

Exploration of the Path to Improving the Quality of Practical Teaching in Engineering Management Major

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Abstract: With the rapid development of the economy and continuous technological progress, the teaching quality of engineering management majors needs to be continuously improved. Practical teaching, as an important component of undergraduate education, is an important way to improve the quality of undergraduate talent cultivation. Optimizing practical teaching can help undergraduate education cultivate excellent talents. This article analyzes the current situation and existing problems of practical teaching in engineering management major, analyzes its professional ability training system, and then explores the path to improve the quality of practical teaching in engineering management major from the aspects of training goal positioning, practical teaching system, practical teaching plan, practical teaching platform, and teaching staff. Enable students to effectively integrate professional theoretical knowledge with engineering practical abilities, strengthen the systematic and integrated cultivation of students' practical abilities, and enhance their engineering practice and innovation capabilities.

Keywords: Engineering Management; Practical Teaching; Teaching Quality; Talent Cultivation.

1. Introduction

In recent years, with the continuous deepening of higher engineering education reform in China, more and more educators believe that "practice is the foundation of engineering majors". With the acceleration of social pace and increasingly fierce market competition, employers require graduates to have a quick start and pay more attention to their professional practical experience when recruiting. This requires universities to change their original talent cultivation concepts, have a deeper understanding of engineering education concepts, attach importance to students' comprehensive qualities, and enhance their engineering practical abilities. Engineering management is not simply a management discipline, but a multidisciplinary cross disciplinary combination, which includes knowledge of engineering technology such as construction economics and engineering bidding, as well as knowledge of real estate operation management, cost management, and other management aspects. The professional characteristics are practical, applied, and composite. Students majoring in engineering management are required to master the basic knowledge of management, economics, and civil engineering technology, and be able to apply the theories, methods, and means of modern management science to engage in decision-making and full process management of engineering construction projects, possessing strong engineering, practical, and innovative abilities [1]. In recent years, the employment rate of graduates majoring in engineering management in many universities has been declining year by year, and there has been a phenomenon of increasing unemployment rate and cross industry employment rate. This undoubtedly puts forward higher requirements for the cultivation of engineering management talents, especially practical abilities. Therefore, universities should strengthen the reform and construction of practical teaching in engineering management majors, take the practical system as a carrier, vigorously reform the practical teaching process, focus on innovating practical education models and methods,

improve the talent training system, and enhance the quality of talent training. Cultivate innovative engineering management professionals who meet the requirements of the times.

2. The Current Situation and Existing Problems of Practical Teaching in Engineering Management Major

Through extensive research on construction units, real estate development units, supervision units, engineering consulting units and other employers, feedback on the evaluation of interns and fresh graduates by enterprises has been obtained. The most prominent problems are concentrated in students' insufficient understanding of engineering, weak overall awareness of engineering, and poor hands-on ability [2]. Tracing back to the source, the effectiveness of school practical teaching is one of the main reasons for the current employment situation and problems. The specific issues are as follows.

(1) Insufficient emphasis on practical teaching

Some universities do not attach enough importance to practical teaching, and lack systematic, comprehensive, and flexible considerations in the construction of practical teaching systems. The cultivation of students' abilities has not formed a system, and specific practical links have not been connected with engineering practice, resulting in scattered practical teaching, disconnection from reality, and weak applicability.

(2) Low requirements for the design process

Some engineering management majors in universities are established under liberal arts departments, with relatively few course designs. The requirements for course design content are too simple, and the monthly content setting fails to strengthen the comprehensive application of prerequisite courses, resulting in poor course design effectiveness. In the graduation project stage, there are situations where the design questions lack comprehensiveness, are not linked to actual engineering, and are not organically integrated with graduation internships. The design quality is not high, and the

training of students' comprehensive abilities has not achieved the expected effect.

(3) Insufficient investment in the experimental internship process

Some universities have outdated experimental equipment, limited experimental hours, and do not provide extracurricular experimental conditions, resulting in insufficient reinforcement of experimental activities and students not receiving the necessary training. In the internship process, due to risk considerations, companies are often unwilling to provide internship opportunities, and schools have limited supporting funds, which cannot compensate companies economically, resulting in difficulties in carrying out internships. Some internships can only be turned into "visits", and some centralized internships can only be arranged for students to use their holidays to find projects on their own, making it difficult to guarantee internship time and effectiveness.

(4) The teaching staff for practical teaching is weak

The lack of "dual qualified" teachers has become a common problem in universities. Due to the lack of engineering practice, teachers are not attentive to the design, content, depth, comprehensiveness, innovation, and other aspects of specific practical activities. They cannot carry out targeted practical activities according to the actual needs of the project, nor can they fully stimulate students' enthusiasm,

initiative, and creativity in practical learning; At the same time, due to the lack of engineering practice experience, teachers have limited abilities from school to school, from theory to theory [3], which is also one of the factors restricting practical teaching, thus affecting the improvement of teaching quality and effectiveness.

3. Analysis of the Professional Ability Training System for Engineering Management

The knowledge system of engineering management major consists of humanities and social science knowledge, natural science knowledge, applied knowledge, and professional knowledge [4]. Through systematic learning of the knowledge system, students can master the basic knowledge of engineering technology and the methods and means of modern management science, and be able to engage in project decision-making and whole process management. To cultivate students' comprehensive quality and innovation ability, the engineering management major should establish a professional ability training system for engineering management based on the philosophical law of "cognition--practice -- re cognition -- re practice", as shown in Fig.1.

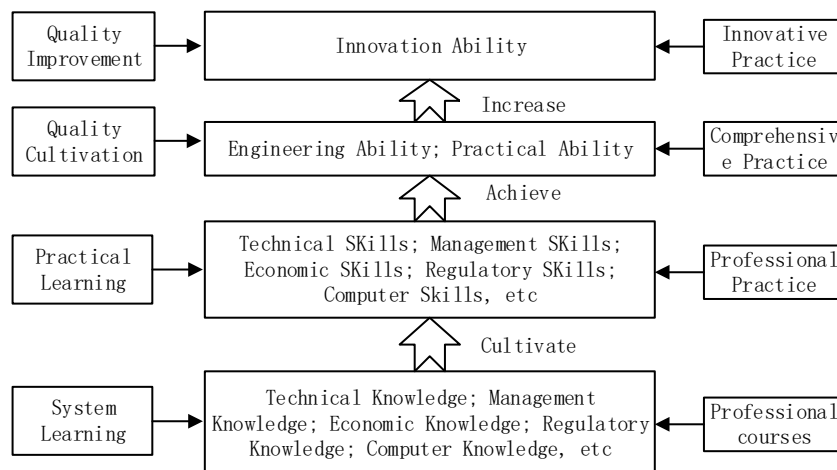


Fig 1. Engineering Management Professional Ability Training System

In the training system of engineering management professional abilities, practical teaching is an indispensable teaching link. The practical teaching process can not only consolidate students' basic knowledge, theory, and skills, but also cultivate their subjective initiative, guide them to think actively, analyze seriously, and solve problems independently, stimulate their innovative consciousness, and achieve the coordinated development of knowledge imparting, ability cultivation, and quality education. The setting of practical teaching activities is like a bridge, effectively solving the problem of students' strong theoretical knowledge and weak practical ability, integrating the two well, and improving the quality of talent cultivation.

4. Analysis of the Path to Improving the Quality of Practical Teaching in Engineering Management Major

Firstly, clarify the training objectives and characteristic positioning of engineering management professionals;

Secondly, based on the characteristic of engineering management discipline integrating technology, economics, management, and law to solve practical engineering problems, fully considering its requirements of keeping pace with the times and integrating theory with practice, the curriculum system is reorganized to make the curriculum design and objectives have clear pertinence; Once again, based on the curriculum, we will explore the reform and innovation of teaching modes, break through the constraints of teaching venues, forms, carriers, and thinking, and carry out diversified teaching such as on-site observation, imaging, seminars, and self-study; Finally, considering the strong applicability and high skill requirements of the engineering management profession, a special reform was carried out in the practical teaching process, and initial results were achieved [5]. The optimization and reform of the practical teaching system for engineering management majors in universities mainly start from the following aspects.

4.1. Analysis of Professional Training Objectives and Ability Requirements

Engineering management professionals are high-level applied talents who can engage in project whole process management, project engineering consulting, engineering supervision, and real estate operation and management in the field of engineering construction. After clarifying the training objectives, based on the talent positioning and market requirements for engineering management professionals, the abilities that graduates should possess are divided into basic abilities and core abilities. Basic abilities mainly include necessary foreign language and computer skills, good communication skills, certain organizational and management abilities, preliminary design and material selection abilities, etc.; Core competencies are mainly reflected in the ability to adapt to the specific needs of engineering management work, such as the ability to determine project costs, prepare construction organization design, bidding and tendering capabilities, project decision-making capabilities, project comprehensive management capabilities, etc. After determining specific ability requirements, analyze the formation and interrelationships of various abilities, and use them as the basis for setting up practical activities.

4.2. Establish a Multi-Level Practical Teaching System

Integrating theory with practice and improving students' ability to analyze and solve problems is an important principle in cultivating applied talents. In the process of establishing a practical teaching system, based on the need to improve students' professional practical abilities, while respecting the laws of higher education and the needs of industry talents, a multi-level practical teaching link with "course training -- course design -- course experiment -- professional internship -- graduation internship -- graduation design" as the main line is established, which is closely integrated with theoretical teaching, allowing students to gradually understand and master the theoretical knowledge learned from practical application, forming a practical teaching system from simple to complex, from single to comprehensive, and building a "Bridge" for the transformation of "knowledge -- ability -- quality".

4.3. Develop Targeted and Systematic Practical Teaching Plans

After determining the positioning of the teaching process, based on the nature, requirements, and tasks of each course, and following the principle of "experiments follow courses, practical training follows semesters, and internships follow employment", develop a practical teaching plan that conforms to teaching laws and course requirements, adapts to social needs, and is scientifically and operationally strong. When formulating practical teaching plans, one should highlight pertinence, that is, based on the nature, purpose, and position of the course in the entire curriculum system, determine specific practical forms, implementation time, and basic requirements in a targeted manner, fully reflecting the cultivation of engineering skills; The second is to highlight systematicity, that is, to consider the inherent connection

between the professional knowledge involved in the pilot courses and subsequent courses, and to set requirements for the content and depth of practical activities. The practical aspects of subsequent courses should fully consider the comprehensive application of the leading courses, and at the same time, the practical aspects carried out in the later stage should pay attention to strengthening the application and verification of the ability cultivation results of the previous practical aspects, achieving continuity and comprehensive application; The third is to highlight the engineering aspect, that is, in the selection of practical content, we should consider the needs of cultivating applied talents, combine with the relevant requirements of the professional qualification examination, and rely as much as possible on the relevant content of real engineering projects to determine, achieve the comprehensiveness and engineering of practical teaching, and ensure the effectiveness and quality of practical activities.

4.4. Promote Flexible and Diverse Practical Teaching Methods

In the selection of practical teaching methods, attention should be paid to the flexibility and diversity of teaching methods. By enhancing students' intuitive understanding through basic skill training, stimulating their learning enthusiasm and creativity through subject competitions, and improving their comprehensive skills through engineering practice and simulated on-site training.

In the process of cultivating engineering management professionals, attention should be paid to the integration of theory with practice. In the professional teaching process, practical teaching should be oriented towards specific engineering projects, generate unique engineering thinking in project practice, accumulate engineering experience in work, and form innovative awareness of engineering projects. The crucial stage in cultivating and exercising students' practical ability, independent innovation ability, and comprehensive literacy is the practical teaching process. For applied higher education institutions that aim to cultivate applied professionals with innovative spirit and practical abilities, practical teaching occupies an important position. In the practical teaching of engineering management majors, emphasis is placed on shaping students' practical abilities, quality education, and encouraging them to participate in various club and social activities, such as science and technology innovation competitions, innovation and entrepreneurship competitions, and other subject competitions, in order to acquire new knowledge from subject competitions and effectively improve professional practical abilities [4].

4.5. Optimize the Practical Teaching Platform

To effectively improve students' engineering practice ability, it is necessary to optimize the practical teaching platform in multiple aspects, as shown in Fig. 2. Specifically, the practical path of the practical teaching system should be implemented, allowing students to conduct practical training in engineering scenarios and enhance their engineering practice ability [6].

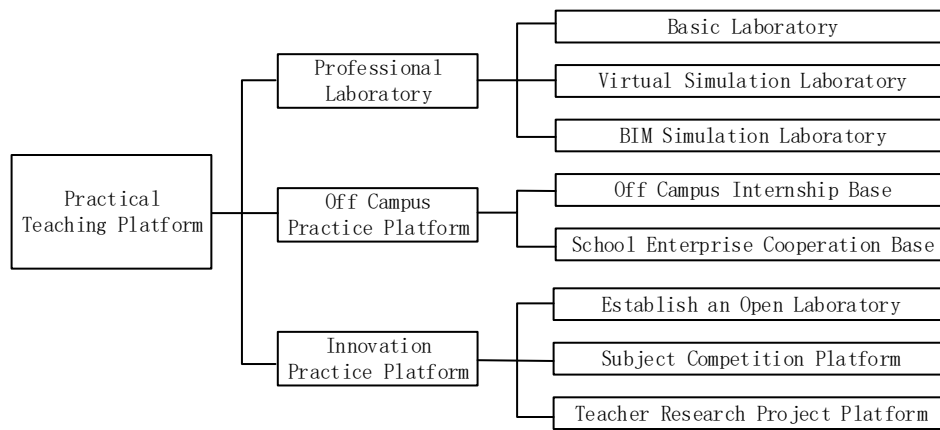


Fig 2. Construction of Practical Teaching Platform

(1) Construction of Engineering Management Laboratory

Professional experiments are one of the important paths for cultivating practical abilities in engineering management. Through professional basic experimental training, students have deepened their understanding of engineering and technical knowledge. The virtual simulation teaching center established in the engineering management major combines modern computer technology with multimedia animation, simulation and other technologies to construct interactive and immersive engineering construction simulation scenarios, improve the fun, vividness and interactivity of practical teaching, and effectively transform students' theoretical knowledge into engineering practical abilities [7]. The engineering technology integration display, bidding simulation and other management and comprehensive experimental teaching courses of the engineering management major are all conducted in the virtual simulation teaching center for practical teaching, breaking down the barriers between theoretical teaching and practical teaching, innovating teaching forms, enriching teaching methods, and stimulating students' initiative for independent learning, which is of great significance for improving students' engineering practice ability. In addition, the engineering management profession should also establish a BIM simulation laboratory. The BIM simulation laboratory combines courses such as "BIM Technology Application", "Engineering Cost", "Engineering Construction", and "Engineering Project Management" to carry out practical teaching, greatly improving students' abilities in drawing reading, engineering cost preparation, and engineering management. It helps students better understand the complex problems in the project implementation process and strengthens their practical abilities in technical and economic management of the "design construction operation stage" of the entire life cycle of building engineering.

(2) Construction of off campus practice platform

The construction of off campus practice platforms helps students combine theoretical knowledge with practical engineering, cultivating talents with solid theoretical foundations and good engineering practice abilities. The engineering management major collaborates with well-known enterprises in the industry to establish talent development goals, establish practical teaching systems, plan practical teaching paths, clarify the responsibilities of universities and enterprises in talent development, break down barriers to university education, and expand student engineering practice platforms. Expanding practical teaching paths, the school and enterprise have extensively carried out industry university research cooperation, integrated their

advantageous resources, established long-term stable cooperation bases, and integrated industry education to carry out professional internships. Both schools and enterprises shall develop a guidance manual for off campus practical activities, clarify the responsibilities of teachers from both schools and enterprises, standardize off campus practical activities, and improve the quality of professional internship teaching. According to the wishes of both students and enterprises, students will be selected to participate in social practice at the cooperative base through diverse methods such as lectures, interviews, group experiences, and on-the-job assignments, allowing students to deeply engage in practical engineering and improve their engineering practice abilities.

(3) Construction of Innovation Practice Platform

Schools should attach great importance to the comprehensive cultivation of students' innovative practical abilities, actively establish students' innovative practical platforms, use practical systems as carriers, design innovative knowledge units, encourage students to innovate their thinking and methods in practice, draw analogies and integrate them, and achieve the goal of cultivating innovative abilities. At the same time, encourage students to participate in projects such as practical innovation and scientific research training programs for college students. The research supervisor develops innovative research projects for each student and follows up on the entire process of their research practice, effectively improving their research and practical abilities. Explore the open experimental teaching mode, incorporate open experimental teaching into students' practical teaching, support scientific research, and offer multiple open experimental projects such as project management sand table making, real estate scheme planning, building structure design, BIM technology application, etc., to assist students in participating in college innovation and entrepreneurship competitions. By actively opening up experimental resources and enriching the levels of the experimental teaching system, students' scientific research and innovation awareness and ability are improved.

4.6. Building a High-Quality Practical Teaching Faculty Team

(1) Pay attention to the cultivation and introduction of "dual qualified" talents.

Firstly, support and encourage existing teachers to participate in engineering project management work or relevant training in enterprises, to be exposed to the latest technology and information, and to cooperate with enterprises to carry out scientific research, etc., to promote the

improvement and comprehensive growth of their practical abilities; Secondly, we will increase efforts to attract talents, especially those with high professional titles and education from engineering construction related units (such as design, construction, supervision, real estate development, etc.), and introduce talents through full-time, specialized, and specially hired forms.

(2) Introduce the "dual mentor" system in off campus internships.

On campus mentors are responsible for pre internship preparation, internship liaison, internship summary, and follow-up work. Off campus mentors, also known as project mentors, are responsible for providing specific guidance during the internship and communicating and providing feedback to on campus mentors. The "dual mentor" system can not only relieve the negative impact of insufficient practical experience of on campus mentors on internship effectiveness, but also accurately grasp the shortcomings of students in skills through communication between dual mentors, adjust and improve practical teaching plans in a timely manner, and promote the improvement of practical teaching effectiveness.

5. Conclusion

In the process of cultivating applied talents in engineering management, talent cultivation in universities is an important source of professional talents in the talent market. Therefore, it is necessary to correctly position, seize opportunities, take market demand as the guide, and take students' successful employment as the driving force to conduct in-depth analysis of the path to improve the quality of practical teaching in engineering management. Starting from the aspects of practical teaching system, practical teaching plan, practical teaching methods, practical teaching platform, and practical teaching faculty team, efforts should be made to cultivate students' engineering application ability, narrow the gap with engineering practice, explore and establish talent cultivation characteristics.

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