

# *Construction of Ideological and Political Teaching Database for Engineering Specialty--Taking Electronic Information Major as an Example*

Shu Yanting<sup>1,a</sup>, Zhong Weihong<sup>1,b</sup>, Lian Bin<sup>1,c</sup>, Huang Jiali<sup>1,d</sup>, Zhao Xianghong<sup>1,e,\*</sup>

<sup>1</sup>*School of Information Science and Engineering, NingboTech University, Ningbo 315100, China*

<sup>a</sup>*abruti2004@163.com*, <sup>b</sup>*zwh@nbt.edu.cn*, <sup>c</sup>*lianbin\_1@nbt.edu.cn*, <sup>d</sup>*1462822746@qq.com*,  
<sup>e</sup>*zxh@nbt.edu.cn*

*\*Corresponding author*

**Keywords:** curriculum ideological and political education; Case base; Core values; Electronic information engineering

**Abstract:** Focusing on the issue of integrating course teaching with ideological and political education, it analyzes the deficiencies in engineering ideological and political teaching. The paper then puts forward the construction of a course ideological and political cases bank and suggests storing it on the official WeChat public account. This enables teachers and students to search for relevant course ideological and political cases.

In May 2020, the Ministry of Education issued the Guidelines on Ideological and Political Construction of Curriculum in Colleges and Universities<sup>[1]</sup>. With the core goal of giving full play to the educational role of each course and improving the quality of talent training in colleges and universities, it has deployed a series of strategic measures to comprehensively promote the ideological and political construction of colleges and universities, and proposed that "combining different curriculum characteristics, thinking methods and value concepts, The educational concept of digging deeply into the ideological and political elements of the curriculum, organically integrating them into the curriculum teaching, and achieving the silent effect of educating people"<sup>[2]</sup>.

Under the background of information age, the rapid development of electronic information major must also meet the fundamental requirements of colleges and universities to cultivate morality and cultivate people. On the one hand, the courses of electronic information major need to train professionals in information electronics and other aspects, on the other hand, they also need to train students' ability to independently propose and solve problems, as well as their scientific attitude of

seeking truth from facts and dialectical materialism world outlook. Especially in the "jammed" environment, students of electronic information major need to have a global vision, a sense of home and country. Full of national pride, sense of historical mission and enterprising ideological and political spirit, to bravely bear nowadays mission.

However, for a long time, the traditional curriculum mode of electronic information major has paid too much attention to the theoretical discipline knowledge, and there are still many shortcomings in the cultivation of students' comprehensive quality and moral emotion, such as students' low interest in learning, unclear purpose of learning, innovation consciousness, truth seeking and other qualities. At the same time, in terms of teachers, most of them lack in-depth exploration and innovative integration of ideological and political resources such as core values, ideals and beliefs, a sense of home and country, and heroic deeds contained in the curriculum of their major. In many cases, due to the lack of correlation between teaching content and ideological and political elements, there is a patchwork of curriculum ideological and political teaching content, and there is no systematic professional ideological and political plan that is seriously integrated into the classroom. These are all problems that we should actively solve at present.

## **1. Significance and characteristics of ideological and political education for engineering majors**

### **1.1 Significance of ideological and political education for engineering majors**

This project will take the major of electronic information engineering as an example. Through the guiding and promoting role of ideological and political education, it will strengthen the ideological connotation of the circuit course teaching of telecommunications major, and improve the comprehensive quality of students, including professional level, moral accomplishment, sense of home and country, global concerns and cultural accomplishment. In order to meet the future information, digital society, as well as the global situation on the training of electronic information talents needs. At the same time, it guides teachers to actively explore the ideological and political elements that keep pace with the times, give full play to the guiding and promoting role of ideological and political education, optimize the design of curriculum structure, build a stable ideological and political team and system, and actively participate in the ideological and political work together with students, build a library of ideological and political cases that can let students accept the edification naturally, and achieve a silent effect.

### **1.2 Characteristics of ideological and political education for engineering majors**

Traditional engineering courses focus on practical practice, logical reasoning, data analysis, technology development and other theoretical skills, due to too much emphasis on subject knowledge, resulting in students' weak ideological and political ability, but these skills also contain rich ideological and political education resources, appropriate integration of subject knowledge with ideological and political education, can reflect the characteristics of engineering education:

(1) Truth-seeking and pragmatic scientific attitude: engineering courses require seeking truth from facts and practicing true knowledge. For example, in circuit analysis, students need to abstract out core problems from complex circuit models, and the results must be supported by practice. With a little guidance, students can cultivate the good character of seeking truth from facts and pursuing truth.

(2) Sense of mission and responsibility: especially in the electronic information technology is facing the "bottleneck", the international situation is grim background, training students to take

responsibility is particularly important, in ideological and political education, through the description of the famous scientists in history, encourage students to grow up, so that they understand that "the rise and fall of the world is every man's responsibility".

(3) Cultural confidence and innovation: With the continuous progress of science and technology, students' cognition of culture should be gradually improved. Engineering majors focus on theoretical calculation, but nowadays theoretical calculation has been linked with traditional culture, such as cultural relic restoration, garden construction and digital processing technology, so it is urgent to cultivate students' sense of cultural identity, which also reflects that engineering ideological and political education has its unique contact.

## 2. Intelligent Ideological and Political assistant based on the public account of large model

How to carry out the relevant ideological and political education design is the scheme to be proposed in this paper. Teaching through edutainment, ideological and political education should be integrated in the curriculum, combined with knowledge points together deeply rooted in the people, which is indispensable is the ideological and political cases. The focus of this project design is to build a database of ideological and political cases, which can be stored in relevant web pages or design public accounts for conversational inquiry.

The ideological and political case database will widely collect current political hot spots, successful enterprise cases and outstanding people related to ideological and political education to ensure the diversity and representativeness of the cases, and classify the cases according to subject, theme or values, to facilitate teachers' searching. Figure 1 is the display of the public account designed by this project. For example, by giving the course "Digital image processing", the public account will automatically design relevant ideological and political cases and give answers based on the knowledge points of the corresponding course.

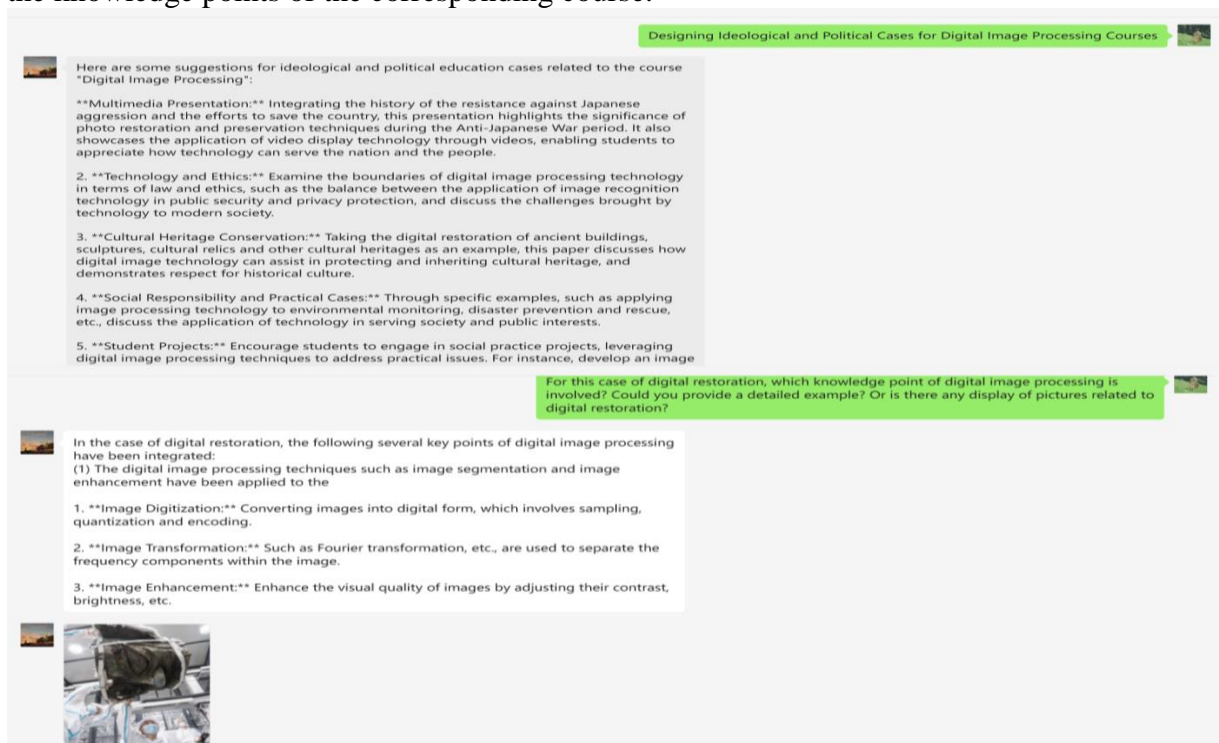


Figure 1. shows the ideological and political case of digital image processing course

In addition, when teaching courses, the public account and other digital platforms can automatically reply to relevant course cases at any time according to the course content, and ensure that each case can be combined with knowledge points, and provide corresponding ideological and political guidance around the core content and technical difficulties of the course. The design of the case base will take into account the current hot spots and technical trends that students are really interested in, so as to learn from playing and play in learning. Imperceptibly, ideological and political education will be integrated into engineering knowledge points, and feedback channels for teachers and students will be formulated. According to feedback from teachers and students, the project will update the course case database in time, aiming to promote the deeper development of ideological and political education through scientific and technological means and innovative models.

At present, according to the related requirements of ideological and political education of electronic information major, the project focuses on the core 12 courses and establishes the curriculum ideological and political case database; And combined with the large language model, the use of fine-tuning method and prompt word engineering, design a ideological and political intelligent assistant, can help answer the ideological and political related questions. In the future, the curriculum ideological and political case base built will be continuously improved. Under the integrated development education mode of value guidance, knowledge imparts, ability cultivation and personality cultivation, truly excellent engineering talents will be forged and contribute to the development of the engineering field<sup>[3]</sup>

### **3. Construct the engineering curriculum thinking and politics case base comprehensively in multiple dimensions**

Only storing the ideological and political cases of the course without in-depth understanding of the dimensional ideas behind it, such ideological and political education will only have randomness, and will not put the idea of ideological and political education in an important position, resulting in students learning knowledge and skills at the same time, the shaping of spiritual and ideological connotation is fragmented, and the depth is not enough. Therefore, the road construction of engineering ideological and political education is far and long. In this process, we must consider the multi-dimensional comprehensive.

#### **3.1 Guiding Ideology**

Through the creation of online and offline learning conditions, the two dimensions of national conditions education and mainstream value edification are realized<sup>[4]</sup>, and the family and country feelings are naturally infiltrated into the curriculum teaching, achieving the effect of subtle influence, and cultivating students into professionals and new people with the family and country feelings, noble moral character, professional competence and craftsman spirit<sup>[2]</sup>.

It can be seen that the growth of college students cannot be achieved without the influence of professional courses and teachers. It is crucial to integrate moral cultivation, national feelings, global concerns and cultural literacy into the whole process and link of teaching<sup>[1]</sup>. Efforts can be made in the directions of "two links", "four integrations" and "four improvements", as shown in FIG. 2.

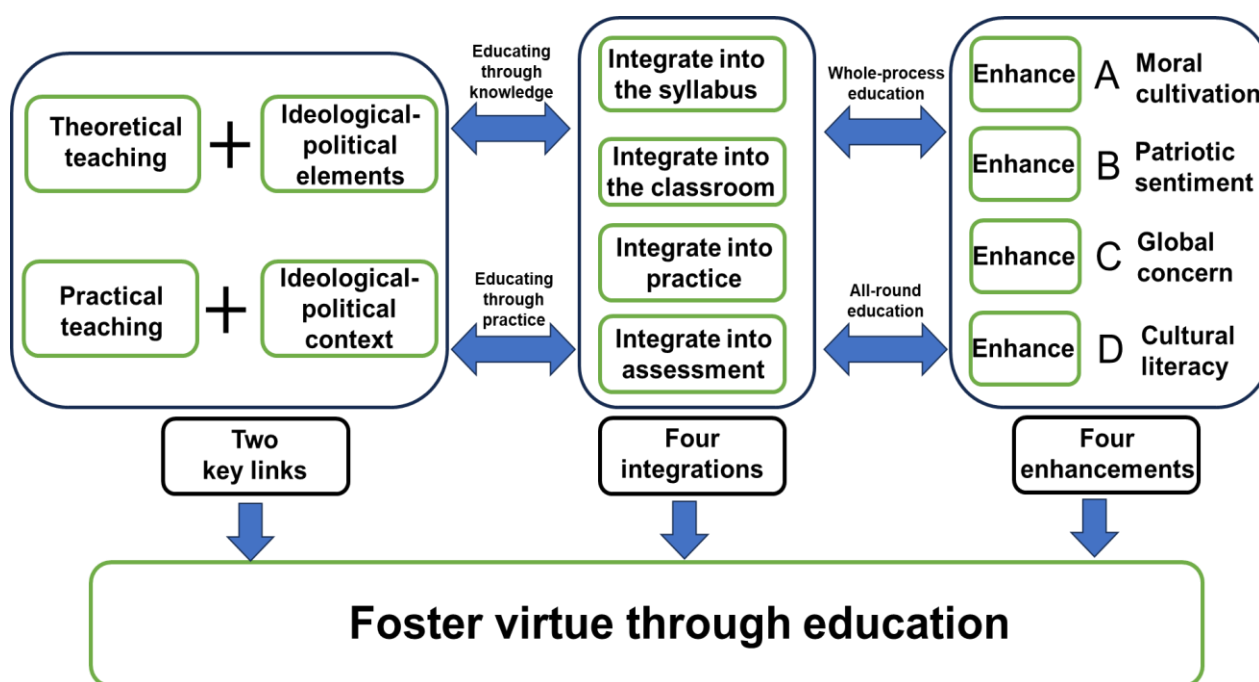


Figure 2. shows the main guiding ideas

### 3.2 Specific measures of curriculum ideological and political construction

Curriculum ideological and political reform should integrate high-quality teaching resources, integrate curriculum knowledge learning and value guidance, improve teaching syllabus, enrich ideological and political teaching resources, innovate multiple teaching modes, and train ideological and political teachers, and effectively implement teaching objectives, teaching content, and teaching methods. By the "construction idea", "construction implementation", "construction purpose" three aspects of specific implementation<sup>[1]</sup>.

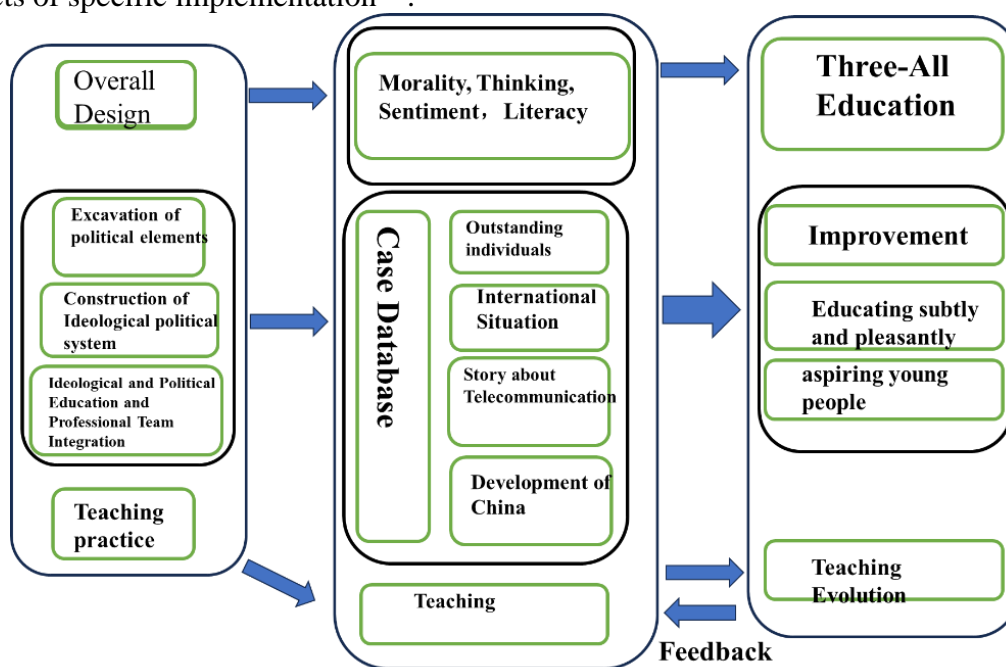


Figure 3. block diagram of overall measures

Figure 3 Specific measures are described as follows:

(1) Integral design

Do a good job in the overall design and form a regular system. As the current routine work of ideological and political thinking, we should do a good job in top-level design and systematic design. Avoid duplication and omission of ideological and political elements, and integrate the ideological and political system into the teaching syllabus and training objectives, design a good system, and integrate into daily teaching and management work.

(2) Ideological and political integration

Strengthen the communication between teachers of professional courses and teachers of ideological and political courses, establish a fusion team of ideological and political courses, and accelerate the high-quality construction of the case base of ideological and political teaching, which is reflected in:

Deepen the cooperation and exchanges between schools and departments within the university

Cultivate the concept of collaborative education between professional teachers and ideological and political teachers<sup>[5]</sup>. To build a case base of high-quality curriculum ideological and political teaching, professional teachers are the main leaders and implementers, ideological and political teachers are the overall coordinators, and students are practitioners and feedback parties. Only with tripartite cooperation can the best results be achieved<sup>[6]</sup>.

Enhance the ideological and political professionalism of teachers of specialized courses, and promote the sustainable development of the curriculum ideological and political teaching case base.

Strengthen team building. An excellent team of teachers can promote the construction of curriculum ideological and political teaching case base. The construction of the case bank of curriculum ideological and political teaching cannot be accomplished overnight. It needs the long-term persistence of teachers of specialized courses, the long-term cooperation of teachers of ideological and political courses, and the long-term attention of all relevant personnel in the school<sup>[6]</sup>.

(3) Professional characteristics

Combined with professional characteristics, gradually dig into the ideological and political elements of the basic courses of electronic information major. Figure 4 shows the ideological and political characteristics of the public account, and gives relevant cases:

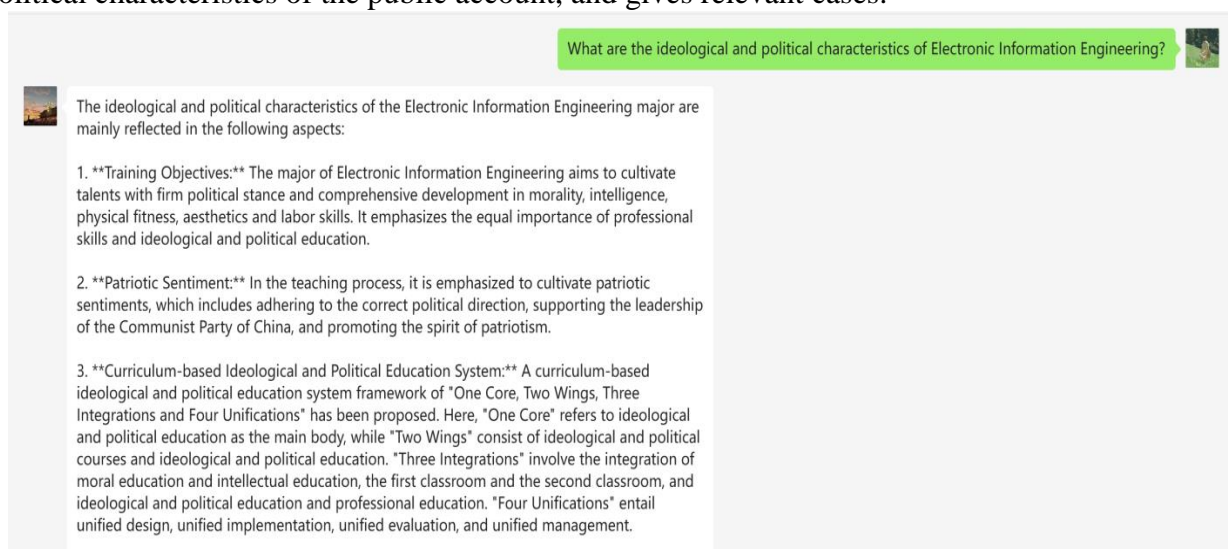


Figure 4. Professional ideological and political characteristics of the public account

**Knowledge Point:** Basic Transformations of Digital Images

**Case:** Digital Portrait Reconstruction Technology  
 "What kind of image will we have in the virtual network?", this question can be answered by Douyin. Recently, Douyin and other short-video platforms have introduced a special effect - "Disney Princess".

**Effect:**



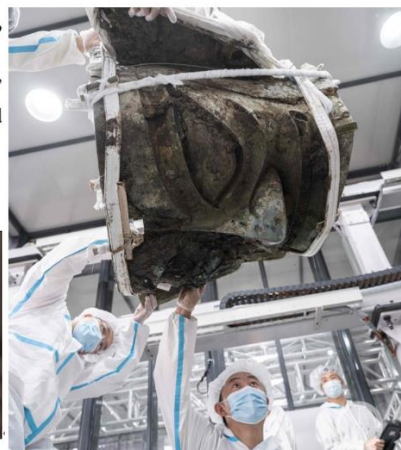
**Knowledge point:** K-means clustering, convolutional neural network, object recognition technology based on deep learning

**case:** Image recognition and analysis in Black Myth: Wukong



**Knowledge point :** digital image restoration and reconstruction

**case:** Sanxingdui Site cultural relics restoration



**Knowledge point:** Discrete signals and systems, applications of digital signals: Communication technology + Digital signals have extensive applications in modern life. They represent and transmit information in a discrete manner, featuring strong anti-interference capabilities, ease of encryption processing, and convenience in storage and transmission. The following

**examples can be applied:**

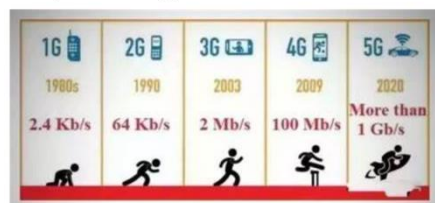


Figure 5. Part of the ideological and political case base enumeration

Make clear the unity of the teaching purpose of professional courses and ideological and political courses teachers, and establish a unified ideological and political system of electronic information professional courses. The key to the coordination of professional courses and ideological and political courses is to find the overlap of the two [4], that is, the similar and unified part within the discipline, such as the pursuit of truth and pragmatism, the pursuit of truth, goodness and beauty [6].

In the process of constructing the case base of ideological and political teaching, colleges and universities should innovate the teaching forms of professional courses and ideological and political courses according to the development of nowadays and the characteristics of contemporary college students, so as to ultimately achieve the purpose of fostering morality and educating people [6]. For example, not only can the advanced deeds of the older generation be carried forward in combination with the major, but also the advanced figures and examples of the new generation that are hot and searched on the Internet are fresh and can be used together, and the professional courses and ideological and political courses can be combined online and offline.

Encourage students to take the initiative to combine their own interests, personal experience and online resources to participate in the construction of ideological and political case database. The "Black Myth Wukong" in Figure 5 is very popular worldwide, which conforms to the ideological

and political elements of students' cognition and hobbies. In this way, students can change from passive receivers to active participants and contributors, which is more conducive to students' natural acceptance of influence.

With the help of the construction of curriculum ideological and political teaching case base, the teaching forms of professional courses and ideological and political courses should be innovated <sup>[7]</sup>. For example, in the course of electronic information, the project of raising the national flag by robot and playing the national anthem by simple electronic organ will be demonstrated and practiced by integrating elements such as "acousto-optic electric power" generated by electronic technology.

#### 4. Display the content of ideological and political database of the course

In order to strengthen the effect of ideological and political teaching in the curriculum and continuously promote the reform and construction of ideological and political teaching in the curriculum, it is necessary to take measures in the aspects of personnel training plan and course outline, teacher team construction, and course teaching case base construction to provide teaching guarantee for ideological and political teaching in the curriculum <sup>[7]</sup>. The ideological and political case bank related to the public account is constructed according to multi-dimensional aspects, and Table 1 shows some course cases.

Table 1. Cases of some courses

Serial Number	Course name	An overview of the course content	The goal of ideological and political education	Teaching method
1	Circuit Principles	Circuit classification, weak and strong: west power to east, the great Chinese electricity!	National feelings, responsibility, craftsman spirit	Watch the video
2	Circuit principle	The process of invention of alternating current phasor analysis method	Self-discipline, moral cultivation, global concern, responsibility	Knowledge integration, teacher guidance
3	Circuit Principles	The idea of Thevenin's theorem: the intertransformation of complexity and simplicity	Dialectical thinking, global concern, responsibility, artisan spirit	Knowledge combination, teacher guidance, case study
4	Digital Electronic Technology	The state of China's digital technology: Huawei, chip jam neck and other facts	National feelings, responsibility, craftsman spirit	Watch a short video, Group discussions



5	Digital Electronics Technology	"Count", "pinch refers to a calculation", "half and half", Tianqian, ground branch, the link between the I Ching and the progressive system	Cultural self-confidence, inheritance of excellent traditional Chinese culture, responsibility	Knowledge combination, Case telling
6	Analog electronics	The relationship between components - integrated circuits - electronic products	Responsibility, the rise and fall of the world, every man has the value of responsibility	Knowledge combination, Teacher guidance
7	Analog electronics	Many Internet users have become "diods" : they can only accept one outcome	Critical thinking, moral cultivation, responsibility and global concern	Knowledge integration, Case telling, Teacher guidance
8	Analog electronics	A/D and D/A conversions are indispensable	Contribute individual strength to build a harmonious society and promote the development of the country	Case study, Teacher guidance
9	Microcomputer principle and interface	PWM motor control raising national flag	National feelings, responsibility, craftsman spirit, practice teaching	Case study, Teacher guidance, practice teaching
10	Digital image processing	Tiktok Disney princess special effects and digital portrait reconstruction techniques	Craftsman spirit, practical teaching, global development	Case telling, Video cases, practical teaching
11	Digital image processing	Sanxingdui with digital restoration technology	Cultural confidence, national feelings, craftsman spirit	Case telling, video cases, teacher guidance

Are there any case illustrations related to the knowledge points of circuit principles and circuit classification? Also, please provide the relevant ideological and political education spirit.

1. West-to-East Power Transmission and Its Connection with Circuit Classification  
The West-to-East Power Transmission project mainly involves the following aspects:

1. **"Hydropower Development and Transmission"**: The project focuses on developing large-scale hydropower stations in the southwestern region, such as those in the basins of the Jinsha River, Lancang River, Nu River, and Yarlung Zangbo River. Large-scale hydropower stations are constructed and electricity is transmitted over long distances to the eastern load centers through ultra-high voltage direct current transmission technology.
2. **"Utilization of Coal Resources"**: The western region is also an important coal production base in China. Through the construction of large thermal power plants, coal is converted into electricity and then transmitted through the power grid to the eastern regions, reducing losses and pollution during coal transportation.
3. **"Power Grid Construction and Upgrade"**: To achieve large-scale power transmission, it is necessary to build and upgrade ultra-high voltage transmission lines to improve the transmission efficiency and stability of the power grid and ensure the reliable supply of electricity.

Related ideological and political spirit: Family and country sentiment, responsibility and commitment, craftsmanship spirit

The West-to-East Power Transmission project not only solved the problem of power supply shortage in the eastern region, promoted the sustained and rapid development of the eastern economy, but also drove the economic construction and environmental protection in the western region, achieving common development and mutual benefit and win-win results between the eastern and western regions. Understanding the West-to-East Power Transmission has enhanced students' win-win thinking and also made them appreciate China's strong scientific and technological strength.

*Figure 6. Inquiry of ideological and political case base*

The course database details how to integrate ideological and political education into professional courses, and achieve all-round development of students through specific teaching contents and objectives. Figure 6 shows that when the knowledge of corresponding subjects is queried, corresponding cases will be given. Teachers can choose each case and combine it with actual teaching methods, such as watching videos, group discussions and case narration, which emphasize the values of patriotism, responsibility and craftsman spirit. At the same time, through the designed case base, teachers can conveniently consult and apply relevant teaching materials, which is conducive to cultivating students' ideological and political spirit. Each course combines specific cases and teaching methods to make ideological and political education more vivid and concrete.

## 5 Conclusions

Taking electronic information engineering major as an example, this paper discusses the importance of ideological and political education in engineering major courses and how to build curriculum ideological and political teaching database<sup>[8]</sup>. Moreover, the construction of ideological and political system and system of electronic information major courses, integration of ideological and political major and telecommunications professional teacher team, combined with students' active participation and feedback, has a demonstration role, and the natural integration of ideological and political elements of the course is high. Moreover, the coverage of the ideological and political development of the electronic information course is wide. Some of its basic courses are open to all engineering students, such as circuit principle, digital electronic technology, analog circuit and so on are also mechanical and electronic, mechanical manufacturing, energy engineering, computer, biochemistry and other professional compulsory courses, the number of students to take courses, the benefit is very large.

In the daily teaching, we should pay attention not only to teaching, but also understand the needs of students. Moreover, we should pay attention to social current politics, and guide students to explore in the ideological and political elements of the course<sup>[9]</sup>. In the future work, the storage of relevant ideological and political database will be further improved and promoted to the public.

The idea of "two links, four integration and four promotion" proposed in the article also provides a new direction for the ideological and political education of similar courses, and supports and encourages teachers to adopt diversified teaching methods, such as project-oriented learning, flipped classroom, and mixed online and offline teaching, so as to improve the implementation

effect of ideological and political education of courses. And the use of modern technology means to enhance the ideological and political education of interest and interaction<sup>[10]</sup>. With the deepening of education reform, we also expect that more colleges and universities and majors will actively explore and practice courses, and truly realize the fundamental task of cultivating morality and educating people.

## Funding

This research was supported by the Ningbo Natural Science Foundation project under Grant No.2024J215, by Zhejiang Provincial Natural Science Foundation of China under Grant No. LY23F020013, by the National Natural Science Foundation of China under Grant No. 61972350, by the Ningbo 2025 Major Project of Science and Technology Innovation under Grant No. 2021Z109, Major Technological Innovation Projects of Ningbo High tech Zone under Grant No. 2022BCX050002, by 2023 Ningbo Key Research Plan under Grant No. 2023Z040, Ningbo Science and Technology Innovation Yongjiang 2035 Key Technology Breakthrough Plan under Grant 2024Z261, by the Professional Comprehensive Reform Project of NingboTech University, with the project titled “Construction of the Ideological and Political Education Case Library for Electronic Information Courses.”

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