

Research on the Construction of Practical Teaching System for Engineering Management under the Background of New Engineering

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Abstract: With the continuous promotion of the requirements of the Ministry of Education for the construction of new engineering disciplines, China's engineering education has officially entered a period of rapid development, and its scale is also constantly expanding. In the new era of national economic construction and technological development, the new round of basic education reform in engineering management undoubtedly puts forward higher requirements for the cultivation of practical, innovative, and professional abilities of students majoring in engineering management in universities. Practical teaching is not only an important component of teachers' teaching work, but also a necessary path to enhance students' above-mentioned abilities. It is also an important process to promote students to apply what they have learned. Therefore, it is imperative to increase the reform efforts of practical teaching in the engineering management profession. In this regard, this article takes the new engineering discipline as the background, first analyzes the importance of practical teaching in engineering management majors in universities, introduces the new requirements for talent cultivation in this profession in the construction of new engineering disciplines, and finally elaborates on the specific construction of the practical teaching system for engineering management majors, aiming to cultivate more excellent and practical engineering management professionals for the country and society, for reference only.

Keywords: New engineering; Universities; Engineering management major; Practical teaching; System construction

With the continuous development of education in our country, the enrollment scale of major universities is getting larger and larger, but with it comes the problem of difficult employment for students. According to relevant data released by the Ministry of Education in 2022, the number of college graduates in China reached 107600 at that time, making 2022 known as the "most difficult employment season in history". In addition, due to the influence of the external environment, the operation of various enterprises has also encountered many new challenges, which greatly increases the difficulty of employment for college graduates. In this situation, the Ministry of Education of China has put forward new requirements for the construction of engineering disciplines based on "new requirements for cultivating morality and talents, new situations in international competition, and new needs for national development", which has pointed out new development directions for the teaching reform of engineering majors in major universities.

I. The Importance of Practical Teaching in Engineering Management under the Background of New Engineering

1. Practical teaching is an indispensable and important part of engineering management teaching

Under the background of new engineering disciplines, the cultivation of engineering management professionals focuses more on the organic combination of theory and practice, emphasizing the need for practical teaching to be oriented towards specific engineering projects, promoting students to form unique engineering thinking and accumulate engineering experience in actual projects, ultimately achieving the goal of cultivating students' engineering innovation awareness, practical ability, and comprehensive literacy. For universities, if they want to cultivate applied professional talents with good innovative spirit and practical ability, practical teaching is an indispensable and important component of professional teaching. Science and technology innovation competitions, subject competitions, etc. are important practical forms to enhance students' professional practical ability.

2. Practical teaching is a necessary link for universities to cultivate applied talents in the new era

Both the acquisition of professional knowledge and the development of various abilities cannot be separated from concrete practice, which to some extent indicates that the development of practical teaching is of great significance for universities to cultivate applied professional talents in the new era. In the context of the new engineering discipline, a major core goal of universities in cultivating applied professionals is to ensure "high quality". However, to achieve this goal, theoretical teaching alone is far from enough, and practical teaching is needed as a supplement. Only in this way can the modern application logic of theoretical knowledge be fully demonstrated, and the coordinated development of students' theoretical literacy and practical ability be ensured. From this, it can be seen that in the context of new engineering, practical teaching is a necessary link for universities to cultivate applied talents in the new era.

3. Practical teaching is the key to cultivating students' spirit of cooperation and innovation ability

Strengthening the cultivation of students' innovative abilities is an inherent requirement of the current stage of new engineering education. When cultivating the innovative ability and cooperative spirit of engineering management students, universities should transform the traditional classroom teaching mode of "emphasizing theory and neglecting practice", strengthen the integration of theory and practice teaching, and achieve the goal of improving students' professional abilities. A large amount of practice has proven that the comprehensive

abilities and qualities of students, such as innovation ability and cooperation spirit, can be achieved not only through theoretical learning, but also through extensive practical practice. More importantly, some of the core educational values in practical teaching cannot be fully realized through theoretical teaching alone. Therefore, from this perspective, practical teaching is also a key link in cultivating students' comprehensive abilities and qualities.

II. New demands for the cultivation of engineering management professionals in the construction of new engineering disciplines

The construction of new engineering disciplines requires the cultivation of engineering management professionals in universities to face the future development trends of the social market and the modernization needs of the construction industry, aiming to provide more outstanding engineering management professionals with high practical ability, innovation ability, and interdisciplinary background for the country and society. With the continuous development of modern technological means, the social market based on the perspective of new engineering has put forward higher new requirements for the quality of relevant practitioners. Specifically, as a key major in engineering education in China, engineering management needs to be guided by industry development and market demand to cultivate applied professional talents, and strengthen the construction of key content such as innovation education, industry university research cooperation, and platform construction based on new engineering as the foundation and core.

III. Construction of practical teaching system for engineering management major under the background of new engineering disciplines

1. Integration of practical teaching content

In the context of the new engineering discipline, universities need to re allocate the proportion of theoretical and practical teaching hours, and strengthen the organic integration of practical teaching content, in order to better improve the teaching effectiveness of practical training courses. For the engineering management major, teachers can divide it into three different levels of practical teaching content systems based on the characteristics of different courses: basic practice, professional technical practice, and social production practice. The purpose is to continuously improve students' practical abilities and professional qualities through various practical teaching forms such as engineering understanding internship, enterprise production internship, process operation practice, classic cases, and course design. Taking curriculum design as an example, firstly, teachers need to rely on actual engineering projects to plan and design different types of courses according to their characteristics, teaching objectives, etc., and reasonably integrate them into practical teaching implementation plans to avoid repeated teaching of the same knowledge point. Afterwards, students can be organized to conduct laboratory simulation training based on their existing experience, allowing them to fully understand the knowledge points and internal connections of each course through practical engineering projects, thereby gradually forming a relatively systematic knowledge framework structure system. For example, in the teaching of basic practical courses, teachers can integrate the practical training knowledge points of courses such as surveying, descriptive geometry, and architectural CAD through a specific engineering example, so that students can complete closed-loop engineering project practical training by measuring maps, hand drawn drawings, CAD drawings, and other methods on campus.

2. Optimization of practical teaching process

Overall, the practical teaching process of engineering management majors in universities can be mainly divided into three major stages: basic practice, professional practice, and social practice. The optimization of each link can be achieved through the following methods:

The first step is the basic practical stage, which should mainly focus on understanding internships, process operation practices, measurement practice courses, and housing architecture course design, in order to strengthen the cultivation of students' engineering basic practical abilities and lay a solid foundation for their participation in interdisciplinary and integrated engineering practices. Teachers can introduce BIM technology into the original practical teaching process, and transform the original two-dimensional classroom practical teaching into three-dimensional practical teaching through virtual engineering simulation.

Secondly, there is the professional practice stage, which is usually presented in the form of course design after the completion of professional theoretical courses. The main purpose is to enable students to design practical project cases based on the theoretical content they have learned, in order to enhance their independent innovation ability. In addition, there are also some student participation in guiding teacher research activities, subject competitions, etc., which are also important components of professional practice. In specific practice, teachers can allow students to collect relevant literature and materials in groups, understand the relevant guidelines or standards of their majors, and combine their own knowledge and experience to solve complex real-world engineering problems, thereby achieving the goal of improving students' professional literacy.

Finally, there is the social practice stage, which is generally carried out in the form of on-the-job internships, aiming to "practice the integration of industry and education, and deepen school enterprise cooperation." For the optimization of this stage, on the one hand, both schools and enterprises should use relevant mobile software to strengthen the supervision of student internships, timely upload student internship weekly and monthly reports, etc., to ensure that both schools and enterprises can timely understand and grasp the practical situation of students, and adjust practical education plans accordingly. On the other hand, both schools and enterprises should regularly assign guidance teachers to each other to visit and investigate students' practical situations, understand the current talent cultivation needs of the social market, and then adjust the direction of talent cultivation based on this.

3. Improvement of practical teaching methods

The improvement and optimization of practical teaching methods is an important link in the construction of the practical teaching system for engineering management majors. If we want to effectively improve the quality of teaching from the source, we must pay attention to it.

For example, teachers can be guided by engineering projects and use task driven methods to organize students for integrated learning of industry, academia, and research. The practical stages mainly include: conceptual stage (teachers focus on planning, students conceptualize, independently study, understand and familiarize themselves with the project task book) - design stage (teachers focus on guiding, students develop project plans) - implementation stage (teachers focus on guiding the implementation of projects, students complete project tasks in groups) - operation stage (teachers focus on assessment, students complete reports and summaries in the form of demonstrations, defenses, etc.). In this process, in order to give students more time for classroom practice, teachers can introduce a flipped classroom teaching mode, allowing students to understand project tasks before class and use a shorter period of time in class to solve problems in their pre class learning, further promoting the integration of teaching, learning, and evaluation.

4. The construction of the teaching staff for practical teaching

At present, there are generally problems in the construction of the teaching staff for engineering management majors in universities, such as emphasizing academic qualifications and neglecting practical experience. Especially for many highly educated young teachers, many of them directly enter the campus for teaching after graduation, and their practical and teaching experience is relatively limited. Therefore, in the context of the new engineering discipline, if we want to further ensure the quality of practical teaching in engineering management majors in universities, the key is to build a team of teachers with strong engineering practical abilities. We need to attach importance to both internal training and external introduction. For example, universities can encourage teachers to work in enterprises or exchange experiences with outstanding engineers through cooperation between schools and enterprises, integration of industry and education, etc., to further enrich their engineering practice experience and create a "dual teacher" teaching team.

5. Reform of Practical Teaching Evaluation

The reform of practical teaching assessment and evaluation needs to be as comprehensive and humane as possible on the basis of ensuring fairness and impartiality. For practical teaching of engineering management majors in universities, in addition to routine assessments of student training performance and results, teachers can also appropriately incorporate assessments of student knowledge, abilities, and qualities to comprehensively evaluate the overall learning effectiveness of students. For example, mastering and applying professional knowledge can be achieved through graduation assessment. For the assessment of abilities, emphasis is placed on process assessment, which can be achieved by scoring students' learning ability, logical thinking ability, expression ability, communication ability, organizational and coordination ability, etc. Among them, the first three abilities are evaluated and scored by students in defense and demonstration, and by teachers. The last two abilities are evaluated and scored by group members. For the evaluation of quality, emphasis is placed on result assessment, which can be achieved by scoring students for teamwork spirit, experimental attitude, innovative spirit, etc. Among them, the spirit of teamwork can be evaluated and scored by group members; The experimental attitude and innovative spirit are evaluated and scored by individual students. In addition, in social practice activities, due to the involvement of enterprises as the main body, the assessment of social practice can also introduce relevant opinions and feedback from the enterprise side to ensure the comprehensiveness and objectivity of practical teaching evaluation.

IV. Conclusion

In short, under the background of new engineering disciplines, if engineering management majors in universities want to achieve the goal of cultivating applied talents, in addition to strengthening theoretical teaching reform, they also need to pay attention to the construction and optimization of practical teaching systems. Specifically, we can promote the development of students' abilities in various aspects from the aspects of practical teaching content, practical teaching processes, practical teaching methods, practical teaching faculty, and practical teaching evaluation, making them outstanding engineering management professionals with disciplinary integration advantages and practical innovation abilities.

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