Design and Practice of Curriculum Ideological and Political Teaching for Electronic Information Specialized Courses

Zhixiong Chen[a], Zhihui Yang[b], Junhong Ni[c], Yincheng Qi[d], Jingfang Sun[e]

[a]zxchen@ncepu.edu.cn; [b]yangzh187@163.com; [c]nijunhong@ncepu.edu.cn; [d]qiych@ncepu.edu.cn; [e]sunjingfang19@126.com

Department of Electronics and Communication Engineering, North China Electric Power University, Baoding, China

Abstract. It is of great significance to integrate the ideological and political elements into the teaching process by combining the characteristics of students, the development of the industry and the actual curriculum. In order to explore the ideological and political method in the course for communication engineering majors, this paper proposes a three-levels and three-nodes curriculum ideological and political method. closely related to the development history of China Mobile Communications, and integrates ideological and political education in the key time nodes of the semester. In order to guide the courses to carry out targeted teaching work, the three-level objectives of knowledge, ability and value of the courses such as "Wireless Network Communication Technology" are determined. Besides, the course team makes full use of online and offline resources, actively participates in ideological and political training and lecture competitions, promotes the construction and development through competition, condenses engineering and ideological and political cases, and optimizes the teaching content and design.

Keywords: curriculum design, ideological and political education, major in electronic information

1 Introduction

Considering the student characteristics, industry development requirement and curriculum reality, it is of great significance to integrate ideological and political elements into the teaching process in a silent and subtle way [1], so that the ideology and politics in the specialized courses and the ideological and political courses can go together in the same direction and form a synergistic effect. In the limited class hours, how to meet the comprehensive needs of basic knowledge teaching, frontier technology expansion and curriculum ideological and political development through effective teaching design and content refinement has become an urgent problem to be solved.

"Wireless Network Communication Technology" and "Mobile Communication" are important professional courses for communication and information discipline in higher engineering colleges. Under the background of new technology and era, the existing courses have exposed some problems, such as poor connection between old and new technologies, complicated contents, insufficient excavation of ideological and political elements in the course, and it is

EIMT 2024, March 29-31, Wuhan, People's Republic of China

DOI 10.4108/eai.29-3-2024.2347670

necessary to carry out reform and design in accordance with the ideological and political requirements[2]. The rapid development in the field of mobile communication and the struggle history of China mobile communication provides a lot of useful materials for the ideological and political course of communication specialty, which is conducive to the excavation of ideological and political elements.

In order to explore the ideological and political method in the course for communication engineering majors and realize the mutual integration of "knowledge imparting, ability cultivation and value shaping", the course group actively explores and carries out the construction of "three ones" for curriculum ideological and political: one method(three levels and three nodes of curriculum ideological and political method, One idea(strengthen communication, enhance understanding, do more and say valuable),One key design(the student centered comprehensive design). Based on the proposed three-level and three-node method, this paper discusses and summarizes the ideological and political design ideas of the course "Wireless Network Communication Technology", and provides reference for the ideological and political work of related courses.

2 Curriculum ideological and political design and material mining

The course team proposes a three-levels and three-nodes curriculum ideological and political method, closely combined with the development process of China mobile communication, including "2G following, 3G breakthrough, 4G synchronization and 5G leading", and talked about "Chinese technology, Chinese solutions, Chinese wisdom and the Chinese current situation[3]. Besides, we integrated ideological and political education such as national and industry development, professional ability improvement, and further study and employment guidance into the key time nodes such as the beginning, the midterm and the end of the semester.

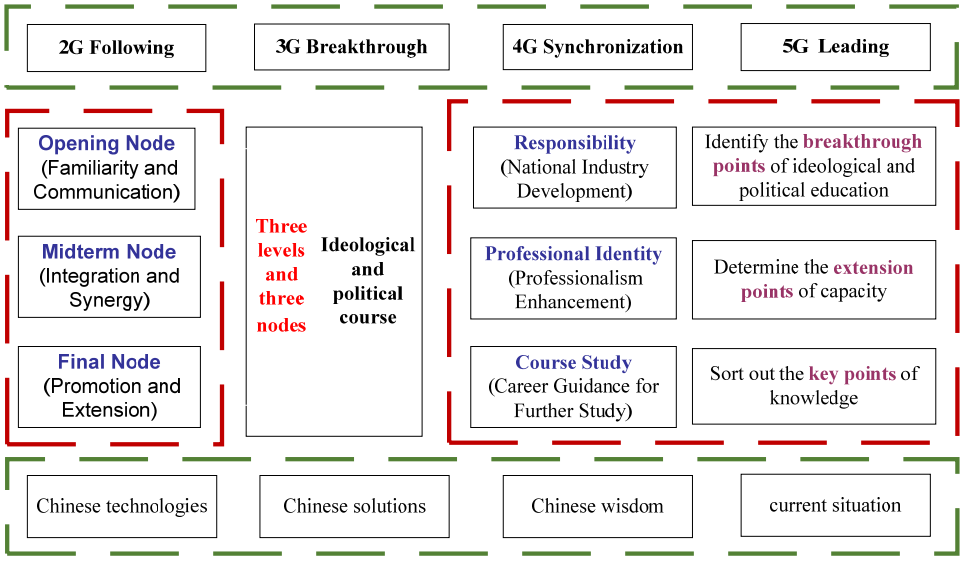

Figure 1. Three-level and Three-node Curriculum Ideological and Political Methods

As shown in Figure 1, the first level of curriculum ideological and political education is the level of responsibility, where we can discuss Chinese technology, wisdom, solutions and current situation related to the course content, and excavates ideological and political elements from the institutional advantages of China's mobile communication development[4], national support, unremitting efforts of correspondents, the construction of the industry ecosystem and the market demand for the application, etc., so as to enhance the students' sense of responsibility and mission. The second level refers to the level of professional identity, focusing on professional development and career planning, helping students to understand the current situation and prospects of the profession and the needs of social development, and concise the ideological and political cases of the course from the construction of digital countryside, green communication and the application of 5G system, so as to enhance the professional ability and engineering ethical literacy. The third level refers to the learning level of the course, which stresses the significance of the course, learning methods and preparing for further study and employment, guides students to correct their learning attitude, work hard, master scientific and reasonable methods of learning and doing things, improves the relevance, enthusiasm and efficiency of learning, and makes students want to learn, can learn, and have a gain.

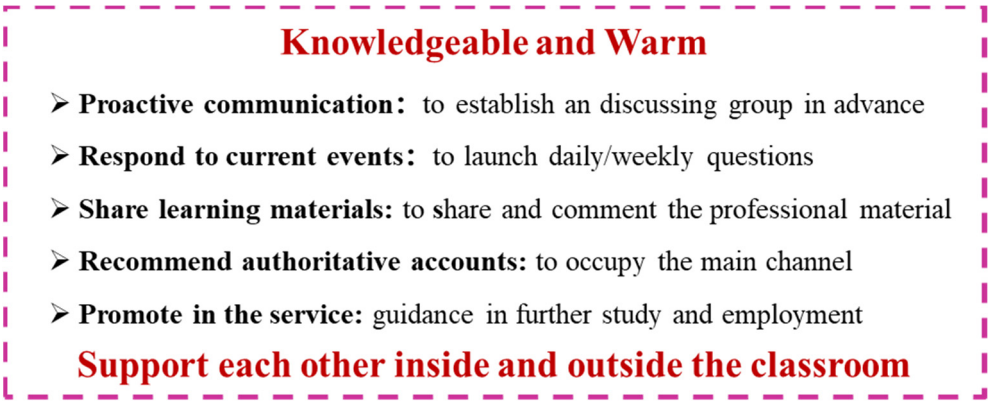

Figure 2.Building an integration communication platform for the course.

As shown in Figure 2, the course has built an integrated communication platform for communication and feedback at key time nodes such as the start, mid-term and final period.

(1) At the beginning of the course, the teacher affinity and attraction are improved by establishing QQ group, interacting with daily question and answer, weekly discussion and the recommending of professional materials.

(2) The midterm is a key node to connect the previous and the next. After half a semester's teaching and learning, the relationship between teacher and students has become more harmonious, and students have become familiar with and accepted the teaching methods and concepts of teachers, so they can conduct periodic summary and tests and carry out engineering case analysis.

(3) At the end of the semester, students have a better foundation for learning, and can conduct necessary discussions and expansion from the perspectives of theory, application, market and system in combination with high-level engineering cases, and utilize research reports and other

methods to guide students to pay attention to the engineering applications and the development of the national industry.

(4) After the final examination, the State Grid exam guidance and postgraduate interview guidance are also an important part to start the course of ideological and political education and practice the "three-pronged education".

3 The design of the teaching goal of integrating the ideological and political course

In order to guide the courses to carry out a targeted teaching, the three level goals including knowledge, ability and value of the “Wireless Network Communication Technology" courses are determined.

(1) Knowledge goal. To understand the key performance such as spectrum effectiveness, system reliability, power effectiveness and engineering practicability, the course adopts the basic logical framework of teaching: from dual-user to multi-user, from independent transmission to competitive networking, combination of theoretical research and engineering application, ideal target and index balance. To direct the student to master the basic theory and key technologies of mobile communication such as wireless channel modeling, modern modulation and coding, anti-fading technology, cellular networking and interference, and application and development of typical systems from four levels with basic principles, main features, engineering conditions and performance evaluation.

(2) Ability goal. To master the methods of modeling and calculation, theoretical analysis, algorithm simulation, system design and optimization for the complex engineering problems in wireless communication, and to construct the knowledge system from multiple dimensions such as horizontal and vertical correlation of knowledge points, logical context and development trend. To understand the key factors of wireless communication development, such as the basic theories, technological development, engineering realization and application requirements, to know the concepts of system coordination, co-construction and sharing and green development in China mobile communication, and to learn the method of “grasping the main lines, learning the logic, dividing levels”, and to improve the ability of solving complex engineering problems.

(3) Value goal[5]. To understand the development history of China Mobile Communications, including “following in 2G, breaking through in 3G, synchronizing in 4G, and leading in 5G". Understanding of the value connotation of mobile communications including progress and explore, rigorous and meticulous, coordinate and balance, and serve the society. To cultivate the students' national sentiment and responsibility, cultivate professional ability and engineering ethics, and to stimulate students' learning interest and professional identity, and inspire them to work hard for the "5W" communication goal.

4 Case design and implementation of ideological and political course

The course team makes full use of online and offline resources, actively participates in ideological and political training and lecture competitions at all levels, promotes construction

and development through competitions, condenses engineering and ideological and political cases, and optimizes teaching content and design. More than 20 cases of ideological and political education have been condensed, and the course team put forward the teaching methods of ideological and political education based on the background introduction of engineering application cases, the summary and promotion after comprehensive explanation, and technical integration of details touching thinking, so as to realize the organic combination, mutual integration and mutual promotion of ideological and political education and the teaching of knowledge, and improve the students' engineering ethical literacy. The Figure 3 shows a case of teaching design. In the classroom, we take the changes and difficulties brought by the breakthrough of 3G in China as the breakthrough point, and introduce the ideological and political teaching and thinking. The breakthrough of 3G has greatly promoted the development of mobile communication in China, although there are shortcomings in industry and hardware, it is the accumulation and practice of 3G in theory, hardware and application that later led to China's 5G lead; In terms of duplexing, The Chinese TD-SCDMA standard is the only one that uses TDD technology, Why? What difficulties exist here? How did China solve it? The class focuses on this question chain to carry out teaching and interaction. Figure 4 shows a case of extracurricular interaction. Before class, push the video link of "The beautiful view of Mount Everest covered by 5G signal" in the QQ group of the class, to guide everyone to think: What is the significance of covering Mount Everest with 5G signal. Finally, a comprehensive summary is made to guide students to pay attention to the significance of innovation and solution ideas, and to encourage students to build a good foundation and establish scientific and technological confidence.

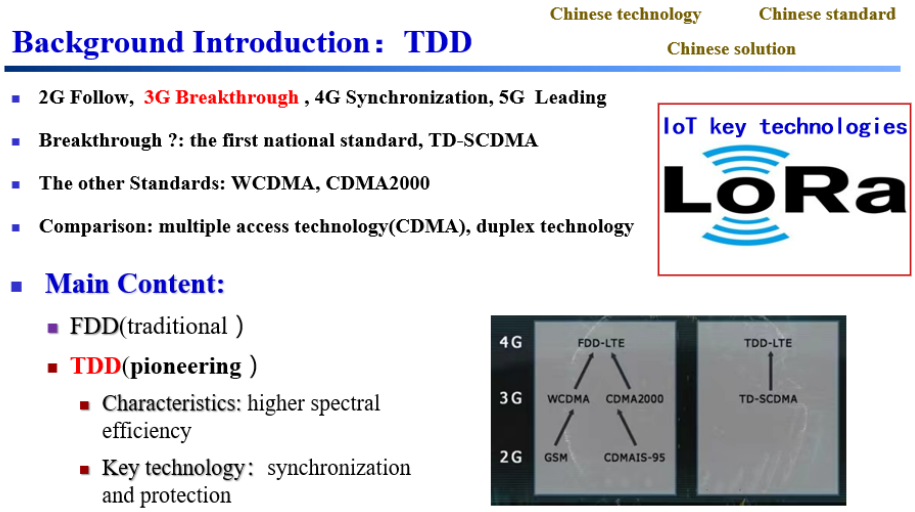

Fig. 3. Background- introduced method based on engineering application cases

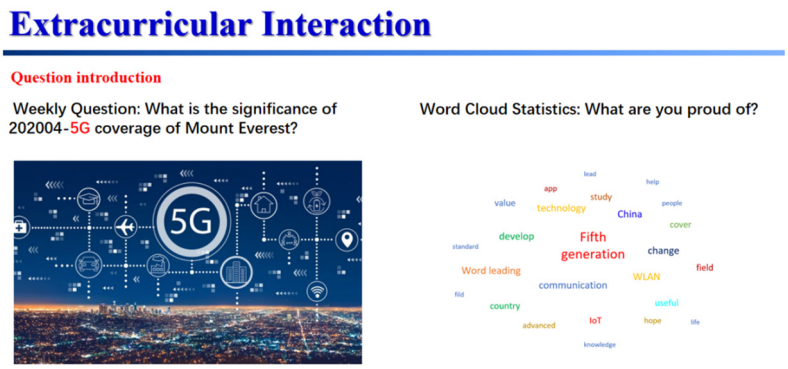

Fig. 4. Extracurricular Interaction method

5 Summary and analysis

In order to evaluate the teaching effect in time, after the end of Chapter 4, We surveyed students through questionnaires. There are 66 students in this class, all of whom participated in the questionnaire survey. The survey results show that through the teaching design and effective implementation of the integration of curriculum ideological and political education, students' motivation of learning has been significantly improved, and they have a more comprehensive understanding of the development of mobile communication in China, especially in 3G breakthrough and 5G leading the world, which is impressive. The following are some questionnaire questions and students' responses:

1. Multiple choice-What have you gained after learning mobile communication? （ ）

A. Knowing the development and difficulties of China's communication, I am more confident and proud of it. [82%, 54 people]

B. More interested in communication major and willing to pursue further studies. [64%, 42 people]

C. Learn more systematic communication knowledge from theoretical research, algorithm implementation and engineering application. [64%, 42 people]

D. After learning the technologies of mobile channel, modulation requirements and anti-fading, the understanding of mobile communication is more profound and comprehensive. [89%, 59 people]

2. What suggestions do you have for the mobile communication course (or this class)?

A. Talk more about some frontier hotspots [83%, 55 people]

B. Teach more engineering cases [76%, 50 people]

C. Teach more theoretical knowledge [29%, 19 people]

D. Less theoretical knowledge [12%, 8 people]

E. Add more tests [8%, 5 people]

F. Leave less homework [15%, 10 people]

G. More opportunities to ask questions in class [5%, 3 people]

H. Talk more about the topics of postgraduate entrance examination and employment [64%, 42 people]

I. Make more use of weekends to supplement knowledge [52%, 34 people]

3. Multi-choice-What do you think is the reason for the transformation of China mobile communication from scratch, from "2G following" to "5G leading"?

A. National attention and institutional advantages [95%, 63 people]

B. Correspondents are diligent and hardworking [94%, 62 people]

C. Huge market and strong demand in China [97%, 64 people]

D. Correspondents are good at learning and the route is correct [77%, 51 people]

E. Good luck [18%, 12 people]

4. Single-choice-Through a stage of mobile communication study, you are more inclined to （ ）?

A. Postgraduates [76%, 50 people]

B. Ph.D. [5%, 3 people]

C. Go to the three major operators [5%, 3 people]

D. Go to the State Grid Corporation of China [8%, 5 people]

E. R&D companies such as Huawei [6%, 4 persons]

5. Q&A-As a correspondent, what are you proud of?

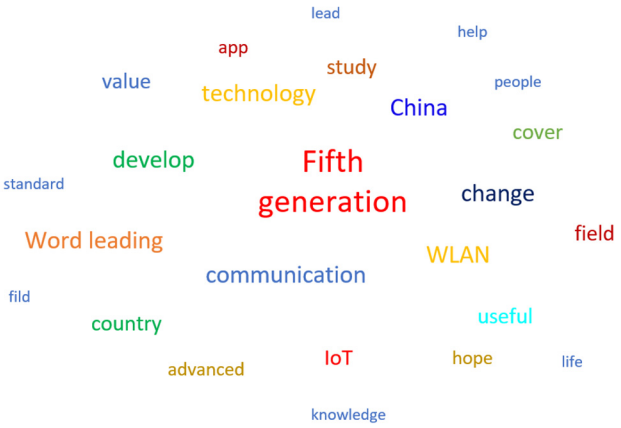

Figure 5. Word cloud statistics of students' responses

According to the analysis of the above survey data, as shown in Figure 5, it can be seen that the vast majority of students are more identified and confident in the communication major, are very interested in cutting-edge technology and hope to continue their studies. They realize that national support, market demand and the responsibility of China's correspondents are the key factors for the rapid development of China's communications, and are proud of China's 5G leading the world, and are willing to continue to work hard for the development of China's mobile communications.

6 Conclusion of construction effectiveness

After the comprehensive teaching is carried out by integrating the ideological and political design method, the learning effect of the class is obviously better than that of other classes, and students have better professional ability and innovative consciousness in literature reading, case analysis and scheme design.

Through continuous curriculum construction, the effect of curriculum team construction is remarkable. The team carried out activities such as case studies and lectures on curriculum ideological and political education in departments and schools, and actively play a leading role in demonstration. The courses and teams of "Mobile Communication" and "Wireless Network Communication Technology" were approved as the Ideological and Political Demonstration Course of undergraduates and postgraduates in Hebei Province and Teaching Master (Team) Project respectively.

Fund Projects: 2022 Hebei Province Postgraduate Curriculum Ideological and Political Demonstration Course, and Teaching Master (Team) Project (Project No. YKCSZ2022129), 2023 Hebei Provincial Postgraduate Quality Course Construction Project (KCJPX2023057); 2023"Double First-Class" Postgraduate Talent Cultivation Construction Project; Hebei Province Postgraduate Education and Teaching Reform Research Project (Project No. YJG2023125), 2021 Hebei Province Curriculum Ideological and Political Demonstration Project (Project No. 117), Hebei Province Higher Education Teaching Reform Research and Practice Project (Project No. 2022GJJG405 and 2021GJJG412).

References

[1] Qi Huamei, Jin Yisu, Shi Jinjing, Kui Xiaoyan, Zhang Deyu. Analysis on the innovation mode of basic courses of communication engineering discipline of "new engineering + ideology and politics"[J].Industrial and Information Education,2022,(05):7-11.

[2] Ahmad N ,Troconis T M , Ibahrine M , et al. CoDesignS Education for Sustainable Development: A Framework for Embedding Education for Sustainable Development in Curriculum Design[J].Sustainability,2023,15(23):

[3] Li Jingchu. Problems and promotion mechanism of ideological and political construction in college courses[J].Quality Education in Western China,2023,9(13):66-69.
DOI:10.16681/j.cnki.wcqe.202313016

[4] Gu Yanhua, Wang Wenxuan, Chen Kai, Jiang Minmin. Ideological and political exploration and practice of "5G communication technology" course from the perspective of integration of industry and

education[J].Quality Education in Western China,2023,9(23):1-4.
DOI:10.16681/j.cnki.wcqe.202323001
[5] Babic A K ,Demush B .The Role of Strategic Planning in Ensuring the Success of Education[J].SEEU Review,2023,18(1):92-106.