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Exploration and Practice of Engineering Management Specialty in the Teaching of Innovative Curriculum System Construction

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Abstract: *The engineering management major is a comprehensive and practical major. However, with the rapid development of the construction industry, the scale of construction projects has become larger and larger and the craftsmanship has become more and more complex. It is difficult for traditional engineering management teaching models to clearly, intuitively and vividly present the implementation and management process of construction projects. Exploring the positioning of engineering management disciplines and the theories and methods of education and teaching has very urgent practical significance. This article aims to explore and practice the construction of an innovative curriculum system for the engineering management major. This research is based on the construction of an innovative curriculum system for the engineering management major. Establish a curriculum system centered on student development and aimed at improving students' innovative quality. Through questionnaire surveys and interviews, we obtained first-hand information on two engineering management teacher education courses. The engineering management course of School B is similar to the engineering management course of School A. It is a modular course divided into five modules. Establish an independent innovation learning module. Course credits are 6 credits, accounting for 3.7% of the total credits; practical teaching credits are 26 credits, accounting for 16.1% of the total credits. The results show that the educational curriculum system of School B can promote the all-round development of students.*

Keywords: *Engineering Management, Innovative Course, Curriculum system, Teaching Construction*

1. Introduction

Education is one of the important criteria to consider the comprehensive strength and international competitiveness of a country [1-3]. Teachers are also educators to cultivate fertilizers for the motherland's flowers. Engineering management is the basic education in the curriculum system. It has the characteristics of humanity, instrumentality, application and development [4-5]. The study of the basic courses of engineering management can not only help students enhance their ideological and moral qualities, aesthetic qualities and humanistic qualities, but also cultivate their sound personality. Therefore, it is particularly important to explore and practice engineering management teaching in the construction of the engineering management innovation course system [6-8]. At present, engineering management courses still have many shortcomings, such as irrational curriculum structure, lack of integration of curriculum content, and disconnection between curriculum content and basic education reform. These problems have seriously hindered the development of the engineering management profession and directly affected the future development of engineering management education [9]. The curriculum is the design and planning of educating people. The training goal of the school can only be achieved through specific courses. Education policy can only be implemented through specific courses. Only by attaching importance to curriculum planning can teaching activities be realized. Through curriculum design, teaching content can be transformed into students' quality and ability [10-11].

Curriculum is the only way to achieve the goal of training. It embodies the educational ideas and teaching contents of different times [11-13]. Therefore, in view of the new trend of the development of Teacher Education in our country, we must carry out innovative research on Teacher Education curriculum, so that the development of Teacher Education in our country [13-15]. Therefore, engineering management courses have the following important theoretical significance: First, to carry out research on engineering management courses and explore the theory and practice of engineering

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management courses. Provide reference and theoretical guidance for curriculum construction, and train high-quality engineering management teachers for basic education [16-18]. Secondly, through the research of engineering management courses, the theoretical level of engineering management courses can be improved, and the theoretical foundation for the research of engineering management education can be laid. Carrying out engineering management courses and teaching research is an effective way for teachers' professional development. Teachers must have the awareness of engineering management courses and teaching research, constantly master and understand the new concepts, new concepts, and new methods of engineering management courses, and learn new theories of engineering management courses and teaching. Combining the current new policies and new trends in the development of engineering management teacher education, formulate reasonable and scientific training goals for engineering management teachers, and design courses according to the training goals.

Zhao Pingjun analyzed the reform and development of engineering management course through mathematical statistics. He innovatively proposed the three-dimensional design of the course, which must first improve the professional quality of teachers. Second, it is necessary to give play to the dominant position of students and actively absorb students' teaching suggestions [19]. In this study, Styurmer and Kathleen explored whether innovative teacher education plans would produce individual differences in pre-service teachers' professional vision, whether these differences would lead to different changes, and whether they would lead to similar personal development of pre-service teachers' professional vision. The reasoning ability of 64 pre-service teachers was measured at four measuring points using the observer research tool, and analyzed by multi-level analysis method. The results show that all three skills increase linearly in the curriculum. In addition, there is a systematic difference between pre-service teachers' entry level and the change rate of professional vision [20].

This research is based on the exploration and practice of professional innovation curriculum system construction, and analyzes the development trend of engineering management curriculum system. Through questionnaire surveys and interviews, first-hand information on the education courses for teachers of engineering management in two universities was obtained. The engineering management course of School B is similar to the course of School A. It is a modular course with five modules. Establishment of independent innovation learning module, course credit 6 credits, accounting for 3.7% of the total credit; practice teaching credit 26 credits, accounting for 16.1% of the total credit. School B's educational curriculum system can promote students' all-round development.

2. Proposed Method

2.1 Innovative Curriculum System

Curriculum system refers to a system that integrates and integrates all curriculum elements under the guidance of specific educational values. Each curriculum element reflects the dynamic process of achieving the goals of the teaching plan system. From a practical point of view, the school system is the sum of educational processes arranged according to different types of courses, educational content and types of courses. Classroom order determines the knowledge structure of students in the learning process. The school system is to achieve the goal of training a career and plays an important guiding role in educational activities. evidence. From the viewpoints of the goals of the learning plan, the structure of the learning plan, and the content of the learning plan, the analysis of the learning system, the evaluation of the teaching plan, the innovation of the curriculum and management are analyzed.

2.2 The Theoretical Basis of Curriculum System Innovation

(1) The innovation of elementary education curriculum system uses a multi-disciplinary perspective to construct a unique and innovative curriculum system, which involves not only pedagogical theory, but also other disciplines. The theoretical basis of curriculum system innovation in elementary education includes depth, height, breadth and breadth, including competency-based theory, social-based theory and constructivism theory.

1) Competence-based theory

Ability-based education is called CBE education model. Ability-based education centers on the abilities and skills required by vocational posts. It decomposes students' future careers according to their vocational needs, so as to determine students' competence standards. A starting point: competency-based education should start from the comprehensive analysis of the characteristics of

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Vocational posts, and take the social demand for talents as the standard. In the teaching process, students are the leading factor, and the core is to cultivate students' practical application ability. Five elements: technical ability is the basis of education. According to professional needs, students' future majors are decomposed and their competence standards are determined, and then teaching objectives are determined.

2) Social Standard Theory

According to the theory of social standard, the fundamental value of education lies in meeting the needs of society. The purpose and implementation of education should be formulated in accordance with social needs and national interests. It emphasizes that individual development depends on society and is restricted by society. Based on Dewey's sociological school, the theory of social standard explores the value of educational purposes from the social and individual levels. The purpose of education should be the unity of individual values and social values, which is an important theoretical basis for the innovation of undergraduate curriculum system.

3) Constructivist Theory

Constructivist theory holds that learning is a process in which students acquire knowledge through meaning construction on the basis of original knowledge and interactive experience of social culture. Constructivism emphasizes four elements in the process of knowledge learning: context, help, dialogue and meaning construction. Students analyze, hypothesize and verify problems through group learning and self-exploration. Under the guidance of teachers, students should independently explore knowledge, actively exert their subjective initiative, actively link new and old knowledge, and construct knowledge system. The innovation of curriculum system in elementary education school should embody the characteristics of student-centered teaching, emphasizing situational teaching under the guidance of teachers, and guiding students to carry out inquiry learning and group cooperative learning.

2.3 Professional Curriculum for Engineering Management Teachers

(1) The Theoretical Basis of the Professional Curriculum for Engineering Management Teachers

1) The Philosophical Foundation of the Professional Courses for Engineering Management Teachers

Philosophy has an important influence on curriculum design, which to some extent reflects the basic philosophy of elementary education decision makers. Our country advocates Marxist theory of all-round development of human beings. Realizing the free and all-round development of human beings is the core of Marxist educational concept. Relevant data show that the theory of human's all-round development can be summarized as: the all-round development of human's labor ability; the all-round development of human's social relations; the all-round development of human's needs; the all-round development of human's free personality; and the spiritual development of human beings.

2)The Psychological Foundation of the Professional Curriculum for Engineering Management Teachers

The main function of this course is to promote the development of students' personality. Therefore, curriculum design must conform to the law of individual development and students' learning process.

3) The Educational Basis of the Professional Curriculum for Engineering Management Teachers

Life is education, society is school, teaching, learning and practice are the organic combination of life education theory, its connotation is: education in terms of life, in this big classroom, “what life is what education”, life and education must be linked together; the place of education should be extended to society, people should not only adhere to the school this small part of the education, because people Society and education.

(2) The Practical Basis of the Professional Curriculum for Engineering Management Teachers

1) The influence of relevant policies of Higher Normal Education on curriculum design

This research involves undergraduate curriculum design. First, the basic concepts of engineering management courses are explained: education orientation, practice orientation and lifelong learning. Secondly, the curriculum objectives are elaborated from three aspects: educational belief and responsibility, educational knowledge and ability, educational practice and experience. Educational beliefs and responsibilities include: having correct student outlook and corresponding behavior; having correct teacher outlook and corresponding behavior.

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2) The Influence of the Training Goals of Engineering Management Colleges on the Curriculum of Engineering Management Teacher Education

The training goal of Elementary Education in China is to train school teachers, especially teachers of various disciplines in Elementary Education schools, such as the professional training of Chinese teachers in Elementary Education schools. This study aims at specific training objectives. The curriculum of normal education is the core of the teaching plan of normal education and the concretization of the training objective of normal education. It can reflect the specific specifications of future teachers.

3) The challenge of basic education curriculum reform to the professional curriculum setting of engineering management teachers

The basic idea of the engineering management course in the "Curriculum Standards" is to comprehensively improve students' engineering management literacy and correctly grasp the characteristics of engineering management education. Actively advocate independent, cooperative, and inquiry learning methods, and strive to build open and dynamic engineering management courses. The smooth implementation of the new engineering management curriculum depends on the professional quality of the engineering management teachers.

3. Experiments

3.1 Experiment Setup

(1) Experimental background

In this experiment, the innovative curriculum system takes the basic education of engineering management as an example. Through a series of practical research, a curriculum system based on students' development and aiming at improving students' innovative quality has been established. Innovation courses are mainly in the form of expanding courses and research-oriented courses, and mainly in the form of project guidance and practical experience.

(2) Experiments

Questionnaire survey and interview are the two main methods of this study. Through questionnaire surveys and interviews, we can obtain first-hand information about the two universities' engineering management teacher education courses. Through questionnaires to understand the satisfaction of elementary education students on the curriculum, Through follow-up interviews with previous basic education graduates to understand and analyze the impact of the curriculum on engineering management teaching. It further analyzes the current situation of the engineering management professional curriculum design, and provides countermeasures and suggestions for the empirical support of the engineering management professional curriculum design.

3.2 Collection of Experimental Data

The questionnaire was sent out through a comprehensive survey. A total of 148 questionnaires were distributed and 145 were recovered. 141 valid questionnaires with a recovery rate of 95.27%. There are 23 questions in the questionnaire, which are divided into three parts: Respondents' personal attitude towards the engineering management teacher education curriculum and its implementation is a single topic; the interviewee's suggestion for the school's engineering management teacher education curriculum is a single topic; and the respondents put forward specific suggestions on the current curriculum as a subject topic, as shown in Table 1..

Table 1: Questionnaire

Satisfaction with Course Proportional Arrangement	Very satisfied	Basic satisfaction	commonly	Dissatisfied	Very dissatisfied
Number	49	70	18	4	0
Proportion	34.75	49.65	12.77	2.84	0

This article compares and analyzes the training objectives according to the two current undergraduate training plans of basic engineering management education, as shown in Table 2.

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Table 2: Table of professional training goals for engineering management teachers of two universities

Name of school	Training objectives
School A	Training professionals with theoretical literacy, systematic knowledge and wide-caliber language skills who are engaged in teaching, scientific research, secretarial, publishing, editing and other work.
School B	Cultivate humanistic talents that meet the needs of social and economic development, master the engineering management knowledge system through professional learning, have the ability to engage in basic engineering management education, teaching and research, and adapt to modern society.

4. Discussion

4.1 Innovative Ways to Implement Courses

In the process of implementing innovative curriculum, we should focus on project learning, take comprehensive utilization of interdisciplinary knowledge as teaching method, and create conditions for students to carry out project research on the basis of general education and innovative literacy training courses. Realize the progressive development model of innovative curriculum.

(1) Ways of curriculum implementation

The implementation and promotion of innovative education should be based on students' existing basic knowledge and skills, analyze students' development trend and innovative potential, and integrate existing curriculum resources and teachers. Fig. 1 shows popular science education, general education, innovation literacy training, special research courses and comprehensive courses. Through five levels of curriculum learning, the integration of interdisciplinary knowledge is realized, the knowledge form of students is improved, and the project-based research process is realized.

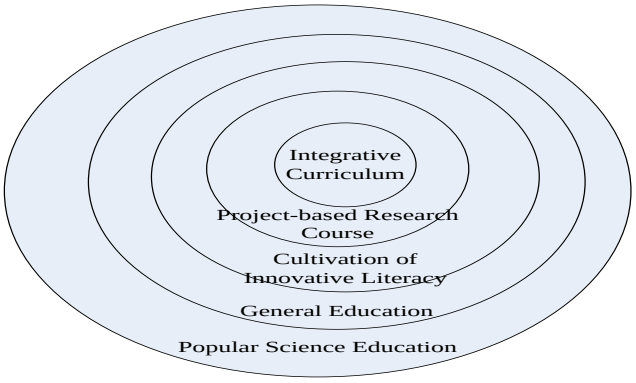

Figure 1: Framework of Innovation Course Implementation

The first level: popular science education. It refers to maximizing the use of various popular science education resources, popularizing scientific and technological information for students, guiding students to participate in popular science practice, and stimulating students' interest in innovative research. The second level is general education. In the process of implementing innovative education, we should carry out general education, popularize students' multidisciplinary knowledge, improve students' learning ability, exercise students' reading ability and aesthetic interest, and lay a good foundation for innovative education of targeted subject courses in the future. The third level: the cultivation of innovative literacy and thinking training. Level 4: Project Research Course. Through the cultivation of basic general courses and innovative literacy, students start from their own topics and carry out relevant research courses. In the process of project research, students can use the knowledge and methods of project research, use experimental skills, experience the process of scientific research, improve the level of scientific thinking, and exercise comprehensive ability in practice. Engineering technology and results show what they learned in a course. The fifth level: comprehensive curriculum. As the main body of the curriculum, each course has its corresponding scientific focus. In the process of explaining the theme, we should stimulate students' thinking training and stimulate their thinking.

(2)Curriculum integration

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The design and development of curriculum is based on the development of students and realized through specific implementation methods. There are many ways to implement innovative education, and the form of organization is different from that of traditional classes. Students are encouraged to follow the cognitive development process and attach importance to daily life practice and life experience in terms of interest and expertise. Level 5 curriculum has trained students' knowledge and skills, and has been applied and improved in practice. The whole process of the content and technology innovation course is shown in Figure 2.

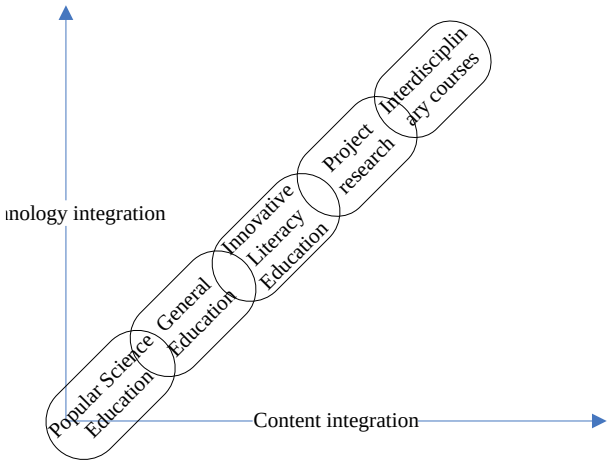

Figure 2: Integration of Innovation Courses

4.2 Engineering Management Course System

The course structure and credit ratio of the two schools are classified and counted.

(1) School A Curriculum System

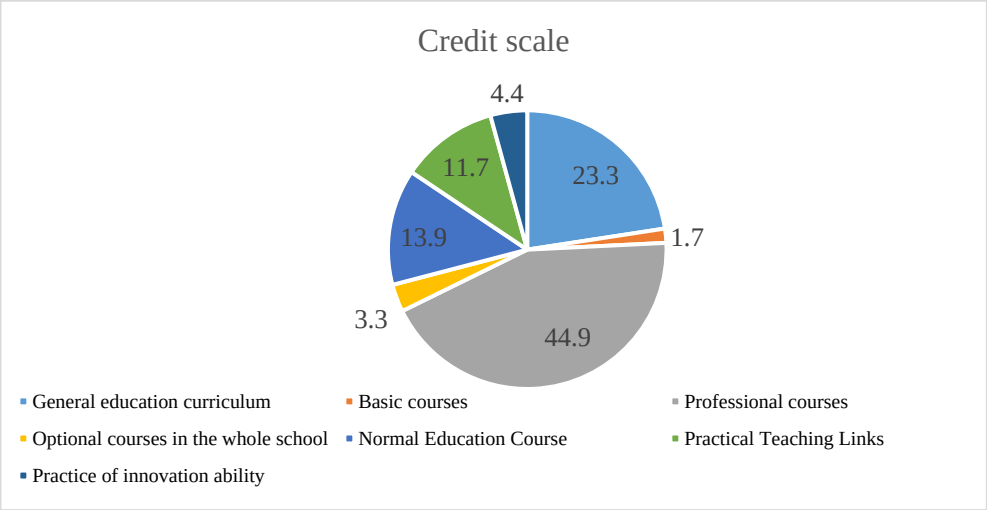

Figure 3: The curriculum system of A Chinese Teachers' College

Figure 3 shows that there are 180 credits in the direction of normal education for Chinese Major in School A. Among them, 42 credits for general courses, 6 credits for elective courses, accounting for 26.67% of total credits; 3 credits for basic courses, accounting for 1.7% of total credits; 60 credits for basic courses, accounting for 33.3% of total credits; 15 credits for compulsory courses, accounting for 8.3% of total credits; 6 credits for elective courses, accounting for 3.3% of total credits; 13 credits for teachers, accounting for 12 credits of total credits. 8 credits for graduation practice, 7 credits for graduation thesis and 8 credits for innovation ability practice, respectively accounting for 7.8%, 3.9% and 4.4% of the total credits.

(2)School B Curriculum System

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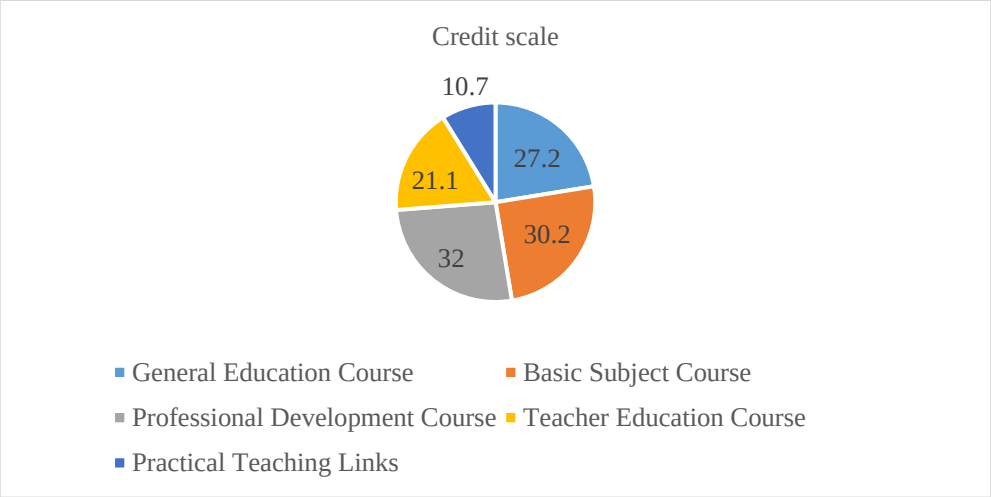

Figure 4: The curriculum system of the School of Engineering Management

It can be seen from Figure 4 that the engineering management professional course of School B is similar to the course of School A. It is a modular course with a total of five course modules. Among them, the general course module accounts for 27.2% of the total credit, and the basic course accounts for 30.2% of the total credit. Professional development is divided into subject courses and teacher courses. Subject courses accounted for 21.3% of the total credit, teacher courses accounted for 10.7% of the total credit, and practical teaching links accounted for 10.7% of the total credit. Independent innovation learning module has also been established, with 169 credits remaining. These five modules constitute the whole framework, each module has different roles. The course credits are 6 credits, accounting for 3.7% of the total credits; the practical teaching credits are 26 credits, accounting for 16.1% of the total credits.

General education courses in school B are relatively rich, which can be divided into compulsory courses and elective courses to promote students' all-round development. Professional courses are divided into basic courses, professional development courses and elective courses. Engineering management education courses are divided into compulsory courses of education and teaching theory and compulsory courses of education and teaching ability training. Through the establishment of compulsory courses of pedagogy and pedagogy, students can cultivate their theoretical knowledge of engineering management education, so that students can truly transform into courses with teacher status and become compulsory courses for pedagogy and teaching ability training. These courses lay a solid foundation for students to become qualified engineering management teachers in the future, and are well adapted to the requirements of engineering management teachers for basic education reform. Whether in general courses, professional courses or teacher education courses, schools have set up practice links to enable students to fully grasp theoretical knowledge, and then use practice links to test the degree of knowledge mastery, so as to realize the application of learning. Especially in the practice of teacher education curriculum, the setting of teacher education curriculum fundamentally improves students' teaching ability.

5. Conclusions

With the deepening and expansion of the curriculum, students' innovative ability and innovative educational achievements gradually appear and enrich. Innovative curriculum system plays an active role in the cultivation of students' comprehensive quality. By grasping the new characteristics and development trend of curriculum design, this paper makes a comparative analysis of the current situation of college engineering management curriculum design. By means of questionnaires, this paper investigates the attitude of Chinese graduates towards curriculum design. According to the characteristics of the curriculum design of the engineering management specialty, the value orientation of the curriculum design of the engineering management specialty is proposed.

The engineering management course structure is mainly composed of theory and practice courses, general and professional courses, compulsory courses and elective courses. It constitutes the arrangement，the main clues of curriculum structure and combination of these courses as well as the proportional relationship. The integration of science and humanities is the key to the innovation of

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curriculum structure. General education accounts for 27.2% of the total credits of Chinese courses in School A. Compulsory courses in general education are divided into science and Technology Natural Science series, teacher education series, computer information technology series, health education series, etc. A curriculum system combining science and humanities is constructed.

School A has set up practical links in the general education curriculum. The educational practice of the engineering management major includes engineering management teaching design, hands-on practice ability training, educational technology application ability training and comprehensive teaching ability training. The cultivation of basic artistic ability, teaching practice, classroom teaching skills testing, etc. Social Practice Credit Course is offered in practical education, and it is planned to be implemented in the sixth semester. It also provides an independent innovation learning platform, one of which is the practice credits. Through comprehensive social practice activities, colleges and universities enable students to contact and understand social life, exercise their ability to serve the society, and test their ability to solve practical social problems. Through the reconstruction of the engineering management professional curriculum system, BIM technology can be fully penetrated into the entire engineering management professional courses, thereby improving the practical ability of engineering management students and improving the application ability of BIM technology.

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