

Research and Discussion on the Integration of Ideological and Political Education into University Teaching under the Background of the New Era

—Taking the Course of Signals and Systems as an Example

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Keywords: Ideology and Politics in Curriculum, Problem-driven, Main Line of Educating People, All-round

Abstract: In the context of the new era, higher education is no longer solely focused on imparting knowledge, but rather emphasizes the infiltration of ideological and political education to achieve the educational goal of "cultivating virtue through education." As an innovative educational model, curriculum-based political and ideological education integrates ideological and political education into specialized courses, forming a comprehensive education system that covers all aspects. Taking the course of "Signals and Systems" as an example, the curriculum has condensed the main line of education centered on "personal cultivation" - "professionalism" - "national belief." Through joint efforts between universities and enterprises in developing course resources, and leveraging information-based teaching methods, a blended online and offline teaching model of "pre-class independent exploration - in-class problem-driven learning - post-class summary and feedback" has been established. This model empowers students to take the initiative in their learning, thereby enhancing the overall effectiveness of holistic education.

1. Course Introduction and Learning Situation Analysis

Curriculum-based ideological and political education (CIPE) represents a significant direction in China's higher education reform, aiming to address the issue of insufficient coverage of traditional ideological and political education within specialized courses. By integrating CIPE, we can permeate ideological and political education throughout the entire university education process, achieving the objectives of educating all students, throughout their academic journey, and in all aspects of their development^[1]. "Signals and Systems," as a core course in Electronic Science and Technology, assists students in establishing mathematical models of signals and systems, and imparts physical significance to analytical results through mathematical analysis. Through mastering fundamental theories and analytical methods, students acquire essential skills for their majors while enhancing their personal cultivation, fostering professional qualities such as "rigorousness, practicality, and teamwork." In the context of national technological development, the course also nurtures students' sense of social responsibility, love for the country, and commitment to selfless contribution, laying a solid foundation for them to become qualified engineers and technicians.

Students have already studied Advanced Mathematics, Complex Variables, and Circuit Analysis, demonstrating a solid grasp of calculus, circuit theorems, and the ability to apply mathematical knowledge to analyze physical problems. They are proficient in utilizing the internet to search for learning resources. However, "Signals and Systems" is characterized by its strong theoretical foundation, abundance of formulas and properties, and abstract content, which can lead to insufficient internal motivation and pose challenges for students. Incorporating ideological and political elements into the course can not only stimulate students' interest in learning but also guide them towards establishing correct values and outlooks on life.

2. Construction Objectives of Curriculum-based Ideological and Political Education

In accordance with the professional talent cultivation objectives and curriculum standards, the team members have refined ideological and political elements from both knowledge and skill perspectives, excavated relevant cases, and ensured the effectiveness of instructional design. These elements are then integrated into the entire process of classroom education and teaching in a hierarchical and comprehensive manner.

Throughout the development of the "Signals and Systems" course, many prominent scientists have emerged. By introducing the innovative research of Fourier, Laplace, and Dirac, we aim to stimulate students' interest in learning. Through case-based teaching, we reinforce the learning outcomes of new concepts and theories, interweaving dialectical relationships, natural laws, and ideological and political content that progresses from the simple to the complex. Additionally, the fundamental theories and analytical methods of signals and systems reflect the scientific connotations of ideological and political education^[2], integrating the beliefs in striving for development and rejuvenating the country through science and technology. The main line of education and the goal of ideological and political education are shown in Figure 1.

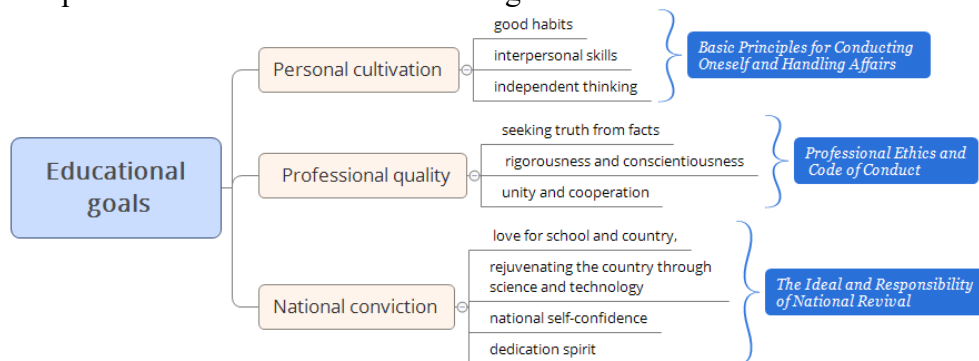


Figure 1 The main line of education and the goal of ideological and political education.

3. Integrating Ideological and Political Education Throughout the Teaching Process

3.1. Refining the Core Thread of Ideological and Political Education for Cultivating Talents

By adhering to the professional positioning and deeply exploring ideological and political elements, we establish the core thread of "ideological and political education for cultivating talents" centered on "personal cultivation," "professionalism," and "national conviction." This approach takes "celebrity experiences," "natural laws," "philosophical theories," "psychological qualities," and "national confidence" as entry points to refine and integrate these aspects into our educational practice.

3.2. Exploring New Teaching and Learning Methods^[3]

To better suit the characteristics of the "Signals and Systems" course and adapt to the training of "new engineering" talents, we propose the PBL-PASE teaching method, which builds upon the Problem-Based Learning (PBL) approach. This method drives the entire classroom through a Problem-Propose-Analysis-Solve-Extend (PBL-PASE) process. In this framework, teachers serve as guides while students work collaboratively in small groups to address problems through discussions, simulation analyses, and case studies. This approach ensures that students apply what they learn in practice, truly embodying a student-centered learning. The main thread of ideological and political education runs through the entire teaching process are shown in Figure 2.

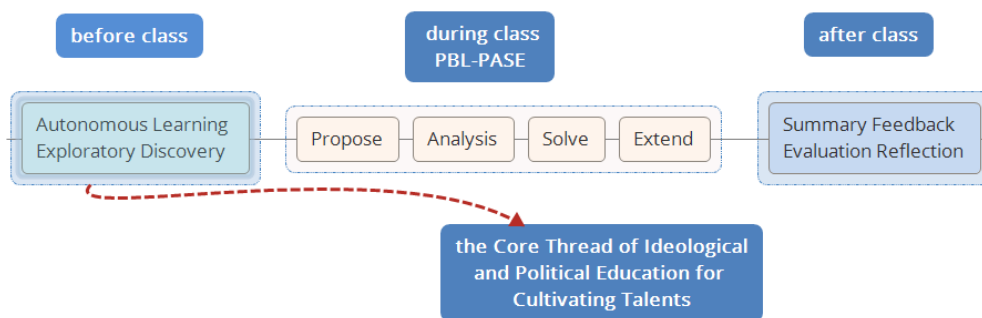


Figure 2 The main thread of ideological and political education runs through the entire teaching process.

3.3. Implementing a Comprehensive Education Model Encompassing "Curriculum, School, and Enterprise"

Based on the professional training program and curriculum standards, we have established a range of resource libraries, including those for ideological and political elements in the curriculum, enterprise training projects, Matlab practical simulation projects, and problem banks for course content. These diverse resource libraries intersect and integrate, driven by student self-study, facilitated by group cooperative learning, and supported by the exchange of information between teachers and students. The educational process combines online and offline methods, alternating between theoretical instruction at the school and practical training in enterprises. Through problem-based discussion and heuristic teaching methods, we inspire students to think critically, guide them in analysis, and encourage them to design solutions based on identified problems.

Collaborating with Qingdao Jiuwei Huadun Technology Research Institute Co., Ltd., we have jointly developed a course project library centered on knowledge points related to signal generation, analysis, and transmission in hardware circuits. This allows students to experience the design process of enterprise projects firsthand. Additionally, we integrate ideological and political elements such as corporate culture, professional ethics, and technological advancements into the curriculum, thereby achieving the goal of enterprise-based education.

3.4. Building a High-Quality Faculty with Strong Ideological and Political Teaching Capabilities

We systematically conduct various forms of teacher training focused on moral education competencies. Regular instructional research sessions are organized, where teaching methodologies and approaches are discussed through formats such as teaching salons, seminars, and observation of classes. These activities aim to enhance teachers' abilities in ideological and political education within the curriculum, including their cognitive abilities, instructional design skills, implementation capabilities, evaluation techniques, and research proficiency. By sharing teaching experiences, we ensure the effectiveness of ideological and political education in courses and foster the development of a high-quality faculty team with a strong sense of ideological and political cultivation and exceptional pedagogical skills^[4].

4. Teaching Cases of Ideological and Political Education in Courses

Case 1: Teaching Electrical Signals

When introducing electrical signals, we narrate the arduous journey of "Father of the Sky Eye," Mr. Nan Rendong, who led his team through a 22-year endeavor from project justification and approval to site selection, construction, and completion, ultimately creating the world's largest and most sensitive single-aperture 500-meter spherical radio telescope known as "China's Sky Eye." Through this story, students not only appreciate the exemplary conduct of our time's heroes but also realize the value of perseverance, dedication, responsibility, and commitment. It inspires students to embrace the innovative spirit of striving for excellence and the craftsmanship of constantly refining their work, strengthening their resolve to study hard, master professional skills, and contribute to the

motherland, thereby enhancing their national pride.

Case 2: Teaching Signal Processing

When discussing signal operations, we leverage voice signals as an illustrative tool. Using Matlab, we demonstrate how image transformation can be applied to voice signals, making them sound sharper. This auditory experience helps students intuitively understand the concept that scaling compression increases signal frequency. By doing so, we guide students to learn how to analyze and solve problems using different carriers, fostering their ability to think creatively and adapt flexibly in problem-solving contexts.

5. Conclusion

In the context of the new era, to better cultivate talents, universities have continuously updated their teaching methods and explored innovative teaching reform models, giving full play to the educational role of specialized courses. The "Signals and Systems" course integrates core values into the entire educational process through refining ideological and political elements, embedding them as a central theme, and fostering collaborative education between schools and enterprises^[5]. Through this course, students' learning initiative, innovation ability, engineering practice capabilities, and the shaping of values have been significantly impacted in ways that cannot be underestimated.

Acknowledgements

High-level key construction courses of Qingdao Binhai University.

Teaching reform research project of Qingdao Binhai University: Research on the ideological and political teaching reform of the "Signals and Systems" course under the background of the new era(2023JC04).

Special research project of Qingdao Binhai University: Exploration of the Implementation Path of Aesthetic Education in the Second Classroom of Colleges and Universities in the Era of We-Media(2023ZGY11).

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