Journal of Education and Culture Studies
ISSN 2573-0401 (Print) ISSN 2573-041X (Online)
Vol. 9, No. 4, 2025
www.scholink.org/ojs/index.php/jecs

Original Paper

Exploration of Pharmaceutical Talent Cultivation Model Based on Industry-Education Integration

Tianjiao Zhang

Zibo Polytechnic University, Zibo City, Shandong Province, 255300, China

Received: October 13, 2025 Accepted: November 16, 2025 Online Published: December 31, 2025

doi:10.22158/jecs.v9n4p100 URL: http://dx.doi.org/10.22158/jecs.v9n4p100

Abstract

The development of cutting-edge technologies such as artificial intelligence and biopharmaceuticals has brought numerous opportunities and challenges to the pharmaceutical industry, and has also raised higher requirements for talents in this industry. Talents are expected to possess comprehensive and solid theoretical knowledge, as well as good professional ethics and practical abilities, to meet the development needs of the industry. This article takes industry-education integration as the starting point, analyzes the necessity of exploring the pharmaceutical talent cultivation model under industry-education integration, and proposes an effective pharmaceutical talent cultivation model based on reality, aiming to improve the quality of pharmaceutical professional talent cultivation and promote the high-quality development of pharmaceutical talents.

Keywords

Industry-education integration, Pharmaceutical talents, Training strategies

Introduction

Under the new economic situation, for the pharmaceutical industry to achieve high-quality development, it is imperative to employ comprehensive talents with interdisciplinary knowledge and skills. However, current medical talent cultivation in universities still primarily focuses on theoretical teaching, with a relatively low proportion and low quality of practical teaching. This results in medical talents lacking in professional ability learning, mastering only theoretical knowledge, and having limited practical skills, making it difficult to meet the development needs of the pharmaceutical industry. In response, universities should establish a deep and systematic industry-education integration teaching system, optimize training objectives and curriculum systems with the help of enterprises, organize diversified and targeted practical activities, effectively cultivate students' professional qualities, achieve a two-way alignment between "education supply" and "industry demand", and provide high-quality, composite

talents for the pharmaceutical industry to facilitate its sound development.

1. The Necessity of Exploring a Pharmaceutical Talent Cultivation Model Based on Industry-education Integration

(1) Respond to the development needs of higher education

Currently, modern technology is rapidly developing globally. To ensure that China's technology does not lag behind the global level, we must prioritize talent cultivation. Therefore, the Party and the state have set fundamental requirements for higher education, emphasizing the need to cultivate highly skilled talents who are capable of operation, possess high technical proficiency, and are innovative. The pharmaceutical industry is closely related to people's health, economic development, and social progress, which requires that pharmaceutical talent cultivation align with national development strategic goals and core social development needs. In this context, the deep integration of education and industry, as well as collaborative talent cultivation among multiple parties, has become the primary mode for pharmaceutical talent cultivation. Through school-enterprise cooperation, various practical activities are carried out to effectively cultivate students' practical skills, innovation ability, and professional qualities. Therefore, universities must actively respond to national development strategies, establish the teaching concept of industry-education integration, continuously deepen the reform of talent cultivation models, organize targeted, personalized, and effective teaching and practical activities, achieve the organic combination of theoretical and practical teaching, effectively improve the quality of talent cultivation, provide talent support for the development of the pharmaceutical industry, and meet the needs of higher education development.

(2) Addressing the development needs of the pharmaceutical industry

In recent years, the emergence and application of various scientific technologies have led to rapid development in global industries, with an endless stream of new drugs emerging to safeguard public health. At the same time, this has also brought more challenges to the pharmaceutical profession, with increasingly stringent drug quality control standards, higher-quality drug research and development goals and types, and even significant improvements in the level of pharmaceutical services. All of these require pharmaceutical talents to possess stronger professional abilities, higher innovation capabilities, and critical thinking. In this context, the pharmaceutical talent training model must be optimized according to enterprise needs, adjusting training objectives, improving the curriculum system, and strengthening practical teaching to cultivate pharmaceutical talents who understand medicine, are proficient in pharmaceuticals, and are capable of innovation. The application of the industry-education integration training model can meet the needs of pharmaceutical talent training, strengthen students' innovative consciousness and practical abilities, narrow the "gap" between industry and education, and promote high-quality development in the pharmaceutical industry. Under the industry-education integration model, universities should actively cooperate with local enterprises or pharmaceutical institutions to assist in their own talent training efforts and provide students with valuable work practice opportunities to

participate in drug research and development, testing, and other tasks. This allows students to understand the talent needs, development status, and technological applications in the pharmaceutical industry through practical work, providing strong support for the transformation of students' theoretical knowledge, cultivating more innovative talents, and effectively responding to the development needs of the pharmaceutical industry.

(3) The need to transform traditional training models

China has a large enrollment scale in medical and pharmaceutical majors, focusing on the cultivation of compound talents. The fundamental goal is to deliver medical and pharmaceutical professionals who are "knowledgeable and proficient in medicine, skilled in research and achievement" to society. However, the traditional teaching model for medical and pharmaceutical talents has certain limitations, with outdated teaching concepts, fixed curriculum settings, and limited emphasis on practical teaching and innovation ability cultivation. It fails to cultivate compound talents who possess solid theoretical knowledge, practical ability, and innovation ability. In recent years, the state has attached great importance to the cultivation of medical and pharmaceutical talents, proposing a series of policies and regulations. Universities are required to actively implement the "Healthy China" national strategy, deeply innovate traditional talent cultivation models, and improve the quality of talent cultivation. Although universities have achieved certain results in reforming their talent cultivation models, there are still shortcomings, such as the lack of effective implementation plans for medical and pharmaceutical talent cultivation, and the proportion of practical teaching is still lower than that of theoretical teaching. Therefore, universities must attach importance to the application of the concept of industry-education integration, further promote the optimization of teaching models, and cultivate more professional and comprehensive medical and pharmaceutical talents, so that they can better adapt to the job market, improve employment competitiveness and quality, and promote industrial development and innovation.

2. Construction of Pharmaceutical Talent Cultivation Model Based on Industry-Education Integration

(1) Scientifically positioning the training objectives

When setting talent cultivation goals, universities should proactively engage in in-depth exchanges with pharmaceutical companies, industry experts, and scientific research institutions to understand industry development, market demands, and talent recruitment requirements. Based on this understanding, they can determine the knowledge and skills that pharmaceutical talents need to master, as well as their comprehensive qualities. On this basis, targeted talent cultivation goals can be established, providing a theoretical basis for curriculum design and teacher instruction. Specifically, the goals of pharmaceutical talent cultivation are mainly divided into three aspects. Firstly, the knowledge level. Students should firmly grasp professional knowledge and cutting-edge technical knowledge in pharmacy and basic medicine, and be able to flexibly apply various types of knowledge. Secondly, the skill level. Through practical classes, skill competitions, internships, and other methods, students' practical operation abilities

in pharmaceuticals should be effectively improved. All pharmaceutical knowledge learned through practical work should be applied in a targeted and effective manner to new drug research and development, clinical medical services, and other work. Thirdly, the quality level. In addition to pharmaceutical knowledge and skills, it is also necessary to focus on cultivating students' thinking ability, innovative spirit, cooperation quality, scientific spirit, professional ethics, and other qualities. Carrying out talent education activities under this cultivation goal can promote the comprehensive development of pharmaceutical talents, enable them to quickly adapt to the industry environment, and ultimately become excellent talents with comprehensive qualities. They can then maximize their potential in their work and promote the healthy development of the industry .

(2) Strengthen the construction of teacher teams

Teachers are the direct implementers of medical talent cultivation. To enhance the quality of talent cultivation, it is imperative to strengthen the construction of the teaching faculty, elevate teachers' professional capabilities, teaching proficiency, and comprehensive qualities. In the context of industry-education integration, universities can implement a dual-mentor system, where key personnel from enterprises and professional teachers collaborate in teaching, each leveraging their strengths, allowing students to receive higher-quality professional education. The teaching content provided by enterprise personnel should focus on industry development, practical work, and medical practice, enabling students to grasp the current development situation and latest technologies of the medical industry through teaching, and effectively enhancing their practical abilities. University teachers emphasize the teaching of medical theoretical knowledge and academic abilities, and guide students in completing activities such as research projects and skill competitions.

In practical teaching, both parties should communicate regularly to understand the specific learning situation of students, ensure the pertinence and effectiveness of teaching, guide students to complete technology transformation and career positioning, and achieve the dual cultivation of "academic leadership + industry empowerment" (Zeng Xiancai, Chen Junling, Pan Huiyan, Li Huixing, & Liu Xueguo, 2025). At the same time, universities should strengthen the cultivation of professional teachers, organize regular professional training activities, and guide teachers to use holidays or free time to conduct on-site inspections and learning in enterprises, clarify the latest industry development trends and recruitment requirements for medical talents, and reflect them in teaching, so that students can better understand industry trends. To activate teachers' learning motivation, universities should regularly evaluate teachers' teaching effectiveness, select excellent teachers through student selection, and give them both spiritual and material rewards, thereby strengthening teachers' learning awareness, improving professional abilities through academic exchanges and self-learning, and building a high-quality teaching team.

(3) Optimize the course teaching system

Under the concept of industry-education integration, universities must readjust the proportion of theoretical teaching and practical teaching, construct a high-quality and high-level course teaching

system, achieve deep integration of theory and practice, and ensure that students master theoretical knowledge and practical abilities through professional learning. Firstly, universities should design a systematic and blended "theory + practice" curriculum system in combination with national strategic orientation, industry development needs, and talent cultivation goals, and integrate practical innovation capabilities into it to promote comprehensive student development. It is important to note that practical teaching should be arranged according to theoretical teaching schedules and student learning stages, ensuring that the content of practical teaching aligns with students' current medical abilities, so that students can better understand and consolidate the basic medical knowledge they have learned through practical activities, and enhance their abilities through extensive practice. Secondly, deepen cooperation between universities and enterprises. Universities should proactively collaborate with the pharmaceutical industry to build practical teaching platforms and effectively cultivate the practical abilities of pharmaceutical talents. Establish joint industry-university-research laboratories to provide students with a drug manufacturing platform, allowing them to access advanced and efficient experimental equipment and cutting-edge technologies, thereby effectively honing their practical abilities. At the same time, various internship and practical activities can be jointly carried out through university-enterprise cooperation, allowing outstanding talents to participate in corporate pharmaceutical projects and providing all students with short-term corporate practical opportunities. This enables students to understand cutting-edge technologies and the development of the pharmaceutical industry through real-world work, effectively apply theoretical knowledge, and genuinely enhance their professional abilities. Finally, establish an information feedback mechanism. Require university teachers and enterprise personnel to report problems and deficiencies encountered by students in practical activities to relevant management personnel, which will then be summarized and transmitted to teachers, forming a virtuous cycle of "teacher teaching - student practice - information feedback - teaching optimization", to effectively cultivate students' knowledge and skills.

(4) Establish a talent assessment system

In the process of optimizing the pharmaceutical talent cultivation model, it is necessary to be guided by the integration of industry and education. By combining the training objectives and curriculum system, we should construct a scientific and targeted collaborative assessment and employment mechanism between schools and enterprises, realizing the organic integration of talent education and industry development. This will enhance the professional abilities of pharmaceutical talents and ensure that their various abilities meet the needs of the industry. On the one hand, a school-enterprise cooperation mechanism should be established, with specific and detailed provisions in contract documents outlining the obligations and responsibilities of universities and enterprises in cooperation, to avoid mutual blame and shirking in the later stages. In this process, universities can set up a dedicated school-enterprise cooperation department to be fully responsible for communication and cooperation between both parties, ensuring that both schools and enterprises reach consensus in various aspects such as the formulation of training programs, curriculum construction, and the construction of practical platforms. Ultimately, a

stable and efficient cooperation model will be formed to ensure that talent cultivation meets the needs of the industry (Quan Haiyan, Li Yajun, & Shan Zhifang, 2025). At the same time, information technology can be used to build a school-enterprise cooperation management platform, through which staff can achieve real-time sharing of various data and information, breaking traditional organizational boundaries, enabling smoother communication between both parties, and ensuring the smooth implementation of the integrated teaching model.

On the other hand, school-enterprise cooperation optimizes the student assessment and employment mechanism. Both parties conduct comprehensive and in-depth assessments of students' theoretical knowledge, practical ability, innovation ability, and comprehensive literacy based on talent cultivation goals and specific practical situations, forming precise assessment results that fully reflect students' comprehensive quality. Targeted improvements are made in subsequent teaching to ensure that students' abilities meet the recruitment requirements of the industry and enhance their market competitiveness. In addition, universities should establish a dynamic feedback mechanism to survey graduated medical talents and collect evaluations from pharmaceutical companies on their graduates. Based on this, deficiencies in talent cultivation are identified and actively improved. Combined with industry development needs, the objectives, training programs, and teaching methods of medical talent cultivation are continuously optimized to effectively improve the quality of talent cultivation and ensure that the direction of talent cultivation aligns with enterprise needs.

3. Conclusion

In summary, the medical talent cultivation model based on industry-education integration plays a significant role in enhancing the quality of talent cultivation, promoting the comprehensive growth of medical talents, and driving the high-quality development of the pharmaceutical industry. Universities should delve into the concept of industry-education integration, explore a series of practical strategies for constructing talent cultivation models, and achieve an organic integration of pharmaceutical education and industry needs through scientific positioning of training objectives, building a professional teaching team, optimizing the curriculum system, and developing a talent assessment system through school-enterprise cooperation. This will provide strong talent support for the pharmaceutical industry.

References

Quan Haiyan, Li Yajun, & Shan Zhifang. (2025). Research and Practice on the Cultivation of Pharmaceutical Talents in Higher Vocational Education from the Perspective of Industry-Education Integration. *Economic Journal*, *2025*(2), 166-167.

Yin Yanyan, Jiang Boyuan, Cui Taizhen, Fang Lizhen, & Song Yu. (2025). Practical Innovation of Pharmacy Talent Cultivation Mode under the Background of Industry-Education Integration. *Regional Governance*, *2025*(1), 0178-0181.

Zeng Xiancai, Chen Junling, Pan Huiyan, Li Huixing, & Liu Xueguo. (2025). Exploration of Talent Cultivation Mode for Biology and Pharmaceutical Specialties Based on Industry-Education Integration. *China Science and Technology Economic News Database Education*, *2025*(6), 029-032.

Zhang Ming, Ren Zhiguo, Qu Chaocheng, Zhang Zhibin, & Guo Li. (2025). Exploration of the "Six Sharing and Six Integrating" Industry-Education Integration Talent Cultivation Model. *Computer Education*, *2025*(5), 85-89.