

The Practice of Ideological and Political Construction in the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” Course

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Abstract: Under the background of the concept of big ideology and politics, through the organic integration of professional courses and “curriculum ideology and politics,” students should not only learn professional knowledge and skills, but also cultivate craftsman spirit, spirit of hard work, professional quality, and professional normative awareness. Taking the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course as an example, this course takes the reform of the three teachings as the background. Firstly, the elements of ideological and political education that are relevant to the course are fully excavated. Then, the ideological and political entry point of the professional course of construction engineering technology are explored. In this way, the effective integration of professional course teaching and ideological and political education elements can be achieved, and the students’ qualities can be developed, leading to a effective integration of ideological and political collaborative education in the curriculum.

Keywords: High occupation; Major in architectural engineering technology; Rebar leveling; Curriculum ideology and politics; Collaborative education

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1. Introduction

In December 2016, at the national conference on ideological and political work in colleges and universities, China’s leaders said: “We must make good use of classroom teaching as the main channel, and ideological and political theory courses should persistently strengthen them through improvement.” All other courses should ‘guard a section of canal and plant a field of responsibility,’ so that all kinds of courses and ideological and political theory courses go in the same direction and form a synergistic effect”^[1]. The “Guiding Outline for Ideological and Political Construction of Curriculum in Colleges and Universities” issued by the Ministry of Education in 2020 not only once again emphasizes the importance of curriculum ideological and political construction in the process of talent training of higher vocational students, but also points out the direction for various disciplines in curriculum ideological and political construction. For vocational colleges, 80% of the courses are professional courses, which means 80% of the students’ time is spent on the learning of professional knowledge and skills. So, professional courses and teachers play an important role in carrying out “collaborative education.”

As a core professional course of engineering in the construction engineering technology major,

“Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course should focus more on cultivating students’ craftsman spirit of excellence and stimulate students’ enthusiasm to serve the country through science and technology. As a professional core course, it undertakes the important mission of cultivating students' morals and practical skills. Taking “educating people comes first, starting with moral education” as the basis of “curriculum ideology and politics,” the students’ craftsmanship, spirit of hard work, professional quality and professional normative awareness can be cultivated through while learning professional knowledge and skills.

2. Teaching practice of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course

The “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course is taught to first-year students majoring in architectural engineering technology in the second semester, with a total of 64 hours (theoretical lessons: 36 hours, practical training: 28 hours).

3. Teaching objectives

Combined with the professional standards of the Ministry of Education, enterprise certification, and the talent training program formulated by Chongqing Energy College, the standards of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course and the school’s professional school-running requirements, the teaching content was designed, and the objectives regarding knowledge, skill, quality, and ideological and political goals were formulated, as shown in **Figure 1**.

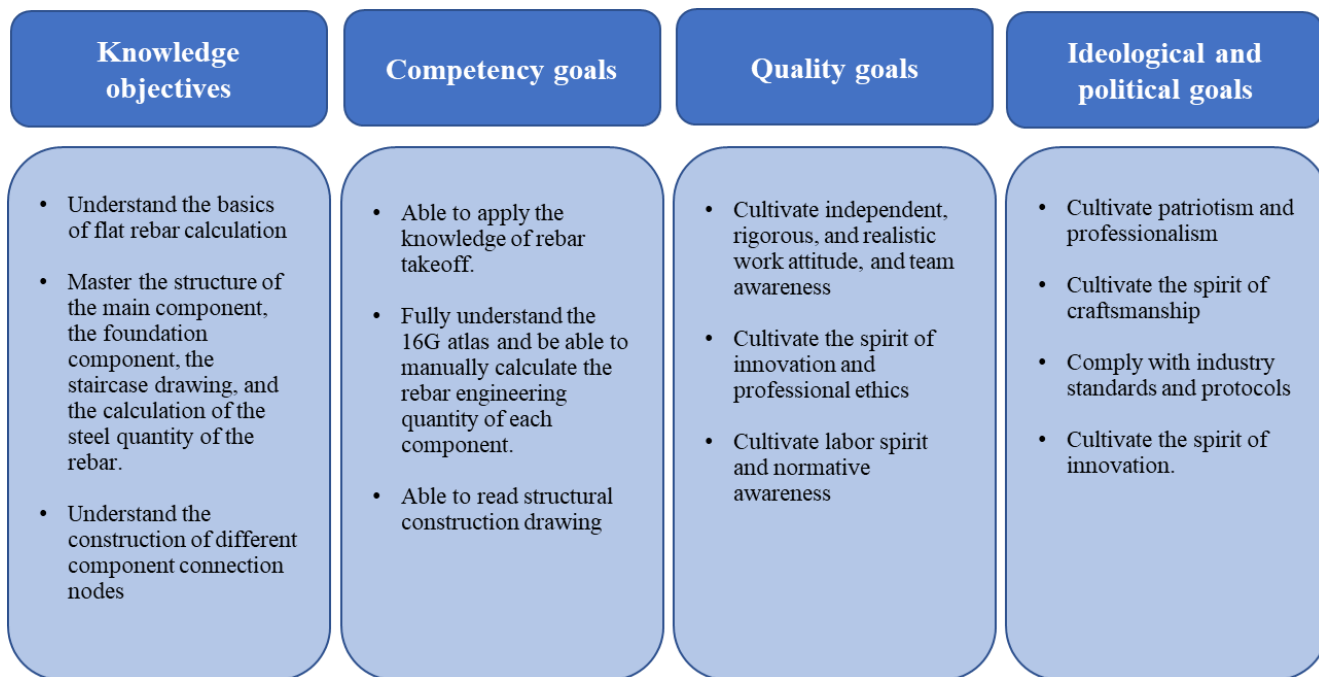


Figure 1. Teaching objectives

4. The concept of ideological and political teaching of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course

The “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course is a professional core skills course and a very practical subject, but improving students’ ideological and political literacy plays a very important role in the road of students to grow into excellent builders. Only by deeply excavating the ideological and political education elements contained in this course, taking

professional knowledge and skills as the carrier, achieving the “trinity” of value shaping, ability cultivation, and knowledge transfer, and “seeking perfection and casting ingenuity,” highlighting the educational goals of ideological and political education in the curriculum, and ensuring the synergy of ideological and political content between the ideological and political courses and curriculum courses, can the effect of ideological and political collaborative education of the curriculum be achieved.

The teaching method should not be limited to the form of teaching but should adopt various forms such as online and offline blended teaching, project-based case teaching, and task-driven teaching, so that students can fully understand the core of this course.

5. Design of ideological and political teaching process

The main ideas are summarized and sorted out during the teaching of each module, and the entry points of ideological and political elements are explored, so as to achieve an interesting integration of ideological and political elements. In classroom teaching, it is difficult to achieve one-on-one tutoring by teachers for all students, and some students are not very good at actively seeking teacher guidance, afraid of asking questions, afraid of losing face, and so on. In view of this, teachers should encourage students to help each other in the classroom, and tell students that teaching others is the best way to learn and it is the learning method with the highest degree of knowledge retention. When students help each other, their abilities can be improved. In this way, in the classroom, the phenomenon of plagiarism or free riding can basically be eliminated, the learning enthusiasm students facing difficulties can be improved, a good learning atmosphere can be formed in the class, and the students’ interpersonal skills can be developed. The design diagram of the ideological and political teaching process is shown in **Figure 2**.

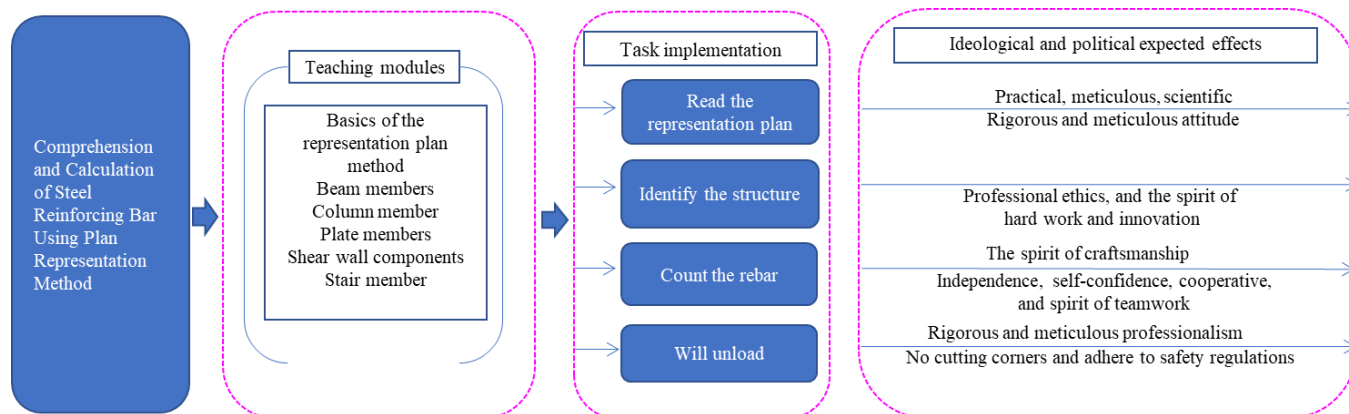


Figure 2. Ideological and political teaching process design

6. Integration and implementation of ideological and political cases of the curriculum

Case analysis is used as the main method of teaching. Before each lesson, students are made to watch major construction projects in “Super Engineering” by China Central Television’s (CCTV) that displays cutting-edge technology, so as to understand how these projects change from blueprints to reality, guide students to innovatively use new technologies in future work, improve production efficiency, and implement the development requirements of new processes, so that their professional skills and general skills can be developed. The concept of “invention changes destiny, wisdom creates wealth” needs to be instilled among the students. Through the learning about major construction projects, students understand the rapid development of China’s construction technology, personally understand the development of China’s economy, technology, and comprehensive national strength in recent years. This helps cultivate students’ patriotic feelings and awareness of scientific and technological innovation, promote students to learn professional knowledge and strive to be craftsmen in this big country, and contribute their own strength to

the realization of China's vision of "building a strong country." Students should be made to deeply understand and inherit the essence of ideas and the values of the times in traditional culture, which can be achieved through collaborative education while understanding professional knowledge.

Besides, interviews of outstanding graduates can be played, as well as the great deeds of engineers for students to understand and practice the craftsman spirit of excellence, cultivate students' professional qualities and good habits, and help students in career planning. Through in-class practical training, different role plays, teamwork, and many more, students are taught to follow the rules and look at the big picture. In the teaching of steel cartographic rules, students read and calculate according to the atlas, which is the rules of this course that must be followed. This strengthens the students' awareness of norms, help them understand the concept of rule of law, and improve their awareness of using rule of law to protect their rights.

Moreover, students should be given group tasks to allow group discussions and completing a project as a team. Ideological and political elements related to the content of each section can be randomly introduced. For example, in the teaching module of introducing slab component, the slabs act as the platforms, which can be independent or connected; this can be used as metaphor of different industries of the country, where they are independent but also complementary to each other in completing development goals. In the teaching module of the wall, the wall plays the role of parallel space separation in the building, and the wall will have doors and windows. Just as countries or all walks of life have their own legal constraints and unique rules, China protects itself with "copper walls and iron walls," and at the same time uses the "window" to view the world and create a new world with the "door" of reform and opening up. Through a reasonable division of labor and effective organization, a friendly atmosphere can be created; the spirit of teamwork, enthusiasm and dedication style can be cultivated. When a member of the group encounters difficulties in completing the group which will affect the overall credit of the group, the teacher intervenes in time to guide students to overcome technical difficulties, actively deal with interpersonal relationships, address problems without complaining and shirking responsibility. Through visiting the construction site, observing component modeling and production, steel quantity calculation, and so on, students can cultivate a rigorous working attitude and the spirit of craftsmanship.

Finally, through the comparison of manual and computer takeoff, students are stimulated to innovate and create, and it was mentioned in the 20th National Congress that "there is no end to practice, and there is no end to theoretical innovation ^[2]." To enable students to constantly innovate and break through while receiving professional knowledge.

7. Pedagogical reflection

7.1. Implementation effect and results

The value objectives of the curriculum are clarified, and the educational effect is improved. The cultivation of patriotism, sense of social responsibility and sense of historical mission in students has a positive educational effect.

In terms of knowledge and ability, emotion and attitude, value and position, classroom teaching and after-class reading are carried out to realize the teaching goal of value shaping, skill development, and knowledge transfer.

7.2. Existing problems

Some students are reluctant to invest more time and energy in class, and there is a large gap in the completion of tasks issued by teachers, and the degree of mastery is uneven, which is not ideal.

7.3. Improvement ideas

Fun tasks can be assigned to students get their attention. At the same time, increase guidance and monitoring before, during and after class.

8. The ideological and political application effect of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course

In order to investigate the ideological and political effects of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course, a questionnaire was distributed in the class at the end of the semester. A total of 60 questionnaires were distributed and 58 were recovered, with a recovery rate of 96.7%.

The survey results show that the teaching effect of ideological and political education of the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course is positive. The integration of ideological and political elements into the teaching content of the curriculum has a subtle impact on students’ values and outlook on life, so as to achieve the effect of unconsciously instilling an ideology. In this way, students will have a deeper understanding of professional knowledge and its practical application, and their knowledge learning and application ability can be improved, as well as logical judgment and analytical skills; on the other hand, the integration of case teaching and ideology and politics can guide students to think deeply about engineering ethics and values, establish a correct outlook on life, and cultivate good professional ethics.

9. The value of ideological and political construction in the “Comprehension and Calculation of Steel Reinforcing Bar Using Plan Representation Method” course

In short, based on this course, with specific and effective tasks, professionalism is integrated into the learning of “moisturizing things silently,” and the organic unity of knowledge imparting and value guidance is completed in the course of teaching. From “ideological and political courses” to “curriculum ideological and political,” the core content of ideological and political education is organically decomposed into each teaching of courses, fully embodying the educational function of professional courses, so as to realize the rational return of educational value.

9.1. Promote the spirit of craftsmanship and innovation

The new era of China is called the “infrastructure madness,” one after another super projects have been initiated in China, and the problems behind these super projects are also world-class. In the face of these problems, the builders fully develop the spirit of innovation and craftsmanship, and finally overcome them one by one. Among them, the Hong Kong-Zhuhai-Macao Bridge, one of the seven wonders of the modern world, took 15 years from design to completion, with wind resistance of 16 levels, earthquake resistance of 8 levels, and a service life of 120 years, which is a bridge island tunnel traffic cluster project. In the past 15 years, the builders have carried out a series of innovations in terms of design concepts, construction technology, construction organization, management mode, and many more with “embroidery efforts,” and various new materials, new processes, new equipment, and new technologies have emerged in the construction of the bridge, which not only fills the gap in many fields in China, but also makes China's cross-sea bridge and tunnel island engineering design and construction management level in the forefront of the world^[3].

As future builders, students majoring in architectural engineering technology inherit and carry forward the craftsman spirit and innovative spirit of their predecessors, which is one of the important contents of ideological construction.

9.2. Cultivate the spirit of great love and enhance self-confidence

Through listening to stories of medical workers, builders, laborers, and other walks of life during the Covid-19 pandemic, as well as the “Chinese power” and “Chinese speed” behind Vulcan Mountain Hospital and Leishenshan Hospital, the students’ “four self-confidence” can be stimulated their spirit of patriotism can be strengthened, and a sense of national pride and professional mission can be cultivated. Therefore, it guides students to think about how to exert their professional skills and personal strength when the society needs, and how to participate in project construction in the future and how to face the difficult environment and difficulties behind engineering construction of class discussions.

9.3. Safety first

The most important thing in the rebar flat map recognition and takeoff is the safety performance of the component, and the calculation of rebar engineering quantity mainly involves material characteristics. Strengthening students’ ideological construction can ensure that students emphasize greatly on safety, keeping in mind the belief of “safety first.”

9.4. Cultivate a sense of responsibility and professional ethics

Through understanding the areas prone to accidents and making students discuss the reasons for quality accidents will make students pay attention to the impact of protective layer thickness and other settings on project quality and safety and enhance their sense of responsibility and professional ethics.

9.5. Teamwork spirit

In order to develop teamwork spirit, the class is divided into groups, and a workshop is set up after the class. In the workshop, students are taught how to calculate the length of the rebar needed and the production of the rebar model. Besides, students are made to come up with solutions for the calculation of rebar and construction lashing, and calculate the amount of rebar required to meet the components to reflect the sense of dividend cooperation.

10. Conclusion

In short, based on this professional course, with a concrete and vivid effective task carrier, professional qualities are integrated into the learning of “moisturizing in silence,” and the organic unity of knowledge teaching and value guidance is completed in the teaching process, and the core content of ideological and political education is organically decomposed into each teaching of professional courses, so as to realize the rational return of educational value.

Disclosure statement

The author declares no conflict of interest.

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