



Exploration on the Reform of Professional Curriculum Teaching in the Perspective of “New Engineering”

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Abstract. With the rapid development of science and technology, the era of “new engineering” has come. In view of the new requirements for talent training in the era of “new engineering”, in order to adapt to the needs of the development of the times and improve the quality of talent training, a thorough and effective method exploration has been carried out around the teaching of professional courses. Combined with the teaching practice of professional courses, from the aspects of learning base, ideological and political elements, pre class preparation, precise teaching and post-class promotion, the paper puts forward the curriculum ideological and political education and teaching development methods for professional courses, and takes the “Automatic Control Principle” professional course as an example to verify the teaching practice. The results of teaching practice show that the precise implementation of the five teaching methods fully mobilized the initiative of students to participate in professional courses, effectively promoted the teaching quality of professional courses, and better realized the organic unity of knowledge teaching, ability training and value guidance.

Keywords: New engineering · professional curriculum · teaching method · informatization means

1 Introduction

In the era of rapid development of information technology, the deep integration of information technology and engineering education has a direct impact on the construction of engineering majors in colleges and universities, the teaching of professional teachers and the transformation of the learning methods of college students [1]. As the main body of higher education, the informatization of engineering education is directly related to the realization of higher education informatization. With the in-depth development of big data and artificial intelligence technology, university education informatization has become an inevitable development trend [2]. New engineering is a major strategy and deployment for higher engineering education to implement engineering education reform under the background of new scientific and technological revolution and new industrial revolution [3]. The essence of colleges is to establish morality and cultivate

people. Establishing virtue and cultivating talents is the primary task of training talents in ordinary colleges and universities [4]. The new engineering department aims to cultivate high-quality and versatile talents with strong practical ability, innovation ability and international competitiveness. It puts forward new requirements and challenges for college education and teaching. In the new engineering era, professional courses should be oriented to the future industry, so more attention should be paid to the cultivation of complex engineering problem-solving ability, unstructured problem-solving ability, and multidisciplinary team cooperation ability [5]. The key to the realization of moral education lies in the effective implementation of ideological and political education in professional courses. The fundamental purpose of ideological and political teaching of professional courses is to solve the dilution and lack of ideological attributes and logic of school education, strengthen the political direction and position of school education, and promote the integration of “knowledge” and “education” of school curriculum [6]. “Ideological and political teaching of professional courses” is essentially a curriculum view, not a professional course, but a specific teaching content in professional courses. It requires that the education element should be reflected in the knowledge transfer of professional courses, and the moral responsibility should be implemented in the teaching activities of professional courses. Therefore, as college teachers at the front line of teaching, it is not only duty-bound but also duty-bound to do a good job in ideological and political teaching. Based on the characteristics of engineering courses, combined with the construction goal of cultivating high-quality compound talents required by the “new engineering”, this paper takes the course of “Principles of Automatic Control” as an example to carry out the ideological and political teaching practice of the professional course, and has achieved the expected results.

2 Practice Methods

The teaching of professional courses mainly focuses on five aspects: learning base, ideological and political elements, pre-class preparation, precise teaching and post-class promotion.

2.1 Find Out the Foundation of Learning

There is a saying in the art of war: “Know yourself and your enemy, and you will never be defeated in a hundred battles. Like the art of war, in order to achieve better teaching results, ideological and political teaching needs to first understand the learning situation and curriculum situation. Learning situation refers to students’ ideological characteristics, learning basis and interests. Course situation refers to the situation of professional courses in terms of content requirements, key and difficult points and difficulty. For the course situation, we should carefully study the syllabus and teaching content; We should fully understand the learning situation through questionnaires, classroom discussions, learning tests and other forms. Secondly, we should formulate the objectives and methods of curriculum teaching. According to the professional training plan and teaching content, we should envisage the ideological and political content, clarify the knowledge objectives, ability objectives and teaching objectives of the course teaching,

and formulate the four-step teaching method of “cultivating morality in the classroom, integrating into the classroom, being happy in the classroom, supervising and after class” and the three-step learning method of “teacher guidance, classroom learning, and after-class learning assistance”. For each class of the course, we should carefully analyze the course and learning situation, and then formulate teaching objectives, so as to achieve targeted and individualized teaching.

2.2 Dig Deeply into the Ideological and Political Elements

It is an important link to promote the ideological and political teaching of professional courses to deeply explore the ideological and political elements and integrate them into the teaching of professional courses. At present, the key topic of higher education is how to design ideological and political links in the content of professional courses and how to integrate ideological and political elements in the form. According to the teaching requirements of professional courses and the course learning content, we can deeply explore the ideological and political elements through direct introduction, thematic embedding, analogy introduction, implicit infiltration and other forms. Generally speaking, the first chapter of most professional courses is an overview, which involves the achievements and development process. At this time, we can seek the ideological and political elements through direct introduction, thematic embedding and other ways. For example, in the course of “Principles of Automatic Control”, the first chapter introduces the outstanding achievements of automatic control technology. We can directly introduce the ideological and political elements of patriotism and scientific spirit, and carry out teaching through online teaching platforms such as superstar and nail, questionnaire survey and group discussion. For the ideological and political teaching method of analogy introduction and implicit infiltration, we can combine a certain knowledge point to launch. For example, in the first chapter of “Automatic Control Principle”, according to the characteristics that closed-loop control is deviation control, we can introduce the ideological and political elements to realize the ideal of life by analogy, as shown in Fig. 1. In Chapter 5, according to the requirements of system stability, we can introduce the ideological and political elements of stability in the same way: for the country, stability is the overall situation, and only national stability can effectively carry out all work; For ourselves, only when we are stable can we learn well. Therefore, analogy can effectively cut into ideological and political elements and carry out ideological and political teaching.

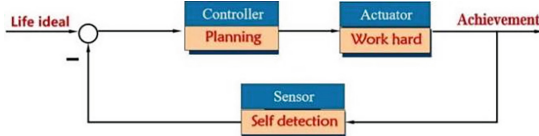


Fig. 1. Introduction of Ideological and Political Elements in the Process of Realizing Life Ideal

2.3 Strengthen Preparation Before Class

As the saying goes, one minute on stage, ten years off stage. Adequate preparation before class is an important prerequisite for ideological and political teaching. There are four things to do before class. First, do a good job of teaching courseware. With the continuous development of information-based teaching, students' demand for fragmented learning is increasing. How to make students interested in the course content, the visualization of teaching content is very important. The quality of teaching courseware will directly affect the teaching effect. In courseware production, pictures, animations, charts, audio, video and other materials are generally selected. However, how to make good use of these materials and realize the organic combination with the teaching content has become the key to high-quality teaching courseware. Generally, when making courseware, we should pay attention to the simplicity of the cover of the courseware, the cleanness and conciseness of the contents, the concentration and refinement of the text and the reasonable color matching. The second is to set up classroom links. Classroom link refers to the specific form of class, that is, the specific arrangement of teaching procedures. The reasonable setting of teaching links directly affects the teaching effect. Generally speaking, the classroom links generally include review preparation, classroom review, new lesson introduction, new lesson teaching, classroom practice, summary of the whole lesson, assignment and other links. Of course, the course teaching follows a hundred schools of thought, without a strict fixed format. We can make appropriate adjustments to classroom links according to different subject courses, different teaching contents and different teaching modes. Third, prepare for class activities. Classroom teaching activities are to convey new knowledge and information to students or consolidate learned content through various forms. Therefore, classroom teaching activities such as questionnaire survey, group discussion and in-class test should be envisaged in advance. Fourth, set up a platform for student assistance. With the development of information technology and network technology, online teaching platforms such as Superstar and Nail have come one after another. We should make full use of various online teaching platforms, organize various classroom activities, achieve online and offline classroom interaction, activate the classroom atmosphere and stimulate learning enthusiasm.

2.4 Precision Teaching

As the saying goes, if the plan is not implemented, everything is equal to zero. Teaching implementation is the key to achieving teaching objectives. The specific method of teaching implementation should not only meet the characteristics of teaching objects, the needs of teaching content and the requirements of teaching objectives, but also consider the necessity and feasibility in a specific teaching environment. We should carry out the activities in accordance with the pre-prepared teaching plan and pre-class preparation, and in combination with the classroom content. Let's take the first lesson of Automatic Control Principle as an example to illustrate. First of all, by introducing and demonstrating the great achievements of automatic control technologies such as Beidou satellite navigation, Beijing Winter Olympics smart restaurant, students are guided to perceive the great achievements of science and technology, and by using the Superstar online platform, they are organized to carry forward the scientific spirit and stimulate

learning motivation. Secondly, by introducing two typical examples of life and industrial furnace temperature control system, the process of holding books by hand and the process of realizing life ideal, the basic concept of automatic control is introduced, and concept analysis is carried out to clarify the internal relationship between various variables. Thirdly, we will review the examples and analyze the three examples just described with the concept of automatic control, so as to introduce the composition of automatic control system. Finally, make a summary of the whole class, review the knowledge, and assign homework after class.

2.5 Focus on Improvement After Class

Post-class promotion is an important part of teaching work. It is not only conducive to teachers' understanding of students' situation, but also conducive to the cultivation of mutual trust between teachers and students, and also conducive to teachers' teaching according to their aptitude. After-class counseling is an important means to strengthen students' understanding of classroom knowledge and improve students' ability. It can not only make up for the lack of students' knowledge in the classroom, but also effectively help teachers find problems and deficiencies in classroom teaching in time, improve and improve teaching methods in time, optimize teaching process design, and improve teaching quality. As a college teacher, we should actively overcome the misconception of "finish speaking and finish"; In terms of action, we should take the initiative to strengthen the follow-up and guidance by assigning homework, correcting homework, troubleshooting and other ways. For example, in the after-class link of "Principles of Automatic Control", we make full use of the online learning aid platform of Superstar to strengthen after-class guidance by recording classroom videos, assigning homework questions, troubleshooting, correcting after-class homework and other methods. At the same time, strengthen the analysis of homework after class. For students' wrong knowledge points, we should investigate the underlying reasons: is it the weak foundation of knowledge and learning, or the lack of methods and abilities? Is it an intellectual factor or a non-intellectual factor? Is it a problem of students' learning methods or teachers' teaching methods? In view of the reasons, carefully find out the deficiencies in classroom teaching, and timely improve and optimize classroom teaching design. In addition, we should also pay attention to the psychological needs of students, pay attention to equal respect, strengthen psychological comfort and encouragement, so that students can have a good learning attitude and psychological impulse to seek knowledge, so as to improve the quality of learning.

3 Practice Effect

The expected purpose has been achieved by carrying out the five-step ideological and political teaching method. Compared with the traditional teaching method, the ideological and political teaching method of curriculum has achieved better results. A questionnaire survey was carried out for 100 students in class, and statistical analysis will be carried out based on the completion of homework at ordinary times. The results are shown in Table 1.

Table 1. Questionnaire survey results of ideological and political teaching method of curriculum

Survey content	Before teaching	After teaching
Patriotic enthusiasm (%)	71	95
Learning interest (%)	52	87
Knowledge understanding (%)	49	83
Accuracy of course assignments (%)	51	85

Through the ideological and political teaching practice of the course, combined with the data shown in Table 1, we can draw the following conclusions:

- (1) Combine the course content, integrate ideological and political elements through thematic embedding, implicit infiltration, analogy introduction and other forms, carry out ideological and political teaching, inherit the scientific spirit, stimulate patriotism, shape the life pattern, and stimulate learning motivation.
- (2) Actively exert the means of information education, make full use of the online teaching platform, carry out discussions, questionnaires, quizzes and in-class tests, and other activities, which enlivens the classroom atmosphere, arouses the learning enthusiasm and improves the learning effect.

4 Conclusions

The fundamental purpose of ideological and political teaching of professional courses is to effectively correct the phenomenon and problems of “only teaching knowledge but not educating people” in educational teaching practice, and effectively implement the fundamental task of establishing morality and cultivating people in colleges and universities. To carry out ideological and political teaching of professional courses is the mission and responsibility of college teachers at the teaching front. With the continuous deepening of the development of new engineering, professional teachers should effectively improve their ideological awareness, make great efforts in finding out the bottom line, ideological and political elements, pre-class preparation, accurate implementation and after-school improvement, put ideological value guidance through the whole teaching process, effectively promote the organic unity of knowledge teaching, ability training and value guidance, and make students become useful talents in society.

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