

RESEARCH ON INTEGRATED TEACHING OF ENGINEERING DRAWING COURSE INTO THE IDEOLOGICAL AND POLITICAL EDUCATION FROM THE PERSPECTIVE OF THREE COMPREHENSIVE EDUCATION

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Abstract: "Three comprehensive education" offers a roadmap for effectively improving the educational impact of fundamental professional courses. Engineering Drawing, a mandatory course for engineering students, plays a crucial role in shaping students' mindset and instilling professional ethics. Tailored to the objectives of talent development and course nature, this paper focuses on fostering virtues and imparting knowledge while honing professional skills in the context of teaching Engineering Drawing in China's application-oriented undergraduate colleges. By centering on the craftsman's spirit, it integrates ideological and political education cases to help students internalize correct values and attitudes, fostering a sense of national pride and professionalism, nurturing their spirit of innovation and craftsmanship. This approach leverages the holistic influence of professional courses, offering valuable insights for incorporating ideological and political education into engineering curricula.

Keywords: Engineering drawing; Ideological and political education; Three comprehensive education; Craftsmanspirit

1 INTRODUCTION

Education is a cornerstone of the nation's vision. General Secretary Xi Jinping emphasized the importance of upholding the central principle of "fostering virtue through education" during the National Conference on Ideological and Political Work in Colleges and Universities. This entails integrating ideological and political work throughout all aspects of education and teaching in order to comprehensively educate individuals in all dimensions. By integrating various courses with ideological and political theory, a synergistic effect can be achieved. This lays the groundwork for advancing the ideological and political development of college courses in the new era and maximizing the educational impact of professional courses[1]. In May 2020, the Ministry of Education issued a document titled "Guiding Principles for the Ideological and Political Construction of the Curriculum of Institutions of Higher Learning," which clearly articulates that the fundamental issue of education lies in determining whom to train, how to train, and for whom to train. It emphasizes that the effectiveness of "fostering virtue through education" serves as the fundamental criterion for evaluating all activities within colleges and universities[2]. The document emphasizes the importance of integrating ideological and political principles into the curriculum in order to reinforce students' ideals and beliefs. This includes fostering patriotism, socialism, love for the people, and collectivism. The focus is on developing political awareness, national pride, cultural understanding, knowledge of the constitution, and moral values. The aim is to enhance the supply of ideological and political content within the curriculum and to incorporate education on socialism with Chinese characteristics, the Chinese dream, core socialist values, the rule of law, labor, mental health, and traditional Chinese culture. The overarching goal is to instill morality and cultivate well-rounded individuals. This approach aims to create a cohesive and comprehensive educational framework that aligns curriculum with ideological and political theory, with the fundamental task of education being the nurturing of virtue through teaching and practical application across all subjects[3]. Engineering science and technology play a crucial role in shaping the world, and the advancement of science and technology is a deliberate decision for humanity to address global challenges and attain sustainable development[4]. In engineering education, there should be a primary emphasis on enhancing students' understanding of engineering ethics, nurturing a dedication to excellence as skilled craftsmen, and inspiring a sense of duty to serve the nation through science and technology.

"Engineering Drawing" is a foundational course for engineering majors in China's application-oriented undergraduate colleges. It focuses on the interpretation, creation, and understanding of engineering drawings, playing a crucial role in preparing students for effective communication and enhancing their sustainable development skills in their future careers. The establishment of the School of Civil Engineering at Northwest Minzu University in November 2005 holds significant importance for the economic development and scientific and technological innovation in ethnic minority areas. The "Engineering Drawing" course is offered to three majors: Civil Engineering, Road, Bridge and River-Crossing Engineering, and Inorganic Non-metallic Materials Engineering. This paper uses the teaching practice of the "Engineering Drawing" course as an illustration, emphasizing the integration of knowledge delivery, value formation, and skill development. It places moral education at the core while aligning closely with the school's "three comprehensive education" reform requirements to implement a holistic approach to teaching and researching the engineering drawing course within the framework of curriculum ideology and politics.

2 CURRICULUM ANALYSIS AND TEACHING STATUS

2.1 Curriculum Analysis

"Engineering Drawing" is a fundamental course for science and engineering majors, playing a pivotal role in laying the groundwork for further professional studies and related engineering and technical work[5]. This course is aimed at freshmen, who are brimming with curiosity and enthusiasm as they embark on their university journey and embrace new disciplines. By seamlessly integrating ideological, political, and professional content, the course aims to foster a shift in students' mindset, instill a sense of responsibility, nurture familial and national pride, and elevate their social consciousness as they acquire professional knowledge and engineering skills. The ideological and political education within the course significantly aids students in transitioning to university life, fostering proper values and life perspectives, and swiftly comprehending the historical responsibilities that today's college students bear in this new era[6-8].

2.1 Current Status of Course Teaching

The "Engineering Drawing" course spans 48 class hours, comprising 16 class hours of theory and 32 class hours of practical work. The course covers fundamental concepts and skills related to drawing, engineering drawing, and CAD. Students often find the course challenging, particularly the section on three-view engineering drawing and professional drawing representation, which requires extensive practice. Given the limited class time and abundant content, it is a crucial and demanding task to effectively integrate ideological and moral education with course knowledge, ignite students' passion for learning, and instill ethical values while mastering professional and technical knowledge, ultimately achieving the training objectives for college students in the new era.

In the teaching process of this course, there is a significant emphasis on integrating ideological and political education. However, due to factors such as energy, interest, and cultural knowledge accumulation, most engineering teachers tend to prioritize technology and skills over ideological and political knowledge. As a result, the incorporation of ideological and political elements into the curriculum is not as effective as it could be. Some teachers focus excessively on the forms and requirements, creating a sense of rigidity and detachment from the professional courses. On the other hand, some teachers thoroughly consider ideological and political elements but struggle with integrating them cohesively due to a lack of overall logical relationship and resource integration. As a result, there is still room for improvement in realizing the goal of "three comprehensive education"[9-10].

3 MEASURES AND WAYS OF INTEGRATING IDEOLOGICAL AND POLITICAL EDUCATION IN ENGINEERING DRAWING COURSE

3.1 Teaching Principles of Engineering Drawing Course under the Ideological and Political Concept of Curriculum

The principles guiding the instruction of the engineering drawing course are founded on the fundamental principles and standards of ideological and political education[11]. They adhere to the underlying principles of education, teaching regulations, and course objectives. These principles showcase educators' grasp of the essential elements and teaching norms of engineering drawing courses. They form the basis for educators to devise instructional content, teaching sequences, teaching activities, and to employ effective teaching methodologies[12].

3.1.1 Student-centered principle

In consideration of the current situation of students, particularly the limited engineering knowledge of first-year students, the teaching content and structure are organized in a progressive manner, with teaching methods carefully selected. The instructional design prioritizes self-directed, hierarchical, and iterative learning for students. Teaching activities are designed to align with students' cognitive abilities, encouraging positive thinking and fostering their proactive engagement in learning.

3.1.2 Heuristic educational principle

The engineering drawing course integrates moral education content in a chapter-wise manner, aiming to stimulate students' enthusiasm through heuristic teaching activities. This approach encourages positive thinking, proactive practice, and the development of creative thinking skills. Throughout the teaching process, instructors utilize heuristic methods to address and resolve problems, incorporating practical problems, engineering examples, application instances, and knowledge structures. Emphasizing the essential unity of knowledge cultivation, thinking skills, ability development, and engineering literacy, the curriculum systematically integrates ideological and political education to subtly influence students' overall learning experience.

3.1.3 Intuitiveness principle

The incorporation of engineering geometric models in teaching is a defining feature of engineering drawing courses. By utilizing these models, students can gain a clear understanding of real-world objects, effectively bridging the gap between abstraction and concreteness. This approach allows students to develop a perceptual understanding of geometric shapes and engineering structures, fostering spatial awareness and improving their ability to observe and think spatially. Successful implementation of intuitive teaching rests on moderation and timeliness. It is crucial to strike the right balance and refrain from overusing teaching models to prevent students from becoming dependent on them. Timeliness entails allowing students space for independent thinking and empowering teachers to take on a guiding role. In addition to teaching models, instructors can use language and body language to encourage students to integrate observation, analysis, and imagination, resulting in more efficient and effective teaching.

3.1.4 Practical principle

The fundamental objective of the engineering drawing course is to foster students' capacity for innovative thinking and product design expression. This is achieved through the gradual imparting of knowledge and skills training. Following the completion of the instructional content, instructors can develop practical projects to aid students in furthering their comprehension, proficiency, and application of graphic theory. This approach enables students to cultivate a sense of accountability towards engineering and society, a practical innovative mindset, and foster their independent learning abilities.

3.2 Rebuilding Teaching Objectives of "Engineering Drawing" into Curriculum Ideological and Political Education

3.2.1 Teaching implementation methods

In alignment with the training plan and the ideological and political teaching objectives of the curriculum, we will refine the new curriculum teaching objectives. Focusing on these objectives, we will reconstruct the teaching content, activities, and evaluation to ensure a coherent alignment between our goals, content, teaching methods, and assessment. This will facilitate the seamless integration of ideological and political elements with professional knowledge within the teaching content. Our teaching approach will prioritize a student-centered, teacher-led philosophy, utilizing a blend of online and offline methods to effectively merge ideological and political education with professional teaching. Additionally, the course evaluation process will encompass assessment of ideological and political education, providing valuable feedback to enhance our teaching content and methods, ultimately serving the essential function of nurturing skilled professionals through education.

Table 1 Rebuilding Teaching objectives and ideological and political objectives of engineering drawing course

Target number	Target description	Target number	Target description
Course objective 1	Guide students to establish a correct world view, outlook on life and values, and strengthen the four self-confidences; Abide by engineering ethics and pay attention to the cultivation of students' craftsman spirit.	Ideological and political objective 1	Strengthen the road self-confidence theory self-confidence system self-confidence culture self-confidence with Chinese characteristics by integrating the ideological and political elements of the curriculum into the whole process of curriculum teaching.
Course objective 1	Master the basic knowledge of drawing in the professional aspect and the relevant requirements of drawing standards; Be able to use professional drawings to identify and judge the key links of complex engineering problems in professional fields; It can support the effective expression of key links in the design of engineering drawings through drawings.	Ideological and political objective 2	Combining Marxist viewpoints, viewpoints, and methods with the cultivation of scientific spirit in curriculum teaching can improve students' ability to correctly understand and solve problems.
Course objective 1	Understand the development history of drawing software (AutoCAD), understand the basic principles of drawing software, master the use of basic commands and drawing methods of drawing software, and be able to use these basic commands and drawing methods to draw engineering drawings.	Ideological and political objective 3	Pay attention to students' engineering ethics education, cultivate students' great country craftsman spirit of Excellence, and stimulate students' feelings of home and country and mission of serving the country through science and technology

3.2.2 Rebuilding teaching objectives

In December 2021, the Department of Higher Education of the Ministry of Education released a document titled "Comprehensive Promotion of Curriculum Ideological and Political Construction in Colleges and Universities." This document integrates the assessment of curriculum ideological and political construction effectiveness into the evaluation of undergraduate teaching, discipline, professional certification, and teaching achievement. As a result, it is essential for educators to integrate the effectiveness of curriculum ideological and political construction into the teaching objectives, leveraging the core values of curriculum ideology and politics and enhancing the educational function of the curriculum, as detailed in Table 1.

3.2.3 The teaching method of "integrated infiltration" of ideological and political education in engineering drawing course

The engineering drawing course incorporates ideological and political education through an integrated approach, with a strong emphasis on moral values. The main instructor is dedicated to promoting ethical behavior, learning, and teaching. The focus is on enhancing students' worldview, life outlook, and values by integrating moral education, aesthetic education, and subject knowledge into the course. The goal is to guide students in developing a proper understanding of their country, nationality, history, and culture, fostering well-rounded technical talents for the society's socialist development, as depicted in Table 2.

4 PRACTICAL TEACHING EFFECT OF INTEGRATING ENGINEERING DRAWING COURSE INTO IDEOLOGICAL AND POLITICAL EDUCATION

By integrating ideological and political courses with the teaching of engineering drawing and was implemented for a semester, students have shown increased initiative in learning "engineering drawing." They have demonstrated greater attention to detail in their homework exercises and drawing practice, leading to a significant reduction in drawing errors. Furthermore, during online courses, students have become more engaged in asking questions and have shown an improved attitude towards learning. According to students, the study of "engineering drawing" has cultivated a sense of patriotism and deepened their appreciation for the challenges and achievements in engineering made by the country. They expressed a commitment to maintaining a work ethic of excellence, rigor, and precision in their future endeavors, embracing a strong sense of responsibility and contributing to the modernization of the homeland.

Table 2 The correlation matrix of "integration infiltration" node and ideological education

Teaching content	Elements of ideological and political integration	Course teaching design	Expected results
Chapter 1: Basic knowledge and skills of engineering drawing	Awareness of obeying laws and regulations. How to be an excellent builder of Chinese dream.	Through asking questions, the necessity of drawing standards is introduced, and the basic knowledge and national standards of engineering drawing are introduced.	Strengthen the awareness of abiding by laws and regulations through the seriousness emphasized by the laws and regulations of "designing lifelong responsibility system"
Chapter 3: The expression method of engineering	Patriotic dedication, daring to tackle, courage to struggle, craftsman spirit	Through Liang Sicheng's Foguang Temple hand-drawn, the drawing method of section drawing is introduced in detail	By comparing the physical drawings, hand-drawn drawings and computer drawings of Foguang Temple, students can understand the craftsman spirit of the master and cultivate the craftsman spirit of rigorous, meticulous, serious and meticulous.
Chapter 5: Reinforced concrete structure drawing and steel structure drawing	The mastery of technical knowledge can realize the sense of historical mission and responsibility of serving the people's happy life for life and studying hard for the country's centennial rejuvenation	Introduce the learning, work, growth experience and advanced deeds of typical representatives of the construction industry, and invite students to talk about their feelings	Sow the seeds of love for the profession in the hearts of the students, develop a sense of professional pride in the school and major, and study hard for the goal of national development and construction and the people's better and happier life.
Chapter 6: Building engineering drawing	Introduce China's current advanced civil construction technology and infrastructure construction projects. Cultivate patriotic feelings as civil engineering professionals	Students make special presentations, and teachers comment	Combined with the deeds of "great country craftsmen", the spirit of patriotism is conveyed to students, and the work attitude of loving their own jobs, being down-to-earth, and striving for perfection is cultivated.

5 SUMMARY

Promoting foster virtue through education is a foundational mission of colleges and universities, and the primary duty of educators is to teach and guide individuals. Ideological and political education plays a vital role in nurturing morality and fostering citizens with patriotic values. Integrating ideological and political education into the curriculum should involve infusing specific courses with relevant content and utilizing distinctive ideological and political elements. By transcending traditional teaching methods and achieving a deep integration of knowledge transfer and ideological and political education, we can infuse ideological and political education throughout the entire teaching process. By emphasizing the "craftsman spirit," students can develop professional pride, recognize their sense of responsibility and mission, and significantly enhance their overall learning experience. This approach aims to enable students to achieve comprehensive development, cultivate high-quality professionals for society, and contribute to the great rejuvenation of the Chinese nation.

COMPETING INTERESTS

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