

Research on the Innovation Method of the Curriculum System of Engineering Management under the Background of New Engineering

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Abstract: Based on the theme and connotation of the development of "new engineering", this paper analyzes the existing problems of the engineering management specialty at present, and explores the innovative methods of the curriculum system of Engineering Management Specialty under the background of "new engineering". The purpose is to train "new engineering" talents in line with the new requirements of national strategy and industry development, effectively improve the innovation spirit, engineering practice ability and management awareness of engineering management students, improve the curriculum system of engineering management, and provide new ideas for the curriculum system reform of engineering management.

Keywords: New engineering; Engineering management; Curriculum system; Engineering practice ability; Management awareness

1. Introduction

The deepening of innovation and entrepreneurship education reform in Colleges and universities is an urgent need for the implementation of national innovation driven development strategy and the promotion of economic quality and efficiency upgrading. It is also an important measure to promote the comprehensive reform of higher education and higher quality entrepreneurship and employment of college graduates [1]. The action line of new engineering construction proposed by the Ministry of education for the construction of "new engineering" consensus and Tianda action and the "new engineering research and practice project guide" of Beijing guide put forward a new direction for engineering construction of colleges and universities in the new era [2]. No matter the deepening of innovation and entrepreneurship education reform or the construction of new engineering, higher requirements are put forward for engineering practice ability, engineering design ability and engineering innovation ability of engineering technical talents.

The major of Engineering Management cultivates the basic knowledge of management, economics and civil engineering technology, the basic theories, methods and means of modern management science, and the high-quality application-oriented talents who can be engaged in project decision-making and whole process management in the field of engineering construction at home and abroad [3]. Therefore, the cultivation of talents should pay more attention to the enhancement of students' com-

prehensive quality and innovation and entrepreneurship ability. Especially in the current background of engineering education professional certification and "new engineering" construction, how to promote the cultivation of innovative and entrepreneurial talents in engineering management is an important issue that needs to be solved urgently [4].

2. Existing Problems of Engineering Management

2.1. Unreasonable curriculum system

As a compound interdisciplinary subject, engineering management major covers courses of engineering, economy, management and law. However, the curriculum often refers to the teaching materials of civil engineering specialty, which are directly applied to the teaching of engineering management specialty after simple compression, and lack of strong pertinence [5]. But in fact, the curriculum system of engineering management specialty is not deep enough. Although there are many subjects involved, most colleges and universities pay more attention to their own advantageous subjects when setting the curriculum system, which leads to the independence of each subject, the separation of courses, and the lack of mutual accommodation of knowledge points. The students finally cultivated cannot meet the needs of the industry Please.

2.2. Engineering management professionals lack of practical experience

Our country mainly cultivates practical talents, which requires college graduates not only to have a solid theoretical basis but also to have some practical experience [7], while the engineering management specialty in the course system, with less integration with the actual social needs, most of the practice, curriculum design, cognitive practice related to practical teaching are still in the classroom demonstration operation, manual calculation Prepare relevant documents [8]. Although graduates have learned a lot of theoretical knowledge, they lack of practical operation, and practical teaching is difficult to integrate into the actual project, which makes it difficult for graduates to find suitable jobs.

2.3. Lack of integration of engineering management professional basic knowledge and innovation ability

Due to the lack of practical operation in the engineering management major, there are few practical engineering cases introduced into the theoretical teaching, some construction technology and management methods are difficult to combine with the theoretical knowledge, some practical engineering cases can only play a simple inspiration, lack of a normal university students' science and technology innovation base, unable to make students feel the same experience, and the innovation ability of students can not be cultivated The innovation ability of engineering management students is seriously insufficient, with few innovation achievements and poor results. It is difficult to solve the emerging new problems in the actual engineering management project.

2. Training Objectives of Engineering Management Talents under the Background of New Engineering

Based on the concept of new engineering education, the curriculum system of engineering management specialty is organized with students as the center and engineering practice management ability as the goal, and the training goal of engineering management specialty curriculum is determined as [9]:

Master the basic knowledge of basic management, economics and civil engineering technology, and lay a solid foundation in engineering technology, management, economy, law, foreign language and computer application.

Master the bidding method and the ability to prepare the actual project bidding documents, the construction management method and the construction organization design ability to prepare the actual project bidding documents.

Master the management method of project parry and the ability of preparing actual project budget, the supervision method of actual project and the ability of preparing supervision plan.

Master the ability of engineering project management optimization, engineering project technology transformation and innovation.

According to the training objectives of engineering management courses, the main professional courses are divided into four modules according to the learning system, namely, basic module, improvement module, comprehensive module and practice module. See Table 1 for details.

Table 1. Table of teaching modules by school system

Academic year setting	Teaching module	Main courses
First academic year	Basic module	Engineering Technology
		Management and Engineering Economics
		Engineering drawing and CAD
Second academic year	Enhancement module	engineering mechanics
		engineering structure
Third academic year	Integrated module	Professional courses
		curriculum design
The Fourth academic year	Practice module	Graduation project
		Graduation practice

3. Specific Measures for the Reform and Innovation of Engineering Ability Training Mode of Mechanical Specialty

3.1. Optimize the curriculum structure and establish a curriculum system with equal emphasis on management and Engineering

According to the current situation of the coexistence of management science and engineering technology in

engineering design in China, this paper puts forward the idea of teaching content reform in the basic module, changes the traditional segmented teaching mode of engineering technology and management science, and organically combines the courses of management, civil engineering, accounting, engineering drawing and CAD for freshmen, so as to cultivate students' management consciousness and engineering ability.

First of all, freshmen are required to study engineering drawing and CAD, learn basic two-dimensional software, master basic engineering design ability, realize

virtual scene, introduce relevant knowledge of engineering management, engineering measurement and engineering budget according to specific design, explain management in engineering, and achieve organic combination of engineering and management.

3.2. Student centered sand table simulation practice

In traditional engineering management courses, teachers teach and students passively accept. After the students finish engineering design, engineering management and engineering budget, they can change the budget model into a student-centered model. After the students carry out the engineering design, they can introduce the theoretical knowledge of Engineering Mechanics and engineering structure, and let the students analyze and discuss the engineering drawing by themselves. After the analysis, they can carry out the sand table simulation practice, through the students' role-playing and project operation. The mode of teacher's comment makes the students become the main body of teaching, and integrates the fragmentary engineering knowledge and management consciousness, which not only deepens the students' understanding of the implementation process of engineering projects, but also exercises the students' ability to analyze, solve problems and cooperate in teams.

At the same time, organize students to carry out BIM competition, construction management sand table and software application competition to improve students' ability of independent thinking, creative thinking, analysis and problem solving. Through competition activities and in-depth exchange and learning, students can understand professional knowledge and continuously improve professional practical skills, and finally achieve the goal of practical teaching and comprehensively improve students' comprehensive ability.

3.3. Curriculum design of "5E" mode

The implementation of curriculum design should follow five steps: engineering drawings, engineering construction, engineering contracts, engineering cost and engineering management.

Through the preliminary study of freshmen and sophomores, students have a preliminary understanding of the basic knowledge of engineering drawings, engineering construction, engineering cost, engineering management, etc. using curriculum design can effectively sort out the knowledge learned.

In the course design, first of all, conduct the engineering contract and bidding course design, engineering project management practice, be familiar with the engineering contract and bidding documents, and then, according to the engineering project management practice, form a multi-disciplinary teaching supported by "engineering, management and law" [10]. The systematic

training of the students' engineering consciousness and engineering ability.

At the same time, through joint course teaching, major engineering consulting, enterprise engineering construction, etc., a multi-disciplinary team of "engineering, management, law" and "teachers, architects, lawyers" will be formed, which will make innovation practice reports, hold lectures, science and technology exhibitions, project research and other activities, stimulate students' innovation interest and master the innovation side through rigorous scientific training. And cultivate the students' innovative spirit.

3.4. Integrated mode of graduation design and graduation practice

Construction of graduation practice and graduation design integration model. Combined with the training objectives of engineering management, the graduation practice and graduation project are scientifically and reasonably set up to achieve the organic integration of the two. Put "student-oriented" into practice [11].

For senior students, they can start graduation practice and graduation design at the beginning of the seventh semester. Strengthen the cooperation with the off campus practice training base. When students enter the enterprise practice, they should complete their own graduation design, advocate the students to choose the graduation design topics in combination with the actual projects of enterprise production and scientific research, adopt the dual tutor system of enterprise and University, select the topics that meet the training objectives of their major and the basic requirements of engineering practice, and jointly guide the students to carry out graduation design. In this way, students can apply the contents of freshmen, sophomores and juniors to graduation practice and graduation design, apply theory to practice, and improve their engineering ability and management awareness in practice.

4. Conclusion

Based on the curriculum system reform of engineering management major in the new engineering construction, the teaching links and contents are arranged according to the principle of "learning for application", forming an integrated design from the realization of virtual scene to the simulation of sand table to the practical operation of the practice base, strengthening the students' ability of engineering design, practice and management awareness, exercising the students' team spirit and better motivating learning. Students learn independently, and train a group of engineers with engineering ability for the country.

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