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Current Situation and Thinking of Engineering Practice Ability of Students Majoring in Pharmaceutical Engineering in Local Normal Universities: Take Yancheng Teachers University as an Example

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Abstract

Due to the lack of teachers' engineering practice ability, limited school conditions, and insufficient practical teaching quality assurance, the students' engineering practice ability is difficult to meet the current demand of pharmaceutical engineering professionals. In the point of local government-university-enterprise cooperation and industry-education-research integration, some measures to improve teachers' engineering practice ability, diversification of school running subject to improve educational conditions, and deepening reform at multiple levels to guarantee practice teaching quality were put forward. It is hoped to provide some reference and guidance for the talent training of pharmaceutical engineering in local normal universities.

Keywords: pharmaceutical engineering, local normal university, engineering practice ability, excellent engineer

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1. Introduction

With the new round of scientific and technological revolution and industrial revolution, the development of new quality productive forces has become the key to win the initiative of international competition strategy. To promote the development of new quality productive forces, we must thoroughly implement the strategy of strengthening the talents in the new era and provide solid strategic support for the development of new quality productive forces with the new quality of talents。

Since the 21st century, China's pharmaceutical industry has developed rapidly and become a major country of pharmaceutical industry in the world. The pharmaceutical industry is playing an increasingly important role in ensuring people's health and promoting the sustainable development of society, and has become a pillar industry and strategic emerging industry to promote the development of national economy. Pharmaceutical engineering is responsible for cultivating and conveying high-quality professionals for the pharmaceutical industry.

Pharmaceutical engineering professional requires to master the basic theory and knowledge of chemistry, pharmacy, pharmaceutical engineering, and chemical process; possess good innovation consciousness, entrepreneurial spirit and professional ethics; and have the ability to analyze and solve the problem of complex engineering and innovative entrepreneurial ability. So pharmaceutical engineering trains senior engineering and technical personnel who can be engaged in scientific research, technology development, process and engineering design, production organization, management and service in pharmaceutical and related field to meet the changing development needs of the pharmaceutical industry.

In local normal universities, the history of liberal arts and science is longer, and they have more extensive experience and strong comprehensive strength. For example, all 14 normal majors of Yancheng Teachers University have passed the Ministry of Education certification (Level 2); while engineering has a short educational time, weak foundation and relatively traditional educational philosophy, and the development of engineering majors is obviously inferior, especially the pharmaceutical engineering with high requirements for engineering practice ability. According to the needs of local industrial development and combined with the disciplinary foundation of the university, Yancheng Teachers University set up the School of Pharmacy and the pharmaceutical engineering in 2012, and began to recruit students in the autumn semester of 2013. During the construction and development period of 10 years, we constantly tried to reform the training program and curriculum system, but due to the lack of teachers' engineering practice ability, limited school conditions, and the

lack of practical teaching quality assurance, students' engineering practice ability is difficult to meet the needs of the current industry for pharmaceutical engineering professional and technical personnel.

2. Current Situation of Undergraduate Talent Training for Pharmaceutical Engineering Major in Local Normal Universities

2.1 Lack of Engineering Practice Ability of Teachers

Teachers' engineering practice ability directly determines their teaching concept, teaching method, teaching level and teaching effect, and is an important factor affecting the engineering practice ability of students. Chinese college and universities have higher requirements for teachers' academic qualifications, and they are basically doctoral of graduates or outbound postdocs. But the vast majority of teachers work in the laboratory for a long time, mainly engaged in basic research, and they almost have no experience of engineering practice, so that their engineering concept is not strong, engineering consciousness is weak, and engineering ability is obviously insufficient. In teaching, theoretical knowledge can not be combined with practical production, students' engineering practice ability can not be well cultivated through engineering cases, and it is difficult for teachers to be competent for the guidance of engineering practice teaching and competition, such as course design, graduate design and professional competition

2.2 Limited School-Running Conditions

Generally speaking, the construction scale of engineering majors is not large, the space is tight, and the instruments and equipment are insufficient in local normal universities. In the face of the increasing number of students, the existing teaching resources and funding input cannot fully meet the training requirements of new quality productivity for senior applied talents of pharmaceutical engineering major "excellent engineer education". In addition, the engineering construction of local normal colleges is relatively late, the brand benefits of professional construction are not sufficient, the economic benefits brought to local development are not as obvious as that of engineering colleges, and the recognition and support of local governments and related enterprises are not enough.

2.3 Insufficient Practical Teaching Quality Assurance

The curriculum system, the carrier to achieve the training objectives, stipulates the planning scheme of the training objectives and is the key to ensure and improve the quality of education. Colleges and universities have been reforming and optimizing the curriculum system of pharmaceutical engineering, fully reflecting the characteristics of "new engineering", such as adopting the "3 + 1" training mode, increasing the proportion of design and practical courses, and increasing the market-oriented, optimizing the professional curriculum system, rationally constructing engineering modules, cultivating application innovation ability, setting characteristic practical courses and strengthening skill training. However, the connection of basic specialized courses needs to be further scientific and rigorous; the consultation from enterprises is not enough, the "industry" characteristics of the curriculum system are not distinct, and the engineering modules are classic but do not reflect the current characteristics and future trends of the pharmaceutical industry. In addition, as for the practical teaching on campus, insufficient engineering practice ability of teachers, insufficient experimental practice place, and less and obsolete equipment influence the teaching quality; outside school, due to the production safety and technical confidentiality, almost no large and high-tech pharmaceutical enterprises are not willing to accept student internship and practice, so that students can only practice in some small enterprises with single practice projects, and the advanced, multi-layered and comprehensiveness of the practice content is obviously insufficient. All these have had a bad impact on the quality of practical teaching and the cultivation of students' engineering practice ability.

3. The Key Way to Improve the Engineering Practice Ability

University-enterprise cooperation and industry-education integration are the only way to promote the reform and development of "new engineering" talent education. It is a powerful measure to cultivate applied talents with engineering practice ability, and an important measure to promote the new quality of talents to promote new quality productive forces and promote social and economic development. By this way, the skill level of teachers can be improved, the school conditions and the quality of skilled personnel training can be improved, and the quality of education, educational efficiency and engineering practice ability of students can be improved.

3.1 Take multiple measures simultaneously to improve teachers' engineering practice ability

As a local normal university, it firstly needs to optimize the evaluation mechanism, such as increasing the proportion of engineering practice ability in professional title evaluation, performance appraisal, and award for excellence to foster stress and motivation for teachers to continuously improve their engineering practice ability; secondly, to formulate appropriate incentive policies that will encourage teachers to participate in relevant training of pharmaceutical engineering to be familiar with the development status and trend of the industry; encourage teachers to take temporary positions in enterprises, deepen school-enterprise cooperation and industry-education integration, and continuously improve the practice ability through industry-university-research cooperation. The most important point is to boldly try the flexible talent introduction policy that is to break the only education and introduce high-quality professional teachers full-time or part-time from the enterprise production management and research and development line. This part of the teachers know enterprise development trend, production process, employment standards, talent demand, etc. They present obvious advantages in school-enterprise cooperation and project development. They are both engineer and lecturer, the real "double type" teachers, not only can effectively improve the cultivation of students' engineering practice ability, also help the school teachers engineering practice ability.

3.2 Make diversification of school-running subjects to comprehensively improve school-running conditions

3.2.1 Optimal allocation of campus resources

For local normal colleges and universities, some chemistry-related majors always have been opened before pharmaceutical engineering, and the development of the former is relatively mature in many aspects, especially the experimental conditions, such as chemical engineering virtual simulation laboratory, chemical principle laboratory, and some large instruments so on. Under the condition of insufficient space and tight funds, the school can enable the students majoring in pharmaceutical engineering to fully enjoy the existing resources of the school through the strategy of overall management and resource sharing, which not only realizes the maximum benefit of resource utilization, but also contributes to the improvement of experimental teaching conditions.

3.2.2 University-enterprise cooperation and the integration of industry and education

University-enterprise cooperation and the integration of industry and education are the key to improve the conditions of practice. First, through production practice cooperation mode between colleges and enterprises, we can make full use of industry high quality resources and establish stable external practice bases, which makes up for the shortage of campus training equipment, strengthens the practice link teaching, realizes "zero distance" cohesion between the teaching content and industry demand, and creates good conditions for the cultivation of students' engineering practice ability. Second, by the rational allocation and optimization combination of space, capital, technology, equipment, personnel and so on various aspects, school and enterprises cooperate to establish training centers or training bases on the basis of complementary advantages, mutual benefit and win-win cooperation mechanism. On the one hand, the centers or bases can provide professional training conditions for school teachers and students; on the one hand they can be used for enterprise technical personnel training. In addition, schools can recruit students according to the employment needs of enterprises. In the training process, the enterprise specially provides students with internship sites and conditions, which highly meets the employment requirements.

3.2.3 An important bridge between universities and enterprises-government support

Government support is an important bridge to deepen university-enterprise cooperation and the integration of industry and education that is a long-term and complex systematic project and requires the joint efforts of local governments, universities and enterprises, especially the support of local governments. Government is the leader in the development of new quality productivity, and needs to create a good policy environment and play a good bridge between universities and enterprises, such as increasing the intensity of policies (tax cuts) and financial support, which will stimulate the enthusiasm of enterprises to participate in the cooperation and integration, provide students with practice, training places and positions, and finally give full play to the important role of carrier of new quality productivity. Colleges and universities should closely follow the market, actively connect with the enterprises, change the educational concept, innovate the talent training model, and serve as the mission of cultivating talents for the Party and the country. Only in this way can we promote the good situation of "government promotion, university initiative and enterprise interaction", and the deep integration of industry, education and research, so as to improve the quality of talent training for students majoring in pharmaceutical engineering, empower new quality productivity, and promote social and economic development.

3.2.4 Effective supplement of other universities

Some experimental and training projects involving large instruments and equipment, such as GMP training, can not be solved by local normal universities or one certain enterprise due to a large amount of training, the open GMP training center of China Pharmaceutical University can be used to ensure the training of students and fully make up for the shortage of teaching resources in the university.

3.3 Deepen the reform at multiple levels to ensure the quality of practical teaching

In the training process of senior applied talents in pharmaceutical engineering, the colleges and universities should establish a talent training process oriented by solving practical problems in production activities and improving the engineering practice ability, so as to realize the connection between course content and professional standards. Professional construction is the deep mode of school-enterprise cooperation, so under the support of local government, colleges and universities should depend on the actual needs of enterprise production and market demand, actively invite enterprises to participate in school professional construction and discuss the training scheme, curriculum system, teaching content, etc, especially the specific content and way of practice, so as to more closely combine enterprise market demand and school high-skilled personnel training. At present, Yancheng Teachers University has established good cooperative relations with four pharmaceutical enterprises, namely Tongyi Pharmaceutical (Suzhou) Co., LTD., Jiangsu Kangtai Biomedical Co., LTD., Changzhou Four Pharmaceutical Co., LTD., and Wuxi Yew Pharmaceutical Co., LTD. The enterprises are responsible for providing professional teaching equipment. On the basis of the short-term teaching and training materials, the two parties shall jointly prepare the professional teaching plan outline, professional curriculum standards and teaching materials, jointly train teachers, and jointly educate students to fully ensure the quality of practical teaching.

3.3.1 Reshaping the talent training system

In the process, colleges and universities should strengthen cultivating virtue and nurturing talents, actively integrate into the local industry layout, follow the order of "engineering cognition, engineering foundation, engineering comprehensive, engineering innovation" as the main line of progressive four levels practice training ideas, and build the new engineering “excellent engineer” personnel training system of "five in one" of ideological and political education leading, model reform, scientific research feedback, industry-education integration and double-creation promotion.

3.3.2 Rebuilding of the curriculum system

Colleges and universities should first take the pharmaceutical engineering "excellent engineer" as the main line; then expand and refine the three aspects of "knowledge, ability, quality", scientifically construct the knowledge system, focusing on the cultivation of students' comprehensive accomplishment and engineering practice ability for production, design and management; next, according to the professional orientation and objectives, connect with the professional positions and tasks, through deep integration of universities and enterprises, closely follow the industrial development, reconstruct the curriculum system of “content projectization, knowledge modularization, ability progressive type, and quality professionalization”; and finally establish the collaborative education system of “classroom teaching, experimental training and engineering practice”.

3.3.3 Refining the innovation and entrepreneurship education system

With "four-wheel drive, four-innovation integration and four-chain integration" as the core, a new education system of pharmaceutical engineering professional innovation and entrepreneurship will be built, and courses and credits of scientific research training and practice, innovation and entrepreneurship will be added to the talent training program. Here, the four-wheel drive refers to mechanism leverage, teacher drive, curriculum linkage and platform promotion; four-innovation integration refers to creativity, innovation, creation and entrepreneurship; and the four-link integration refers to knowledge construction, innovation experiment, engineering practice and graduation design. Meanwhile, based on the existing platform, university-enterprise cooperation and industry-education integration, it is necessary to increase new high-quality university-enterprise construction platform and practice base to fully guarantee the students' experimental teaching, professional internship, production practice and field practice, constantly improve students' professional ability and engineering practice ability. Besides, colleges and universities should give full play to the carrier function of "Internet +", "Challenge Cup" and "Create the Youth", and establish the working idea of “incubating project by preparing for the competition, testing the results of the project by participating in the competition, and realizing the transformation of the results by summarizing the competition”.

4. Conclusion

The shortage of the cultivation of engineering practice ability of students majoring in pharmaceutical engineering of local normal universities is analyzed, and it was put forward that with the support of local governments, the cooperation of university and enterprise, the deep integration of industry, education and research is the key to solve current problem. By this way, we can take multiple measures to improve teachers' engineering practice ability, make diversification of school-running subjects to comprehensively improve school-running conditions, and deepen the reform at multiple levels to ensure the quality of practical teaching, including reshaping the talent training system, rebuilding of the curriculum system, and refining the innovation and entrepreneurship education system. It is hoped to be helpful to the training of engineering practice ability of pharmaceutical engineering of local normal universities.

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