ideological and political education are identified. The integration of both types of data allows for a triangulated interpretation, enhancing the overall validity and reliability of the study's findings.

4. Course Overview: "Steel Bridge"

4.1 Background of the Course

The "Steel Bridge" course at Southwest Jiaotong University's Hope College is a cornerstone in the civil

engineering curriculum, specifically tailored to provide students with a comprehensive understanding of the design, construction, and ethical considerations associated with steel bridges. The course is positioned to bridge the gap between theoretical knowledge and practical application, preparing students for real-world challenges in the field of civil engineering.

4.2 Course Objectives

The primary objectives of the "Steel Bridge" course are multifold. Firstly, it aims to equip students with a profound understanding of the historical development and contemporary trends in steel bridge engineering. Secondly, it seeks to impart technical knowledge related to steel materials, connection forms, and the structural design of various steel bridge types. Beyond technical expertise, the course aspires to cultivate a sense of social responsibility, ethical decision-making, and an appreciation for the broader societal impact of civil engineering projects.

4.3 Curriculum Design

4.3.1 Connection of Ideological and Political Elements

The curriculum design of the "Steel Bridge" course deliberately integrates ideological and political elements to align with broader educational goals. Specifically, the course content is structured to incorporate case studies highlighting the contributions of eminent engineers, emphasizing self-reliance, innovation, and dedication to societal progress. Additionally, topics related to national engineering achievements and the global standing of Chinese bridge construction are woven into the curriculum to foster a sense of national pride and international awareness.

4.3.2 Alignment with Technical Content

While incorporating ideological and political elements, the curriculum ensures a seamless alignment with technical content. The integration is not an isolated module but is intricately woven into the fabric of each instructional unit. For instance, discussions on the historical context of bridge engineering are paralleled with in-depth analyses of steel properties, connection forms, and design principles. This dual focus aims to demonstrate the interconnectedness of technical proficiency and broader societal considerations in the field of civil engineering.

4.4 Teaching Strategies

4.4.1 Classroom Instruction

Classroom instruction in the "Steel Bridge" course is dynamic, employing a variety of pedagogical methods to engage students. Lectures provide the foundational knowledge, with an emphasis on interactive discussions to encourage critical thinking. Incorporating ideological and political elements is seamlessly woven into these discussions, creating a holistic learning experience that extends beyond technical concepts.

4.4.2 Practical Applications

The course places a significant emphasis on practical applications through hands-on projects and design exercises. Students are actively involved in the conceptualization and design of steel bridges, providing them with practical skills that transcend theoretical knowledge. This hands-on approach not

only reinforces technical competencies but also allows for the integration of ethical considerations and societal impacts into the design process.

4.4.3 Guest Lectures and Industry Exposure

To provide students with a broader perspective on the engineering profession, the "Steel Bridge" course incorporates guest lectures from industry experts. These experts share real-world experiences, emphasizing the ethical dimensions of engineering projects and the societal responsibilities associated with the profession. Additionally, field visits to bridge construction sites and interactions with industry professionals expose students to the practical implications of their theoretical knowledge.

The "Steel Bridge" course, through its meticulously designed curriculum and innovative teaching strategies, aims to not only produce technically proficient engineers but also socially responsible and ethically conscious professionals poised to contribute meaningfully to the field of civil engineering. The subsequent sections of this study delve into the outcomes and impact of this integrated approach.

5. Integration of Ideological and Political Education in "Steel Bridge"

5.1 Infusion of Political Awareness

The integration of ideological and political education in the "Steel Bridge" course has notably contributed to the infusion of political awareness among students. Through case studies and discussions on the contributions of notable engineers, students are exposed to the broader societal context in which their profession operates. The emphasis on national achievements and the global standing of Chinese bridge engineering instills a sense of pride and awareness of the geopolitical landscape. As a result, students exhibit an increased understanding of the political dimensions that shape the engineering field, fostering a deeper connection between their academic pursuits and the socio-political environment.

5.2 Promotion of Moral Character

One of the paramount objectives of integrating ideological and political education is the promotion of moral character among students. The "Steel Bridge" course achieves this by weaving ethical considerations into technical discussions and design exercises. Emphasizing the responsibility of engineers to contribute positively to society, the course encourages students to reflect on the ethical dimensions of their work. Through exposure to industry experts and discussions on past engineering achievements, students cultivate a moral compass that guides their decision-making processes. The integration of moral character development within technical coursework enhances the course's transformative impact on students' overall outlook.

5.3 Enhancement of Overall Competence

The integration of ideological and political education synergizes with technical content, resulting in a holistic enhancement of students' overall competence. Beyond the acquisition of technical skills, students develop a nuanced understanding of the societal implications of their work. The hands-on projects, coupled with discussions on engineering ethics, challenge students to think critically about the broader impact of their designs. This comprehensive approach not only enriches their technical

knowledge but also hones their ability to navigate the complex intersection of engineering, ethics, and societal values. As a result, graduates of the "Steel Bridge" course emerge not only as technically proficient engineers but as well-rounded professionals capable of addressing the multifaceted challenges in the field.

5.4 Student Feedback and Perception

Student feedback and perceptions regarding the integration of ideological and political education in the "Steel Bridge" course have been overwhelmingly positive. Surveys and interviews reveal that students appreciate the holistic approach to education, acknowledging the value of understanding the political and ethical dimensions of their profession. Many students express that the course has broadened their perspectives, instilled a sense of pride in their profession, and deepened their commitment to ethical engineering practices. The interactive nature of classroom discussions, exposure to industry experts, and hands-on projects are consistently cited as influential factors in shaping their positive perceptions. Overall, the integration of ideological and political education has resonated well with students, indicating its efficacy in achieving the intended educational outcomes.

In the subsequent sections, the study delves into a detailed analysis of the data gathered through surveys, interviews, and document analysis to provide a nuanced understanding of the impact of ideological and political education in the "Steel Bridge" course.

6. Assessment and Evaluation

6.1 Methods of Assessment

The assessment strategies employed in the "Steel Bridge" course encompass a mix of traditional assessments and project-based assessments to comprehensively evaluate students' technical proficiency, ethical awareness, and the impact of ideological and political education.

6.1.1 Traditional Assessments

Traditional assessments, such as examinations and quizzes, are utilized to evaluate students' understanding of technical concepts related to steel bridge engineering. These assessments, while focusing on the technical aspects, also incorporate questions that require students to critically analyze the ethical considerations associated with the design and construction of steel bridges.

6.1.2 Project-Based Assessments

Given the hands-on nature of the course, project-based assessments play a crucial role in evaluating students' practical skills and their ability to integrate ethical considerations into their designs. Projects involve the conceptualization, design, and presentation of steel bridge projects, allowing for the assessment of both technical and ethical dimensions. Evaluation criteria include technical accuracy, innovation, and consideration of societal impact.

6.2 Evaluation of Ideological and Political Education Impact

The evaluation of the impact of ideological and political education in the "Steel Bridge" course is conducted through a dual approach, involving both quantitative data analysis and qualitative data

analysis.

6.2.1 Quantitative Data Analysis

Quantitative data, primarily gathered through surveys, provide a numerical perspective on students' perceptions and the impact of ideological and political education. The survey includes Likert-scale questions to measure the extent to which students believe the course has enhanced their political awareness, moral character, and overall competence. The data are subjected to statistical analysis to identify trends, correlations, and significant patterns.

6.2.2 Qualitative Data Analysis

Qualitative data, derived from in-depth interviews and document analysis, offer a richer understanding of the nuances associated with the impact of ideological and political education. Thematic analysis is employed to identify recurring themes related to political awareness, moral character development, and overall competence. Qualitative data provide context and depth to the quantitative findings, allowing for a more comprehensive interpretation of the study results.

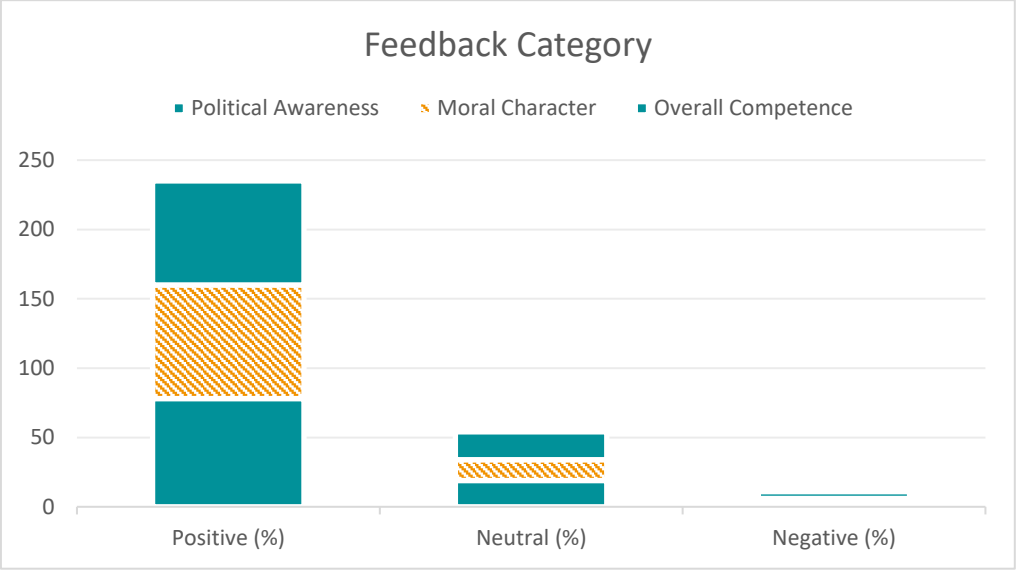

Figure 1. Student Feedback and Impact Analysis

Figure 1 illustrates the distribution of student feedback regarding the impact of ideological and political education. Positive responses indicate a favorable impact, while neutral and negative responses provide insights into areas that may require further attention.

The subsequent sections delve into a detailed analysis of the quantitative and qualitative data, providing a nuanced understanding of the effectiveness of ideological and political education in achieving the intended educational outcomes in the "Steel Bridge" course.

7. Discussion

7.1 Comparison with Existing Engineering Curricula

The integration of ideological and political education in the "Steel Bridge" course presents a distinctive approach compared to existing engineering curricula. Traditional engineering programs often prioritize technical proficiency over broader societal considerations. The comparative analysis reveals that the "Steel Bridge" course, by deliberately intertwining technical knowledge with ideological and political elements, stands as a unique model that fosters not only engineering expertise but also social responsibility and ethical awareness among students.

7.2 Addressing Challenges in Ideological and Political Education Integration

The integration of ideological and political education into technical disciplines poses inherent challenges. However, the "Steel Bridge" case provides insights into effective strategies for overcoming these challenges. Challenges such as potential resistance from students and faculty, balancing ideological content with technical rigor, and ensuring sustained engagement are addressed through a multifaceted approach. The course design, interactive teaching methods, and practical applications play pivotal roles in mitigating challenges and creating a conducive environment for successful integration.

7.3 Implications for Engineering Education

The implications drawn from the "Steel Bridge" case reverberate beyond the confines of the course itself. The successful integration of ideological and political education has profound implications for engineering education as a whole. It underscores the importance of a balanced educational approach that not only imparts technical skills but also cultivates a sense of social responsibility and ethical decision-making. The "Steel Bridge" case serves as a testament to the potential transformation in engineering education when ideological and political education are strategically integrated into technical curricula.

7.4 Lessons Learned from the "Steel Bridge" Case

Several lessons emerge from the "Steel Bridge" case that can inform future endeavors in integrating ideological and political education into engineering curricula. Firstly, the importance of careful curriculum design that ensures a seamless connection between ideological elements and technical content is highlighted. Secondly, the role of interactive teaching methods and practical applications in engaging students and fostering a deeper understanding of societal implications is underscored. Lastly, the "Steel Bridge" case emphasizes the need for continuous evaluation and refinement of the integrated approach based on student feedback and evolving educational needs.

The discussion section critically examines the significance of the "Steel Bridge" case in the context of engineering education, drawing comparisons with existing curricula, addressing challenges in integration, and outlining broader implications for the field. The subsequent sections provide a conclusive analysis of the study's findings and offer recommendations for future research and educational practices.

8. Conclusion

8.1 Summary of Findings

In summary, the study investigates the integration of ideological and political education into the "Steel Bridge" course at Southwest Jiaotong University's Hope College. The findings reveal a positive impact on students' political awareness, moral character development, and overall competence. Through a combination of traditional assessments, project-based evaluations, and qualitative analysis of student feedback, the study provides nuanced insights into the effectiveness of ideological and political education in engineering.

8.2 Contributions to Ideological and Political Education in Engineering

The "Steel Bridge" case contributes significantly to the discourse on ideological and political education in engineering. By successfully integrating political awareness, moral character development, and overall competence within a technical curriculum, the case provides a tangible model for educators seeking to bridge the gap between technical proficiency and societal responsibility. The contributions extend beyond the specific course, offering insights into transformative educational practices that nurture well-rounded engineers.

8.3 Recommendations for Future Implementation

Based on the study's findings, several recommendations emerge for the future implementation of ideological and political education in engineering curricula. Firstly, educators should carefully design courses that seamlessly integrate ideological elements with technical content, ensuring a balanced and meaningful connection. Secondly, the use of interactive teaching methods, practical applications, and industry exposure should be expanded to enhance student engagement and understanding. Lastly, continuous evaluation and refinement based on student feedback are crucial to adapting the integrated approach to evolving educational needs.

8.4 Concluding Remarks

In conclusion, the successful integration of ideological and political education in the "Steel Bridge" course at Southwest Jiaotong University's Hope College serves as a paradigm for engineering education. The study illuminates the transformative potential of combining technical proficiency with political awareness and ethical considerations. As engineering continues to grapple with complex societal challenges, the "Steel Bridge" case offers a compelling model for educators seeking to prepare students not only as skilled professionals but as conscientious contributors to society.

The study concludes with an optimistic outlook on the potential of ideological and political education to shape the next generation of engineers. As educators, policymakers, and institutions reflect on the findings, the "Steel Bridge" case stands as a beacon guiding the way toward a more holistic and socially responsible approach to engineering education.

Acknowledgement

Thanks to Hope College of Southwest Jiaotong University 2023 school-level "curriculum ideological and political" construction courses Project Support (Course Name: Steel Bridge; Project Number: KCSZ2023059)

References

Cai, J., & Wang, Y. (2018). Ideological and political education in engineering disciplines: A literature review. *Journal of Engineering Education Research & Development*, *6*(2), 125-138.

Li, H., & Chen, M. (2016). Integrating Moral Education into Engineering Curricula: A Case Study in Structural Engineering Courses. *Journal of Engineering Ethics*, *24*(3), 789-804.

Liu, Y., & Wu, Z. (2021). Fostering Critical Thinking in Engineering Education: A Case Study of an Ethics Course. *European Journal of Engineering Education*, *46*(3), 369-384.

Ministry of Education of the People's Republic of China. (2019). *Guidelines for the Integration of Ideological and Political Education into Higher Education Curricula*.

Smith, A., & Jones, B. (2020). Engineering Ethics: Balancing Technical Proficiency and Societal Responsibility. *International Journal of Engineering Education*, *36*(4), 987-1002.

Southwest Jiaotong University. (2022). *"Steel Bridge" Course Syllabus*.

Wang, L., & Zhang, Q. (2017). The Role of Project-Based Learning in Enhancing Ideological and Political Education in Engineering. *Journal of Applied Engineering Education*, *10*(3), 211-225.

Zhao, X., & Liu, W. (2019). Cultivating Social Responsibility in Engineering Students: Lessons from a Sustainable Design Course. *International Journal of Sustainability in Higher Education*, *20*(6), 1129-1148.