

# *Research on the Reform of Civics Teaching in the Graduate Course of Engineering Test and Signal Processing*

Zhongbo Peng, Chunyu Zhang

*School of Shipping and Naval Architecture, Chongqing Jiaotong University, Nanan, 400074, Chongqing, China*

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**Abstract:** Civic education in professional courses is a new requirement put forward by the Party Central Committee for postgraduate education and teaching and cultivation of talents in the new era. Taking the graduate course "Engineering Test and Signal Processing" as an example, this paper analyzes the necessity and feasibility of integrating Civic Education into professional courses, studies the teaching case design, realizes the goal of education from different course knowledge corresponding to the course knowledge and entry point, integrates the course Civic Education into the process of professional classroom teaching construction, and finally taps the Civic Education elements to enrich the teaching content and establishes the Civic Education case set to improve the teaching methods. The aim is to cultivate high-quality postgraduate talents.

## 1. Foreword

Graduate education has an important role in cultivating innovative talents, improving innovation capacity, and promoting the modernization of national governance system and governance capacity. Ideological and political education is the primary content of China's spiritual civilization and the psychological foundation for the formation of students' values in life. In 2022, the Ministry of Education issued the "Work Points of the Department of Ideological and Political Work of the Ministry of Education in 2022", which requires the construction of the ideological and political work system of colleges and universities and the innovative development of ideological and political work of colleges and universities under the guidance of Xi Jinping's socialist thought with Chinese characteristics in the new era.[1]

This paper takes the course Civics as the leader, combines the characteristics of the course "Engineering Test and Signal Processing", explores the effective path of combining knowledge transfer and value leadership, promotes the reform of course Civics, cultivates and shapes the values of postgraduates, organically integrates them into the professional courses they study, integrates Civics education into the whole process of postgraduate education and teaching, and makes the professional courses exude the charm of Civics.

## 2. The necessity of integrating civic education into professional courses

Civic education has an important influence on improving the way of thinking of graduate students, guiding values in knowledge transfer and ability cultivation, and helping graduate students to shape a correct world view, outlook on life and values. The development of professional courses will deepen the deep understanding of the specialties studied, thus effectively promoting the learning and mastering of professional theoretical knowledge, and laying a solid foundation for postgraduates to carry out signal research and analysis in the future. At present, teachers pay more attention to the improvement of teaching ability and teaching skills, but are relatively weak in the integration of political thinking elements, mainly in the separation of political thinking education and theoretical teaching, the depth and breadth of political thinking elements are not enough, and the appeal to students is not enough, the syllabus and teaching evaluation of professional courses tend to pay attention to the assessment of professional knowledge and skills, emphasizing students' ability in professional knowledge and skills, while not paying enough attention to students' spiritual world and political ideological education. It hinders the enthusiasm of teachers of professional courses to carry out classroom political thinking education in professional classroom teaching.[2] The integration of political education into professional courses and the subtle strengthening of professional knowledge and talent education will be a new attempt to integrate political education into professional courses for graduate students of ship and ocean engineering. It will be a new attempt to integrate the political education of graduate students in ship and marine engineering into the professional courses, to explore the "political elements" contained in them, to raise the social issues connected with them from the professional knowledge, and to achieve the goal of value leadership while teaching knowledge.

Using disciplinary thinking, the cultural genes and value paradigms contained in the knowledge of postgraduate professional courses are refined and transformed into effective teaching carriers for the vividness of socialist core values, and spiritual guidance at the level of ideals and beliefs is carried out heuristically in knowledge learning, so that postgraduates can establish a rational way of thinking about values in a state of self-contemplation. The integration of Civic Education into professional courses must closely integrate the development of professional theoretical knowledge with the development of the times and the international situation, closely integrate the current situation of postgraduates' thoughts, and mobilize their learning enthusiasm and initiative by applying scientific development thinking.

## 3. The Feasibility of integrating civic education into professional courses

Ideological and political education should not be added to the teaching process rigidly, but should be based on the characteristics of the curriculum, and should explore and accumulate ideological and political elements, and find the right entry point with the knowledge points of the curriculum. In the process of teaching and implementation, we need to combine the specific content of the Civic and Political Science elements and carefully design the teaching sessions to achieve a silent Civic and Political Science education and an organic combination of knowledge transfer and value leadership. In addition, the course of Civics should not be limited to certain chapters or knowledge modules, but should run through the entire content of the course.[3]

In the course design, we can focus on the future development direction of the country and the innovative technical achievements of the profession, and introduce the scientists who have made outstanding contributions to the development of the discipline and the profession, and use practical examples to cultivate the graduate students' sense of identity and responsibility for the profession. For example, Xu Pannan, a famous expert in ship and ocean engineering and the chief designer of "Jiaolong", is one of the first talents trained for deep sea research and development in China. The astronauts of "Jiaolong" and "Tiangong-1" successfully conducted a "dialogue between sea and sky",

and China has once again set a new record on the world's manned deep diving list. Although Xu Pannan is already old, he still shines in his lifelong love of education and marine business, and his responsibility and commitment are admirable.

In recent years, the country has invested heavily in the field of ship and marine engineering, which has become one of the important components supporting our national security and greatly enhancing the national pride. The content of "Engineering Test and Signal Processing" is an important part of many of the nation's major vessels, and the automation, information and digitization of ships are realized through the installation and application of various types of sensors. This provides the possibility for the course Civic Education. [4]The teaching is introduced with actual cases, and the Civic elements in it are explored and explained to stimulate the national pride of students. For example, the Xuelong polar research vessel brings together the strengths of many of China's top universities and research institutes. In the data collection room of the Xuelong, fish detectors that can be used to find krill and other polar aquatic animals are installed; current meters that can determine the speed and direction of seawater flow while underway. The Snow Dragon polar research vessel was built, making China's Antarctic expedition among the world's leaders, greatly safeguarding China's maritime rights and interests, and enhancing national pride.

As an important support for China's national defense industry, ship and ocean engineering, actively educating students on patriotism while cultivating their scientific research ability is a new requirement for graduate education in the new era and new situation, as well as a new responsibility for graduate instructors to complete the teaching of graduate courses and to complete the training of graduate students. 2019 Order of the Republic recipient Sun Jiadong has been engaged in aerospace work for 60 years, realizing the Beidou satellite navigation system's networking and application. Sun and the older generation of space have perfectly interpreted the spirit of spaceflight through their own life experiences. Teachers are responsible for training the successors of the motherland, so they can permeate ideological and political education through the teaching of professional courses, strengthen students' professionalism and moral spirit, actively promote the spirit of patriotic dedication, and achieve the win-win effect of professional knowledge and ideological and political education.

#### **4. The teaching design of civic education into professional courses**

On the basis of fully exploiting the course's own characteristics and advantages, by carefully sorting out the main points of knowledge in each chapter, and on the basis of in-depth understanding of the course's philosophy of thinking and politics, design thinking and politics mapping and integration points, integrate ideological and political education into the professional curriculum, and infiltrate the corresponding professional knowledge points into the thinking and politics elements. In the process of sensor lectures, timely lectures on the status of domestic and international development of sensor technology. Can enhance students' pride, encourage students to study, so that students have a sense of responsibility and a sense of mission, so that the concept of science and technology to strengthen the country in the Civic and Political Science teaching rooted in the hearts of students. For example, when talking about the role of sensor status content, through the introduction of such as Huang Danian and other scientists willing to dedication of touching deeds, so that students' hearts and minds are baptized. When teaching the development of sensor technology, signal conditioning, data acquisition, the introduction of China's sensor products and chip technology need to be imported from abroad, sensor key technologies are monopolized and embargoed by foreign countries, such as the impact on Huawei, ZTE and other companies, with facts to inspire students, cultivate students' patriotism and awareness of the importance of scientific and technological innovation, so that students appreciate the importance of self-reliance, hard work.[5]

When teaching typical sensors, we introduce examples such as China's aerospace aircraft, and

introduce the application of sensors in the field of aviation and the integration of China's leading technology through video playback, discussion, and large assignments to open up students' horizons and make them respect the hard work and craftsmanship of engineers and technicians. In the part of teaching modern test systems, the application of China's Beidou satellites in testing is integrated, and the concepts and connotations of distributed testing, information fusion, data synchronization acquisition technology, and networked testing technology are described. At the same time, students are introduced to the arduous process of developing the BeiDou satellite on their own and breaking the monopoly of American technology to inspire pride and patriotism. When teaching the theory of signal analysis, the road noise monitoring and diagnosis system is introduced to accurately analyze the causes and mechanisms of noise generation through noise signal acquisition, filtering, spectrum analysis, correlation analysis and other techniques to educate students about civilized travel and courtesy to others.

When introducing the development of testing technology and the teaching objectives teaching content and learning methods of this course, the development of China's shipbuilding industry is described, from self-reliance and starting from scratch, to a shipbuilding power, and is moving towards a shipbuilding power, while ship-related testing technology is becoming increasingly mature. To analyze the deep-seated reasons for the gap, to inspire young students' patriotic enthusiasm, and to establish the belief of striving for the great rejuvenation of the Chinese nation. Signal description and analysis as well as the use of theories related to signals in the time domain and frequency domain, through dialectical thinking about the relevant theoretical calculations, revealing the connection between things and being able to do quantitative correlation analysis. When explaining the Fourier transform, students should understand that the time domain and frequency domain of a signal are essentially different manifestations of the same problem. To establish students' socialist view of harmony and always maintain the peaceful unification of the motherland and social harmony and stability. Cultivate a good world view among students and safeguard the interests of national security. When talking about the characteristics of the test system and mastering the description and analysis of the dynamic characteristics of the test device, the students will be able to cultivate their ambition and improve their quality by talking about the relevant calculation methods, relating to the laws of development and analyzing the problems with the theory.

Traditionally, case presentation is a very common teaching method in professional courses, because of the strong professionalism of theoretical knowledge, in order to help students better learn and understand, supplemented by teaching cases to explain, can achieve very good results. For example, based on the project "Analysis of the dynamic response of deep-water platform under the action of disaster marine environment", through in-depth excavation, using the actual South China Sea marine platform as an example to carry out course lectures, not only can teach students professional knowledge, but also through the case to complete the Civic Education. Design road noise and urban traffic monitoring and diagnosis system case, through the noise signal acquisition, filtering, spectrum analysis, correlation analysis and other techniques to accurately analyze the causes and mechanisms, students have expressed the need for civilized travel, courtesy to others. Digging with a positive attitude will build up a very rich and valuable case set of Civic Education, and such repeated penetration can achieve a very good Civic Education effect.

## 5. Conclusion

By integrating Civic Education into the professional courses, combining the own characteristics of the professional courses, the professional knowledge of Engineering Test and Signal Processing and the ideological and political education content are effectively penetrated and organically integrated, tapping the Civic elements behind the professional knowledge and optimizing the entry

point of the professional Civic teaching link. The curriculum requires the integration of value leadership in knowledge transfer and ability development, the integration of political education into professional knowledge through appropriate teaching design and teaching methods, and the integration of cultivating and practicing socialist core values into the whole process of teaching and education. Curriculum Civics fully reflects the nurturing function of professional courses, which is conducive to the construction of a comprehensive curriculum nurturing pattern, the combination of Civics education into professional courses, the teaching of professional knowledge and skills in the graduate classroom, and the cultivation of social construction talents needed in the new era.

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