Design and Practice of Course Ideology and Politics in Discrete Structure Teaching

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Abstract. Curriculum ideology and politics is a comprehensive educational concept that reasonably infiltrates elements of moral education into professional knowledge. Curriculum ideology and politics plays an important role in promoting the all-round development of students. According to the characteristics and teaching content of the discrete structure course, this paper introduces the design of the ideological and political overall scheme of the discrete structure course. The design of the overall plan is mainly introduced from the aspects of the determination of the ideological and political goals of the course, the construction of the teaching staff, the mining of ideological and political elements, and the updating of teaching materials. Taking the reasoning theory of propositional logic as an example, the paper elaborates how to practice the ideological and political course in the discrete structure. These include teaching content and teaching objectives, learning situation analysis, teaching strategy design and teaching process design.

Keywords: Discrete Structure · Curriculum Ideology · Reasoning theory · Teaching Case

1 Introduction

Curriculum ideological and political education is ideological and political education for students through curriculum construction and classroom teaching. It emphasizes the integration of elements of ideological and political education, including theoretical knowledge, values, and spiritual pursuits of ideological and political education, into various courses. Finally, it can exert a subtle influence on the students' ideology and behavior [1]. The ideological and political requirements of the course are based on the concept of collaborative education. The ideological and political course adopts scientific and innovative thinking and the method of combining explicit and implicit to realize the multiple unity of knowledge imparting, value shaping and ability training. Finally to achieve the purpose of cultivating people through virtue. Curriculum ideology and politics are characterized by extensiveness, hidden teaching and diversity. When implementing curriculum ideology and politics, the following principles need to be adhered to: the combination of in-depth excavation and organic integration, the unity of professional teaching and ideological and political education, and the echoing of curriculum

ideology and politics [2]. In the design of teaching content, we can guide students to strengthen their ideals and beliefs, guide students to cultivate patriotism, guide students to strengthen their moral cultivation, guide students to increase their knowledge, guide students to cultivate the spirit of struggle, and guide students to enhance their comprehensive quality [3]. In practice, curriculum ideology requires teachers to dig deep into the educational elements contained in the courses they taught, and to find the matching point for the combination of educational elements and knowledge points. The teacher organically integrates these elements into the knowledge points taught to achieve ideological leadership in education and teaching. Finally, it can promote the continuous deepening of students' ideological understanding and the gradual improvement of values.

Discrete structure (namely discrete mathematics) is an important branch of modern mathematics, which mainly studies discrete quantitative relationships and discrete mathematical structure models. Discrete structure is the core basic course of software engineering and computer and other related majors. Discrete structure is a precedent course for courses such as programming language, data structure, operating system, compilation technology, artificial intelligence, database, algorithm design and analysis, etc. It plays an important role in the professional curriculum system. Discrete structure mainly involves mathematical logic, set theory, graph theory, algebraic system, number theory, etc. It is characterized by a high degree of abstraction, strong logic, many concept definitions, complex and profound content. In order to complete teaching tasks within a limited period of time, teachers focused more on imparting knowledge while teaching, and did not involve the content of ideological and political education. However, the ideological and political course is a course that almost all related majors in colleges and universities must offer. If it can be introduced into the course teaching of discrete structure, it will provide important support for colleges and universities to implement the fundamental task of cultivating people through virtue.

In recent years, a series of studies have been carried out on the ideological and political aspects of discrete structure courses in China. Chen Kehua [4] discussed the specific methods of integrating ideological and political education and discrete mathematics teaching. He expounded the role of integrating ideological and political education in discrete mathematics, and gave measures for the integration of ideological and political education in the curriculum. Liu Yating [5] and others expounded the teaching reform strategy of discrete mathematics under the ideological and political background of the course. For example, it has been elaborated from the aspects of strengthening the construction of the teacher team, rationally setting the teaching content, digging out the ideological and political elements of mathematics, exploring the best way to educate people, changing the traditional teaching methods, and improving the assessment and evaluation mechanism. Zou Le [6] and others proposed the organic integration of theory and examples, and the in-depth integration of curriculum ideological and political concepts in the construction of smart classrooms. They also discussed effective measures and suggestions for integrating ideological and political elements into discrete mathematics courses. Shao Tingting [7] and others proposed to integrate the history of mathematics into the teaching of discrete mathematics courses. They gave a teaching practice process consisting of situation creation, introduction of new knowledge, concept analysis, knowledge application and classroom summary. Jia Baomin [8] and others

put forward corresponding teaching cases for the teaching content of discrete mathematics, and designed the ideological and political teaching process of discrete mathematics courses by combining online and offline methods. Jia Jingdong [9] and others put forward the teaching reform idea of integrating ideological and political elements into discrete mathematics courses. They introduced the specific course ideological and political teaching design and practice process from four aspects: excavating ideological and political elements, constructing ideological and political maps, designing curriculum systems, and comprehensive quality assessment. Li Yanyan [10] and others have carried out exploration and practice on the ideological and political course of discrete mathematics. They mainly elaborated from the aspects of being a role model, realizing the curriculum culture education, cultivating students' dialectical thinking, cultivating students' teamwork spirit, etc.

On the whole, many colleges and universities are currently trying to integrate curriculum ideology and politics with discrete structure courses, and have gained some experience, which is of reference value. On the basis of previous research, relying on the school's undergraduate teaching engineering project. The ideological and political teaching of the course was practiced in the discrete structure course of the software engineering major of Chengdu University of Information Technology. The paper focuses on the overall plan of the ideological and political course of the discrete structure course, and takes the reasoning theory as an example to introduce the process of implementing the ideological and political course in detail.

2 Design of Overall Ideological and Political Program of Discrete Structure Courses

2.1 Determination of the Ideological and Political Goals of the Course

The core of curriculum ideology and politics is fostering virtue through education. It emphasizes the use of ideological and political elements in professional courses to maximize the role of courses in fostering virtue through education [11]. The ideological and political elements contained in different courses are not completely the same, and the specific ideological and political objectives of the courses also have different emphasis. The ideological and political elements and curriculum ideological and political goals need to be determined according to the course content, and keep in line with the cognitive and ability goals of the course. The discrete structure course of Chengdu University of Information Technology required students to master the basic knowledge of mathematical logic, set theory, algebraic system, and graph theory in order to lay the foundation for possible in-depth research in the future. In terms of ability, students are required to have abstract thinking ability and logical reasoning ability, as well as the ability to model practical problems. In the syllabus of the course, we clearly stated that the ideological and political goal of the course is "establishing a correct philosophical view of Marxist materialist dialectics, cultivating students' spirit of climbing the peak and to innovate, cultivating students' patriotism and good moral character". And combined it with the graduation requirements of "students should have correct values, understand traditional Chinese culture and fundamental realities of the country, understand the relationship between individuals and society, and establish a good outlook on life."

2.2 Construction of Curriculum Ideological and Political Resources

Curriculum ideological and political resources are the basis and key to implementing curriculum ideological and political resources. Therefore, the discrete structure courses carry out the construction of ideological and political resources from the three aspects of teacher team, ideological and political element mining and teaching data update.

1. Construction of teaching staff
   Teachers are not only the guides for the implementation of classroom teaching, but also the main body leading the ideological and political aspects of the curriculum. To implement curriculum ideology and politics, first of all teachers themselves should have firm beliefs and good moral character. Teachers should be a role model, use their behavior to set an example for students, guide them to make continuous progress, and finally achieve the effect of using their own behavior to guide students well. Secondly, teachers should change the traditional teaching mode and teaching philosophy, fully realize the importance and necessity of the integration of curriculum ideology and teaching, and implement it in teaching. Finally, teachers need to be fully aware of their own lack of experience. Teachers can master the corresponding skills and knowledge required for the development of ideological and political teaching content through courses such as course ideological and political training, course ideological and political exchanges, mentoring learning, and independent learning.
2. Mining of ideological and political elements
   The discrete structure contains rich ideological and political elements. These elements require teachers to reorganize the teaching content of the course, dig out the ideological and political elements contained in it, and establish the connection between knowledge points and various ideological and political elements. In the end, the result of the connotative integration of ideology and politics and curriculum can be realized. Through research and practice, we believe that the ideological and political elements of the discrete structure can be excavated from two aspects: the connotation of Marxist philosophy and the connotation of moral character [12].

   In terms of excavating the connotation of Marxist philosophy: From the course overview, it can be found that science and technology are the ideological and political elements of the primary productive force. From the development history of discrete mathematics, the ideological and political elements of epistemology of dialectical materialism can be excavated. From a large number of laws and theorems in the discrete structure, the truth of cognition, the standard of truth testing and the ideological and political elements of dialectical thinking methods can be excavated. From the equivalent calculus, the ideological and political elements of the law of contradiction and the law of negation of negation can be excavated. From the isomorphism of graphs, the ideological and political elements of dialectical movement of cognition are excavated.

   In terms of mining the connotation of moral quality: We can reintroduce the spirit of striving for new heights and continuous innovation from the anecdotes of scientists. Positive social examples can be combined with course content to cultivate students' patriotism and good moral character. Through the application of groups in information security, students can be told the principles of professional ethics.

Through the relationship between mathematical logic and artificial intelligence, students can be guided to think about the ethical issues of artificial intelligence development. Through course experiments, craftsman spirit can be introduced to cultivate students' scientific spirit and professionalism of seeking truth from facts. Discrete mathematics knowledge can be combined with the current achievements of our country in the field of information and communication technology to enhance students' national confidence and pride. But at the same time, it also tells the students that our country is also facing many "stuck neck" technical problems such as the chip problem, and guides the students to establish the spirit of sticking to the profession, being brave to challenge and bravely climbing the peak. In the content of the tree, family relationship can be used as an example to cultivate students' family and country feelings. When explaining the "Syllogism of Socrates", students can be guided to maintain a positive and optimistic attitude towards life.

3. Teaching materials update

After years of research and practice, the current teaching materials can guarantee the achievement of cognitive goals and ability goals. However, when faced with the ideological and political needs of the curriculum, it is necessary to update the teaching resources of the curriculum. Updated materials include lesson plans, courseware and test papers. Cognitive goals, ability goals, and ideological and political goals must be clearly given in the teaching plan. The teaching plan requires that on the basis of analyzing the characteristics of learners, appropriate teaching strategies can be selected, a detailed teaching process can be designed, and teaching reflection can be carried out. The update of the courseware is mainly based on the teaching plan, and a reasonable display method can be selected to present the teaching content. The update of the test paper mainly refers to the content that still reflects the ideological and political concepts of the course in the assessment link. For example, when we examine the knowledge of proposition symbolization, we design "Jiang Mengnan and Peng Shilu are both people who touched China in 2021" "We must oppose not only the idealist viewpoint of discussing movement in isolation from matter, but also the mechanical materialism viewpoint of discussing matter in isolation from movement." exam questions.

3 Ideological and Political Practice of Discrete Structure Courses

The ideological and political course is practical, and the ideological and political goals can only be achieved through practice. The following takes the reasoning theory of propositional logic as an example to explain in detail how to practice curriculum ideology and politics in a discrete structure.

3.1 Teaching Content and Teaching Objectives

The main task of mathematical logic is to use mathematical methods to study reasoning, and reasoning refers to the thinking process of deriving conclusions from premises. On the basis of the previous proposition symbolization, equivalent calculus, propositional formula classification, and paradigm, it mainly explains the reasoning theory of propositional logic. That is how to apply inference rules to derive a propositional formula

(conclusion) based on the set of known propositional formulas (premises). This part mainly includes the formal structure of reasoning, the method of judging whether the reasoning is correct (truth table method, equivalent calculation algorithm, principal disjunctive paradigm method, etc.), reasoning laws and methods of constructing reasoning proof (direct proof method, additional premise proof method) law, reductio ad absurdum) etc. This part has a lot of content and a high degree of comprehensiveness, but it is more difficult to memorize and understand. The focus of this teaching is to correctly use the inference rules to construct the proof of reasoning. The difficulty of teaching is to correctly write the derivation basis of each step in the reasoning process.

According to the requirements of the syllabus, the teaching objectives of this lesson can be determined. In terms of knowledge, students can symbolize the reasoning that needs to be proved, and construct the formal structure of reasoning. Students can master the three methods of judging whether the reasoning is correct and keep in mind and understand the rules of reasoning. Students can master the direct proof method of constructing proofs, the method of proving with additional premises and the method of reduction ad absurdum, and solve simple reasoning problems in practice. In terms of ability, students' logical thinking ability and ability to solve practical problems can be cultivated by constructing proofs for reasoning. In terms of ideology and politics, students can deepen their understanding of causality and the inevitability of the development of things by grasping the rigor of the reasoning and proof process. Through specially designed examples, students' patriotic spirit can be cultivated. Through the practice of murder detection, students' awareness of law-abiding can be enhanced.

3.2   Analysis of Academic Situation

The content of this lecture focuses on proofs of constructive reasoning. The required knowledge of symbolization of propositions, types of propositional formulas, equivalent calculus and paradigms have all been covered above. However, it is difficult for students to apply these knowledge comprehensively. In addition, there are relatively many inference theories and inference rules that need to be covered this time, and it is difficult for students to memorize them in a short period of time. The process of constructing proofs for reasoning requires students to have quick observation and logical thinking skills, which are students' weak points. College students are in an important period of formation and development of world outlook, outlook on life, and values. They urgently need to continue to learn, strive to improve and perfect themselves under the correct education and guidance of the school. Therefore, rationally designed ideological and political elements can be organically integrated with course knowledge points. This can deepen students' understanding of dialectical materialism, enhance students' awareness of law-abiding, and cultivate students' patriotic spirit.

3.3   Teaching Strategy Design

Using question guidance, discussion, heuristic teaching and other methods, through multimedia, blackboard and teaching platform means to carry out teaching. In order to introduce curriculum ideology, the first thing is to prepare the ideology and politics elements. It mainly includes the viewpoint of causality excavated from inference laws and

inference rules, murder cases, and rationally designed cases. The next step is to clarify the entry point of curriculum ideology and politics. This step is mainly cut through the link of case introduction (how to solve the murder case), the link of example teaching (the method of constructing proof and the designed example) and the link of consolidation practice (using the method of reasoning and proof to solve the murder case). The next step is to determine the course objectives. By solving murders, awareness of the rule of law can be enhanced. Through the designed examples, the spirit of patriotism can be cultivated. Through the rigor of the reasoning and proof process, the understanding of causality and the inevitability of the development of things can be deepened. The last is to clarify the ideological and political implementation ideas of the curriculum. Choose appropriate methods based on ideological and political materials and surrounding ideological and political goals. In the link of case introduction, the goal of enhancing legal awareness can be achieved through heuristic teaching. In the example explanation link, the spirit of patriotism and the understanding of causality can be cultivated through question-guided teaching. In the consolidation practice session, legal awareness can be enhanced through discussion and teaching.

3.4   Teaching Process Design

The whole teaching process is divided into four stages: case introduction, knowledge imparting, classroom exercises and classroom summary. The cultivation of observation and logical thinking ability and the causality of dialectical materialism throughout the whole process. Each stage is described as follows:

1. Case introduction stage
   Give the case "A is a murderer as long as A has been in the victim's room and has not left before 11 o'clock. A has been in the victim's room. If A leaves before 11 o'clock, the janitor will see him. The janitor does not see He. Is a murderer?". Cases guide students to think and try to solve cases through discussion, which stimulates students' interest in learning and enhances students' awareness of the legal system. Through discussion, even if some students can come up with answers, it is difficult to accurately describe the reasoning process, so this content can be introduced smoothly.
2. Knowledge imparting stage
   This stage mainly explains new knowledge, which is the main stage of this lecture and occupies most of the time.
   First explain the definition of reasoning and correct reasoning. Giving correct reasoning, discriminant theorem, three formal structures of reasoning and the method of judging whether the reasoning is correct (truth table method, equivalent calculus method, main paradigm method). By guiding students to compare the derivations learned in middle school, they can think and discuss the difference between valid conclusions and correct conclusions. Using examples to explain whether the reasoning is correct. Teachers and students cooperate to discuss the problem-solving ideas and summarize the general problem-solving steps. This can improve students' learning cooperation ability and understanding of knowledge, and establish a good teacher-student relationship.

Then the teacher explains the 9 newly learned reasoning laws, then reviews the reasoning laws corresponding to the basic equivalent formula and mark the key laws, and guides students to memorize the key laws by associating collective knowledge. Each law of reasoning should analyze and explain the connotation it expresses, so that students can understand and remember. The teacher gives the definition of formal system and natural reasoning system, focusing on 12 rules of reasoning, and establishes the connection between reasoning laws and reasoning rules.

Finally, the teacher explains the form of teaching construction proof method and the writing standard of proof, and guides students to understand and cultivate students' rigorous scientific attitude. For the three methods of constructing proofs, designing reasonable examples for each method can guide students to think about proof ideas, and then teacher and students will complete the examples together. This can help students become familiar with the flexible use of inference rules, improve students' ability to apply knowledge, enable students to experience the rigor of the proof process, and grasp the causal relationship in the proof steps. A sample question was designed for the direct proof method "If the weather is fine today, we will go to the Red Army Long March Memorial Hall or the Red Culture Museum in the ancient city. If there are too many people in the Red Army Long March Memorial Hall, we will not go to the Red Army Long March Memorial Hall. The weather is fine today. There are too many people in the Red Army Long March Memorial Hall. So, let's go to the Red Culture Museum in the ancient city." Through this design example, we can tell students how hard-won life is today and cultivate students' patriotic spirit.

3. Classroom exercises

   This link returns to the case introduced at the beginning. Students are divided into groups to complete the case discussion, while the teacher inspects and gives individual guidance to achieve individualized teaching. By solving cases, students can consolidate the knowledge they have learned, strengthen the application of knowledge, test the learning effect, and improve their interest in course learning. And the way students solve practical application problems through group cooperation also improves students' teamwork awareness.

4. Class summary

   The teacher sorts out the knowledge points of this lecture, emphasizes the key points and difficulties, and improves the students' knowledge summary and inductive ability.

3.5   The Implementation Effect of Curriculum Ideology and Politics

In order to evaluate the implementation effect of curriculum ideology and politics, a questionnaire survey was used at the end of the course to understand students' satisfaction with curriculum ideology and politics. A total of 25 questions were set in the questionnaire. The topic directly related to ideology and politics is "Do you think that this course in the course 8' how are we doing to establish the correct Marxist materialist dialectical philosophy view, to cultivate students' spirit of climbing peaks and continuous innovation and to cultivate students' patriotic feelings and good moral character?'". The answers to this question included the following: Well done, the goals achieved. Generally, the goal has been basically achieved. Do not do well, the goal is not achieved.

Although the goal has not been reached, a lot of efforts have been made. The survey results showed that "well done, the goals achieved" accounted for 56.78%, "do generally, the goal has been basically achieved" accounted for 39.12%, "do not do well, the goal is not achieved" accounted for 4.1%, and "although the goal has not been reached, a lot of efforts have been made" accounted for 0.63%. At the same time, in the question "Overall, how satisfied are you with this course" (the answers include very satisfied, satisfied, dissatisfied, very dissatisfied). 55.52% of the students were very satisfied, 44.16% were satisfied, and 1.26% were dissatisfied and very dissatisfied. The results of the final grade assessment show that among the 389 students who participated in the assessment, 41 students failed, accounting for 10.54%, 229 students scored between 60–79, accounting for 58.87%, and 119 students scored between 80–100, accounting for 30.59%. This shows that the teaching reform that integrates ideological and political elements has achieved certain results, and has achieved the expected cognitive goals, ability goals and ideological and political goals.

4   Conclusion

Course ideological and political education integrates ideological and political education with professional courses. This enables students to develop a correct world outlook, outlook on life and values in the process of learning professional courses. As a course widely offered by computer-related majors, it is of great significance to study and practice the discrete structure course ideology and politics. The thesis puts forward the curriculum ideological and political goals of establishing a correct philosophical view of Marxist materialist dialectics and cultivating students' courage to climb the peak, the spirit of continuous innovation, patriotism and good moral character. The ideological and political elements contained in the discrete structure are excavated from the two aspects of the connotation of Marxist philosophy and the connotation of moral quality. Pointing out the method of integrating ideological and political elements into teaching materials. Taking the reasoning theory of propositional logic as an example. This example elaborates in detail how to realize the connotative integration of ideological and political elements and curriculum knowledge, so as to achieve the cognitive goals, ability goals and ideological and political goals of the curriculum.

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