Research on the Design of "Curriculum Ideology and Politics" - Based on the BOPPPS Teaching Model

Songhan Yu^{1,a}, Fufei Wu^{1,b,*}

¹School of Materials and Construction Engineering, Guizhou Normal University, Guiyang, Guizhou, China ^a2320785976@qq.com, ^bgznuwff@outlook.com ^{*}Corresponding author

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Abstract: In the context of the new engineering disciplines and the emphasis on ideological and political education, vocational engineering education urgently needs innovative reforms in teaching methods and approaches tailored to its own course characteristics. This article, utilizing the mature BOPPPS teaching model from abroad, attempts to reconstruct the traditional teaching model of civil engineering construction organization in engineering courses at vocational institutions. The teaching process is divided into six stages, aiming to centralize students, emphasize participatory learning, and highlight teaching reflection. Simultaneously, at each stage of the teaching process and for different chapters of the curriculum content, the article analyzes points of integration between the course and ideological and political education, striving to achieve "effective" ideological and political education in engineering courses.

1. Introduction

In May 2020, the Ministry of Education issued the Guidelines for the "Construction of Civic and Political Education in Higher Education Courses," which made it clear that ideological and political education should be carried out throughout the talent cultivation system, comprehensively promoted the construction of the Civic and Political Education in colleges and universities, gave play to the nurturing role of each course, and improved the quality of talent cultivation in colleges and universities^[1]. The course "Civil Engineering Construction Organization" has a wide range of content, numerous formula parameters, strong practicality, and typical engineering characteristics, and contains certain explicit and invisible ideological and political elements. Teachers need to take students as the center of the teaching process for effective design, how to enliven the engineering professional classroom through effective teaching methods, integrate the necessary Civic-Political elements into the effective teaching process, and maximally stimulate the students' participation in learning, and then to achieve independent learning, is the direction of Civic-Political teaching of most of the engineering professional courses need to be researched.

2. Basic Overview of the BOPPPS Teaching Model and Curriculum Ideological-Political Education

The BOPPPS teaching model, also known as the "Effective Teaching" model, originated in Canada. Initially employed in teacher training and adult education, it has demonstrated positive outcomes abroad. In recent years, after its introduction in China, it has been utilized not only in teacher training but also extensively in classroom instruction. It holds significance in enhancing teaching effectiveness, addressing issues such as low student engagement, dull classroom atmosphere, and a lack of instructional design clarity for teachers. Based on the theory of constructivism and the communicative method, classroom teaching is divided into Bridge-in, Objective-outcome, Pre-assessment, Participatory Learning, Post-assessment, and Summary, in which the learning objectives are the core and the teaching objectives are the guideline. Each part is connected and plays a different role in classroom teaching with its characteristics.

The ideological and political education program is not a simple supplement to the ideological and political education curriculum, but rather a further deepening of the ideological and political education curriculum so that the content of the explicit ideological and political education curriculum can be invisibly implemented and intensely perceived in other curriculum. Ideological and political education is not a unilateral work of a particular discipline. However, each course must play the role of "synergistic cultivation," which requires extracting the cultural spirit and value connotation embedded in each professional discipline and seamlessly integrating positive guidance beyond professional knowledge into values and worldview levels in the silent refinement of knowledge learning in professional courses. From the perspective of ideological and political education, "Big Ideological and Political Education" involves fully exploring elements with ideological and political significance within each course, establishing channels for ideological and political education, and ultimately achieving "collaborative nurturing." Considering the characteristics of engineering education, it is crucial to emphasize the irreplaceable role of professional courses in ideological and political education. A thorough analysis, coupled with the teaching methods of various disciplines, is necessary. Based on their unique perspectives, theories, and methods, this approach aims to organically integrate the teaching of professional knowledge with the imparting of values and the cultivation of a threefold worldview.

3. The Connotation of Implementing the BOPPPS Teaching Model and Curriculum Ideological-Political Perspectives in the Construction Organization Course of Civil Engineering

In order to achieve the teaching concept of "student-centered," it is essential to incorporate practical construction projects, overall design document cases, unit project construction schedules and network diagrams, and engineering cases into the classroom. These measures enable students to develop schedules, optimize project duration, and manage resources through calculations, diagram recognition, and document analysis. Based on the BOPPPS teaching model, the teaching objectives, methods, teaching resources, and teaching media of the civil engineering construction organization course are designed in an all-round way, combining rich and informative teaching means, such as flipped classroom and 5W teaching elements, to achieve all-round participatory classroom interaction, leading students to learn actively and construct knowledge system positively.

The development and design of ideological and political education courses should originate from the intellectual needs of university students. Emphasizing the integration of theory and practice in the process of setting teaching objectives, there should be a deep expansion of instructional content. Extracting ideological and political elements in line with the developmental patterns of students from introduced classroom resources and cutting-edge knowledge in engineering progress. The comprehensive design should consider talent cultivation goals and disciplinary advantages, fostering in students a strong work ethic, intense commitment to quality and safety, dialectical thinking, engineering ethics, and a sense of patriotism and family.

4. Case Analysis

This article intends to use the chapter on network planning techniques in civil engineering construction organization as an example to explore the BOPPPS teaching model and the integration of ideological and political education in the teaching process. The specific implementation process is illustrated in Table 1 below. Teaching objectives of this chapter: to enable students to master the basic concepts of network planning technology, classification, drawing methods and rules, the calculation of time parameters of various types of network diagrams; Teaching key points: the drawing of network plans, the calculation of time parameters.

Table 1: Network Planning Technique BOPPPS-Curriculum Civics Teaching Implementation Process.

BOPPPS teaching stage	Topic: Network Planning BOPPPS-Curriculum C Process.	Techniques ivics Teaching and L	earning Implementation
В	(Introduced by Civics) The story of Hua Luogeng, who was deeply engrossed in doing experiments and let his assistant help him to make tea: How should the process of finding tea cups, finding tea leaves, washing the cups, filtering the tea leaves, and boiling the water be arranged, then invite students to try to draw a flowchart.		
0	Knowledge and Ability Objective: To master the primary classification, characteristics, drawing, parameter calculation, and optimization of network diagrams. (Introduced by Civics) Affective Attitude and Values: Honesty and trustworthiness, valuing time, and doing things in advance.		
Р	Expressions of flow concerning components of network p	onstruction? What are tanning techniques.	the basic concepts and
Р	Teaching Media PPT, drawings, construction site pictures, videos, standard specifications, other materials, mobile phones, and equipment.	Teachers' work Teach the basic concepts of network diagrams, scope of application, and characteristics. Introduction of actual construction site scheduling video. Combined with practical cases to teach the principles of network diagram drawing, common problems. (Introduced by Civics) Consolidate network planning technology with life cases and release practice questions in Rain Class.	Student work Analyze the characteristics of network diagrams compared to crosswalk diagrams with case studies. Group discussion to analyze the components of a network diagram. Reflect on the pre-class questions and summarize the logical representation of the work. Reviewing the key and challenging knowledge points.
Р	Rain Class APP	Analyzing student completion of assignments.	Complete Rain Class assignments to identify knowledge gaps.
S	Summarize and reflect feedback on teaching and	on the teaching and le learning, and set up after-	earning process, provide school previews.

4.1. Course Introduction

The introduction of the lesson, also known as the introductory session, has been described as the 'hook.' In this section, we can use the scenario introduction method to introduce the content of this

lesson through pictures and videos. Using examples with ideological significance, such as military operations 'network planning' during World War II, the story of renowned overseas Chinese scientist Luogeng Hua brewing tea, and the construction of the Hong Kong-Zhuhai-Macao Bridge, as entry points to arouse students' interest. Before the presentation, it is possible to pose appropriate reflective questions to the students. During the presentation, we are supposed to provide corresponding explanations and narrations, infusing educational significance related to ideological and political aspects. After the presentation, we can use guided and inspiring methods to stimulate students' reflection. This part of the content should be kept as simple and short as possible, not consuming too much time but stimulating the students' desire to learn. The emphasis is on linking the course content to what students already know or problems they will encounter.

4.2. Learning objectives

Briefly and succinctly clarify the learning purpose of this lesson, convey the teaching objectives, especially the critical knowledge and learning value of the course, and tell students what they can know or what they will learn to do through this lesson so that students can grasp the direction of learning^[2]. After introducing the course, fundamental concepts of network planning technology, such as drawing network plans and calculating time parameters, are presented to students through PPT and blackboard illustrations. This approach ensures that students have a clear awareness and understanding of the content as the teacher explains during the lecture. In terms of knowledge and ability, students need to master the classification, drawing, parameter calculation, and optimization of network planning technology; in terms of affective attitude and values, it can help students to form the attitude of continuous improvement, attention to detail, robust concept of time, and sense of integrity. Objectives should be set from the student's perspective, with clear and appropriate objectives that are achievable and measurable.

4.3. Pre-lesson Assessment

After clarifying the learning objectives, this link can provide a reasonable basis for teachers to adjust the method and depth of teaching content in the subsequent teaching process. Usually, questions and answers, quizzes, group discussions, and other methods can be used to know the students' reserve knowledge quickly. Through questions or knowledge tests on the students to carry out pre-tests, we are expected to accurately grasp the knowledge base of the students and the degree of understanding of the content to be taught, and adjust the idea of lectures promptly according to the needs of the objectives of the course and the situation of the students.^[3] Before teaching network planning technology, we can ask students oral questions such as: What is the concept of network planning technology? What are the main categories? Which is the most commonly used one? What is the scope of the application? In the process of consolidating the previous knowledge, some simple problems in the new knowledge are thrown out to the students to test the effect of students' preview or to understand the students' knowledge of the network diagram expression in the form of inspiration, such as "What is the main difference between the network diagram and the crosswalk diagram? What are the advantages and disadvantages of each? "Additionally, with the aid of Rain Class, it is essential to conduct brief quizzes or to employ a structured approach to clarify the learning path for students. Additionally, it is necessary to integrate ideological and political topics such as values, scientific perspectives, and patriotism, aligning them with key concepts. We also need utilize a guiding approach, encouraging students to think critically while learning and learn through thoughtful reflection.^[4]

4.4. Participatory learning

The "New Engineering" discipline establishes clear training objectives and demands diverse teaching content, emphasizing the enhancement of students' interest, engagement, learning outcomes, and skill development.^[5] After the teacher elucidates key and challenging knowledge points, students are encouraged to participate more willingly in learning activities through engaging methods like physical demonstrations and group discussions. This process aims to deepen students' knowledge and understanding while fostering interpersonal communication and collective awareness. For example, after the double code network planning technology, letting the students collect the double code network planning expression in the actual case of the use, from which to experience the applicability of knowledge and to review the comparison of the specific use of crosswalk diagrams, and organize the students from the completion of the homework independently summed up the advantages and disadvantages of the network plan and the expression of the crosswalk diagrams and the scope of application.

The selection of teaching cases should not only be closely related to the lecture's content but also explore the elements of ideology and politics contained therein so that the students can gain spiritual support without realizing it and receive spiritual guidance "silently".^[6] In addition, the teaching process can be interspersed with the mode of the flipped classroom, allowing students to share and explain on the stage; combined with the operation of the software so that students are exposed to the cutting-edge computer software, from a different perspective exposure to the use of construction organization, from which to deepen the understanding of the knowledge and its application.

4.5. Post-testing

After the participatory learning, through the question and answer, quizzes, exercises, reports, and other diagnostic evaluations to test the effect of the students after the lecture. The evaluation method primarily relies on quantification and is supplemented by qualitative assessment to determine whether students have achieved the learning objectives set before the class. Post-assessment corresponds to pre-assessment, resulting in a more effective deepening of understanding. Specific tests can also rely on the Rain Class, learning through establishing primary and extended test questions corresponding to the content of the lectures, timely grasping students' learning effects, and dynamic analysis. For example, after students participate in the study of dual-codename time scale network diagram and dual-codename network diagram. We are Applying questions to assess whether students have grasped the basic concepts, functions, drawing methods, and content of both expressions by contrasting the differences between the two and can identify the distinctions between them.

4.6. Summary

In the summarization phase, the teaching content, student discussions, and student reflections are organized and extended. These enable students to silently internalize ideological and political knowledge, achieving a heartfelt understanding and conscious elevation of their thoughts.^[7] The main contributors to the summary can be either the teachers or students, or additional input from multiple students. Emphasizing key and challenging points by the teacher will enhance the effectiveness. After the summary, the teacher assigns homework to reinforce knowledge and consolidate the learned content. For instance, after completing the above steps for network planning technology knowledge, students could compare and summarize, discussing the respective applications, advantages, and disadvantages. This encourages students to contemplate which

network planning method is most widely used in practical engineering or to find corresponding answers in real-world cases."

5. BOPPPS Model—Analytical Reflections on the Civic and Political System of the Curriculum

Teaching is a high art of molding human souls. In the teaching of professional courses, with the support of moral and professional education, giving full play to the leading role of teachers, if it is used in a clever and natural way, and if it "embellishes the things without any sound" and gains the recognition of the students, then it will be able to achieve the effect of educating people.^[8] The key elements of the BOPPPS teaching model are to make teachers and students pay more attention to the clear and measurable goals, and the students are actively involved in the whole teaching process and the teaching reflection is emphasized. The key elements of the BOPPPS model are a greater focus on clear and measurable goals, active participation of students as the centre of the teaching and learning process, and an emphasis on reflection. The fundamental difference from the traditional teaching model is that more emphasis is placed on the six components of the teaching process in the classroom, and the status of participatory learning is given a more prominent position. Its implementation has provided a certain degree of support and guarantee for the development of the engineering professional course Civics. The BOPPPS teaching method is student-centered and reintroduces students back to the status of the main body of teaching, which makes the development of the course Civics have more possibilities.

Through the above exploration of construction organization and management course reform, the teaching system can be built based on the integration of course ideology and politics under the BOPPPS teaching mode. In the new era, the organic integration of course ideology and politics and professional education, the mutual penetration of humanistic quality and professional knowledge, and the value leadership and professional cultivation should be in the same direction, and by analyzing the impact of BOPPPS teaching mode on engineering professional education, it is obvious that it can effectively improve the teaching problems encountered in the process of teaching, such as insufficient preparation of teachers and scarcity of interaction with students, and efficiently use the limited time of classroom teaching along with guarantee the improvement of teaching quality. It also helps to improve the improvement of teaching quality and other effects, which also creates further conditions for the effective integration of the Civics and Politics of the curriculum into the classroom, and the appropriate combination of the two is bound to bring good benefits for teaching.

The construction of the BOPPPS model-course ideology system requires teachers to conceptualize the teaching philosophy, the assessment of the learning situation, the teaching objectives, the design of the board, and the teaching process. The system can be built around the six stages of the BOPPPS teaching model from: the early stage, the middle stage, and the late stage (Figure 1). The preliminary work is mainly to decompose the classroom teaching tasks from the six stages and find suitable teaching resources to be organized and embellished so that the contents can be docked with the needs of the six stages, and guidance and training can be provided for the teachers' comprehensive competence and quality. We will conduct an in-depth excavation of the Civics elements in the teaching content, take the principles of Civics teaching as the requirements, grasp the words "essence and accuracy," streamline appropriately, find the balance with professional knowledge, and not overcrowd the teaching time of professional knowledge; we will further improve the teaching methods of Civics education in the medium-term work, and explore diverse teaching methods such as integrating flipped classrooms, divided classrooms, OBE

(Outcome-Based Education) teaching philosophy, blended learning, to enhance the persuasiveness and rationality of ideological and political elements. Engineering education generally incorporates a certain proportion of on-campus and off-campus practical courses. The design of the BOPPPS teaching model should also consider the unique aspects of practical teaching components, integrating BOPPPS into the practical teaching process and extracting ideological and political elements from practical courses. This "genetic" integration is embedded in the curriculum teaching plan, ensuring a seamless connection between theoretical and practical teaching without unnecessary transitions. In the later stages, the designed teaching system is applied to guide classroom instruction. Through recording and feedback on classroom effectiveness, a comprehensive summary and refinement are conducted on board writing, the integration of ideological and political elements, and the application effectiveness of the BOPPPS model.



Figure 1: BOPPPS-Curriculum Civics Teaching System

6. Conclusion

In summary, introducing elements with ideological and political significance in various teaching stages of BOPPPS plays a crucial in enhancing students' learning effectiveness and cultivating a devoted scholarly spirit. The author believes that the overall difficulty of the Construction Organization and Management course is low compared to other courses. However, it faces challenges such as abstract teaching content and numerous formulas. Therefore, this article integrates the application of the BOPPPS-Course Ideological and Political Model, paving the way for the development of ideological and political aspects in the course, aiming to make engineering education more dynamic without losing its educational essence. This innovative course design addresses common issues in current engineering education. To make education vibrant, it is essential to use more scientific and thoughtful approaches, enabling students to acquire professional knowledge systematically while fostering a noble sense of patriotism and national pride. This, in turn, contributes to the cultivation of chemical engineering applied talents with both moral and intellectual qualities that meet the requirements of the new era.

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