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Research and Practice on the Teaching Management Mechanism for the National First-Class Chemical Engineering Specialty Construction in Local Higher Engineering Colleges - Taking Changchun University of Technology as an Example

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Abstract: Under the background of the new era, colleges and universities usher in new changes. As an important part of China's education system, the local engineering colleges and universities shoulder the important mission of cultivating high-quality and high-quality engineering talents for the country and society, which is an important cornerstone of providing science and technology, architecture, information and mechanical support for the social and economic development. With the proposed educational concept of "three-in-one education," the construction of state-level first-class chemical engineering majors in local engineering colleges has ushered in new opportunities and challenges. Colleges and universities not only need to focus on building a team of teachers with strong professional ability and high quality, but also should be committed to building a comprehensive system of engineering personnel training. Based on this, this paper will mainly analyze the significance of the construction of national first-class chemical major in local engineering colleges and universities, explore its specific teaching and management paths, in order to provide innovative suggestions for the construction of chemical major.

Keywords: Engineering colleges; Chemical engineering major; First-class professional construction; Teaching management

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1. Introduction

Notice on the Implementation of the "Double Thousand Plan" for the Construction of First-class Undergraduate Majors emphasizes the importance of the construction of first-class majors in colleges and universities, and

puts forward the "Double Thousand" plan for the construction of first-class undergraduate majors, and selects and designs the educational objectives and training plans of key disciplines [1]. The plan regards "classified development and characteristic development" as the main content of the discipline development of colleges and universities. On this basis, local engineering colleges should, according to the provisions of the document, give full play to the advantages of local colleges in the process of building first-class disciplines, and always promote and innovate the talent training mode of integrating industry, university and research according to their characteristics and advantages, to realize the goal of building first-class majors at the national level [2,3]. Under the support of the educational concept of "three-in-one education," local engineering colleges should promote the reform process of chemical professional education, devote themselves to cultivating applied and composite talents, and run innovation and entrepreneurship education through the whole process of professional construction. In 2022, the Chemical Engineering and Technology major of Changchun University of Technology will be selected as a state-level first-class major. This paper will take the construction of a state-level first-class professional teaching management mechanism for Chemical Engineering and Technology major at Changchun University of Technology as an example to explore the implementation path of teaching management reform and upgrading of first-class major construction in local universities.

2. The practical significance of the construction of a national first-class chemical engineering major in higher engineering colleges

2.1. It is conducive to the implementation of the fundamental goal of moral education

Chemical engineering and technology, as a traditional engineering major (hereinafter referred to as chemical engineering major), is an important major to cultivate students' chemical literacy and skills. Under the background of industrial change, the field of science and technology has made a qualitative leap, and new technologies continue to emerge, which makes the intersection and integration of majors become a new educational trend, and brings a new development direction for the construction of chemical engineering majors in colleges and universities [4]. With the continuous advancement of the educational concept of "three comprehensive education" and "five simultaneous education," chemical majors in colleges and universities in China should innovate the education and teaching mechanism, take student development as the center of the basic teaching principle, improve the education quality assurance system, organically integrate the ideological and political education concept with the curriculum system, and implement the fundamental task of cultivating morality and educating people to further cultivate high-quality socialist successors.

2.2. It is conducive to improving the quality of personnel training

Talent training is an important support for higher education development and social influence, a key task of higher education and teaching, and the fundamental purpose of higher education. Professional construction is the basic link for colleges and universities to implement the plan of personnel training and plays a vital role in personnel training. In the teaching system of colleges and universities, specialty construction has systematic characteristics, involving teaching management, experimental courses and personnel training, etc. The level of specialty construction has a close relationship with the quality of personnel training [5]. In this regard, the construction of first-class majors in local engineering colleges should give full play to its advantages in running schools, implement a series of innovative measures, and promote related majors to optimize their positioning in running schools according to the development law of higher education and the needs of talent training, give

full play to professional characteristics, and further deepen teaching reform to meet the needs of the society for high-quality talents. Through the construction of first-class majors, local engineering colleges can optimize the teaching system to the greatest extent, constantly improve the level of professional construction, and realize the overall improvement of talent training quality [6,7].

2.3. It is conducive to improving the core competitiveness

With the deepening of education reform, the construction of first-class majors has provided new opportunities for the development of local engineering colleges. Chemical engineering major is an important part of the professional system of colleges and universities, and an important carrier to reflect the orientation of colleges and universities. Under the guidance of the "Double Million Plan," colleges and universities promote the construction of first-class chemical majors, which is conducive to improving the level of talent training and obtaining higher social recognition and social influence [8]. Compared with other majors, the construction of a first-class major in the chemical industry has certain advantages and characteristics in many aspects, such as personnel training programs, curriculum system, teaching team building, training quality, and so on. In the construction of first-class majors, colleges and universities can carry out a series of scientific and rigorous education and teaching activities to guide students to get an all-round development in knowledge, skills, and quality to improve the core competitiveness of students.

3. The teaching management mechanism research strategy for the construction of a national first-class chemical major

3.1. In-depth analysis of talent needs, innovative talent training model

First of all, under the construction system of first-class majors in the chemical industry, colleges and universities need to establish scientific talent training objectives and evaluation methods, and actively carry out various forms of talent training modes in combination with the needs of social needs, student career development needs and talent training quality to provide strong support for the formulation of talent training objectives.

Secondly, chemical majors in colleges and universities need to recognize the focus of first-class professional construction, build an industry-university-research integrated talent training model with "students as the main body, industry as the support, technology as the link, and practice as the help," and use teaching resources and practice platforms inside and outside the school to cultivate compound innovative talents.

Finally, through the implementation of diversified practical teaching modes, such as the integration of science and practice, the integration of science and education, the integration of industry and education and other forms, the establishment of on-campus experimental and practical training courses that are unified with social needs and talent training goals, the integration of theory and practice courses, and the guidance and encouragement of students to actively participate in scientific research projects and professional competitions. Including chemical engineering design competitions, chemical engineering practice competitions and other professional competitions, to promote the smooth implementation of the integration of science and education, the integration of lessons and competitions, and the integration of industry and education. At the same time, colleges and universities can also introduce chemical enterprise resources, build simulation factories, chemical practical training equipment, and other platforms, so that students can deeply understand the specific experiment process of chemical majors and improve professional recognition [9].

3.2. Build a high-level teaching staff and implement professional construction

On the one hand, teachers are an important support for the development of education in colleges and universities and an important subject to carry out first-class professional construction of the chemical industry. In this regard, colleges and universities should establish a sound professional ability training mechanism based on teachers' professional ability and teaching needs [10,11]. To be specific, colleges and universities can introduce excellent technical personnel from engineering enterprises and scientific research institutions for guidance and exchange, and encourage teachers to practice in relevant enterprises, cultivate teachers' professional ability and practical abilities and encourage them to better implement professional construction. At the same time, colleges and universities can also hold some project competitions associated with enterprise projects, encourage teachers to actively participate in engineering competitions, improve the overall development of professional teachers, and lay a solid foundation for future personnel training. On the other hand, colleges and universities should be more accurate and optimize the talent training system, select teachers with strong professional ability and rich teaching experience to study in other similar colleges and universities and invite nationally famous teachers to conduct scientific training, guide the teachers team to actively study teaching and research projects, and promote them to better improve their professional ability and comprehensive quality. In addition, colleges and universities can take pre-job training as the basis of post-teaching, establish a teacher guidance system, and let teachers with old-fashioned experience help and guide young teachers, so that teachers on campus can give full play to their professional characteristics and advantages, and design and carry out teaching ability improvement paths for teachers of different ages.

3.3. Build a curriculum system with talent training as the basic orientation

First, chemical engineering majors in colleges and universities need to take talent training as the basic orientation, build a platform-based and modular course system for chemical engineering, and design a platform module course teaching model in accordance with the basic principles of balance and systematicness of chemical engineering [12]. At the same time, colleges and universities also need to combine basic courses, such as chemical engineering principles, chemical reaction engineering, professional comprehensive experiments, professional comprehensive practical training and other engineering courses, to strengthen students' professional knowledge foundation. In addition, colleges and universities also need to improve the curriculum syllabus, integrate the main teaching content of each course in the professional system, and find out the key and difficult points in teaching according to the needs of talent training to realize the common coordination of knowledge, and provide important opportunities for the development of practical courses and practical training mode. The implementation of the training goal in each specific link of the professional construction is conducive to the realization of effective cooperation and integration among all courses in the curriculum system.

Second, colleges and universities should focus on the curriculum system and training objectives of chemical engineering, design professional curriculum groups, and take the specific project of chemical engineering and technology as the guide, integrate modern chemical engineering design software into the teaching content, to help students enhance practical experience and improve the ability of practical operation in the actual project. At the same time, colleges and universities need to guide teachers to update their teaching concepts and teaching methods. On the premise of ensuring students' basic knowledge, they should lead them to actively participate in various competitions and promote teaching and learning through the teaching mode of competition. The mastery of students' professional knowledge will be deeply linked with the results of the

competition, to assess their specific learning situation, realize the deep combination of theory and practice, build students' chemical knowledge foundation, and improve students' engineering practice ability.

3.4. Strengthen teaching reform and train first-class engineering talents

The construction of first-class majors is the main way to cultivate high-quality talents, and students are the key subjects of teaching management in colleges and universities. Specifically, colleges and universities need to realize the role and practical value of students' subjectivity and strengthen the cultivation of students' chemical discipline literacy. The level of first-class specialty construction affects the quality of talent cultivation. Based on this, under the background of teaching reform, students not only need to deeply master the basic knowledge, theory and method of chemistry, but also need to clarify the practice process of chemical professional knowledge and the entire theoretical knowledge network system of chemical industry, clarify the knowledge structure of chemical industry, understand the demand and trend of chemical industry development, and promote themselves to be both professional and academic.

At present, most professional courses in chemical engineering are still teacher-centered. In this process, teachers pay more attention to the explanation of theoretical knowledge points of the subject and pay less attention to students' discipline accomplishments. The formation of students' discipline accomplishment is closely related to teaching management, and the establishment of a teaching management mechanism is the foundation of first-class major construction [13,14]. Therefore, colleges and universities can combine social needs and teachers' professional ability, establish a sound teaching management mechanism, and optimize and improve teaching objectives, teaching content, teaching methods, teaching evaluation and other aspects.

Promoting the diversification of educational concepts and teaching methods is the focus of China's higher education teaching reform. In the process of constructing the modern education management mechanism, colleges and universities should give full play to the professional advantages of teachers and the educational resources advantages of Changchun University Chemical Teachers Training Center, and train the science education ideas and methods of "student-centered and output-oriented" for teachers in engineering colleges and universities. At the same time, colleges and universities must also establish chemical practice teaching methods based on chemical disciplines, train teachers' chemical professional quality, professional technical skills, and educational practical ability, so that they can become the main driving force for professional construction, so as to further promote the process of first-class professional construction.

4. Conclusion

To sum up, under the background of quality education, China's higher education has entered a stage of high-quality development, and the cultivation of high-quality talents has become the current key task of colleges and universities. Professional construction is the necessary way to cultivate talents. Therefore, colleges and universities should establish a sound teaching management mechanism, and promote the construction of national first-class chemical engineering majors in local engineering colleges and universities through innovative personnel training mode, training high-level teachers, building curriculum system, strengthening teaching reform and other ways to export high-quality engineering talents to the society.

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