# Innovative research on the practical path of applied talents in the pharmaceutical industry in the service area of pharmaceutical majors in universities

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***Abstract:*** Medicine and health is a national strategic emerging industry and a high-precision and cutting-edge industry type in a region, with a great demand for high-level talents. At present, the integration of industry and education has become the main method for cultivating professional and technical talents, and it is also the key to promoting high-quality social and economic development. In the process of offering and educating pharmaceutical majors in universities, it is necessary to pay attention to the cultivation of applied talents, in order to better serve the development of the regional pharmaceutical industry and meet the demand for pharmaceutical talents in the implementation of pharmaceutical and health strategic goals.

***Keywords:*** universities; Pharmaceutical majors; Regional pharmaceutical industry; applied talents

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## Introduction

The close integration of education and industry has become a key measure for cultivating versatile applied talents. As active practitioners of the integration of industry and education, universities not only need to spread innovative ideas in the field of education, but also need to harvest reliable results in the practice of industry education integration. Driven by innovation in the field of education, the country has always attached great importance to the strategy of innovation driven development, and needs to continuously deepen education reform and explore new models of talent cultivation. The medical field is a key area related to national, social, and economic development, and the cultivation of pharmaceutical talents is also a prerequisite and foundation for the development of the regional pharmaceutical industry. How to cultivate applied talents in pharmacy and better serve the development of the regional pharmaceutical industry is the latest issue that needs to be considered in the development of pharmaceutical education in universities. This study is based on the analysis of the current demand for talents in the pharmaceutical industry and the current situation of talent cultivation in pharmaceutical majors in universities. Innovative methods for practical paths of applied talents are proposed to provide reference for the development of higher education.

## 1.Analysis of the Current Demand for Talents in the Pharmaceutical Industry

According to the data analysis of the "2024 Pharmaceutical Manufacturing Industry Talent Trend Report" (hereinafter referred to as the "Report"), it is found that the talent shortage trend in the pharmaceutical industry has always been higher than the industry average, showing an overall shortage of talent and a recent trend of rising demand, indicating that talent is in high demand and employment in the pharmaceutical industry is relatively easy. Especially in key areas such as drug research and development, production, and quality control, there is a high demand for talent due to the higher specialization requirements and the need for a richer level of knowledge. And the training period for this type of talent is relatively long, so it shows a situation of supply shortage. With the innovative development of the pharmaceutical industry, the activity level of R&D talents has increased, and the demand for talents in R&D positions such as drug R&D, pharmaceutical R&D management, quality management directors/managers/supervisors, and researchers is constantly growing, resulting in a situation of supply shortage. In addition, with the expansion of the pharmaceutical industry market and the development of overseas markets, a large

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number of overseas talents have shown a clear trend of returning, especially talents from the pharmaceutical manufacturing industry in the United States, Canada, the United Kingdom, and other places have flowed into China. There is a clear concentration of domestic talents, but they are mostly concentrated in areas such as Shanghai, Beijing, Suzhou, Chengdu, and Guangzhou.

## 2.Analysis of the current situation of talent cultivation in pharmaceutical majors in three universities

### 2.1 Insufficient scientificity of teaching ideas

The main reason is that the current pharmaceutical curriculum in universities has not been strictly designed based on the idea of cultivating applied talents, nor has it been designed with the goal of implementing this fundamental teaching task. The overall understanding of student-centered teaching ideas is insufficient, resulting in a lack of scientific teaching models. The current teaching mode shows a serious formalization of practical content, and pharmacy teachers have insufficient depth of understanding of the integration of pharmacy and practice, resulting in obvious perfunctory behavior. Therefore, it restricts the effectiveness of teaching implementation and needs to be strengthened and adjusted. Especially in the context of rapid development in the pharmaceutical industry, new drugs often emerge and some drugs are often eliminated. However, the editing of teaching materials is relatively slow, which results in students using textbooks that do not incorporate the latest pharmaceutical knowledge. All of this requires teachers to keep up with the latest knowledge in the field of medicine and transmit it to students to avoid lagging behind in their learning.

### 2.2 Insufficient integration of teaching methods

At present, pharmacy teachers lack the ability to seamlessly integrate practical content into pharmacy courses. The practical education they provide lacks specificity and does not reflect distinctiveness. Similar to other practical teaching courses, it does not highlight the characteristics of pharmacy courses, nor does it leverage the advantages of pharmacy courses in this regard. Individual teachers lack effective integration of the "three pronged education" and have not organically integrated concepts such as organizational education, cultural education, and practical education with pharmacy courses, resulting in a lack of comprehensiveness and systematicity in the practical operation of pharmacy course practical education[1]. In addition, some teachers do not pay attention to innovative teaching methods and have not actively applied innovative teaching models such as life oriented teaching, group cooperative learning, inquiry based teaching, and problem oriented teaching in practical teaching of pharmacy courses.

### 2.3 Insufficient systematicity of teaching mode

At present, the vertical depth of practical teaching in pharmacy courses is insufficient, staying at the surface level, and unable to effectively enhance students' professional competence through the development of pharmacy courses. Some positions in the pharmaceutical industry require experimentation, which requires students to master certain practical abilities. If the practical course arrangement is not in place, it may lead to students having only rich theoretical knowledge but lacking practical operation ability, which will bring disadvantages to future job applications and adaptation. Therefore, future pharmacy teachers need to continuously optimize this However, the actual situation shows that most pharmacy teachers have not conducted in-depth research in this area, resulting in insufficient systematization of pharmacy courses. For example, in pharmacy teaching, they do not pay attention to the development of practical resources, lack the integration of practical content, and fail to highlight their uniqueness. This still imposes many limitations on the teaching of pharmacy courses. In addition, pharmacy teachers have not paid attention to communication, exchange, discussion, and cooperation with experts and scholars from various positions in the pharmaceutical industry, resulting in many gaps in the construction of teaching models and poor overall improvement of pharmacy professional competence[2].

### 2.4 Insufficient innovation of teaching carriers

When constructing teaching models, some teachers did not pay attention to the innovation of teaching carriers. Due to the special nature of pharmacy courses, practical activity courses account for a small proportion and are mostly theoretical courses, which also makes it difficult to integrate with practical education. Teachers lack organic integration with relevant carriers when designing teaching content, resulting in deficiencies in the construction of teaching models. In the digital age, the development of the pharmaceutical industry also relies heavily on advanced technologies such as big data. Applied talents not only need to master pharmaceutical related professional knowledge, but also need to master the application of information platforms, technologies, systems, and software. Especially, how to use advanced software to help analyze pharmaceutical experimental data, mine problems, optimize experimental content, etc. can reduce the risk of talent's wrong choices, increase the accuracy of big data recognition, and help clarify experimental ideas[3]. Some teachers also do not pay attention to the cultivation of students' awareness and ability of "integration of knowledge and action". Although practical content is added to the curriculum, it cannot be guaranteed to be implemented in students' learning, nor is it connected to life, which restricts the timeliness of course teaching[4].

## 3.Analysis of Practice and Innovation Paths for Applied Talents in Pharmaceutical Majors in Four Universities

### 3.1 Building Enterprise Practice Bases

The enterprise practice base is the core platform for integrated teaching of industry and education, responsible for providing students with a territory for practice. Considering the special needs of pharmacy, schools need to contact major hospitals, medical institutions, pharmaceutical institutions, pharmaceutical equipment manufacturers, and material companies. These pharmaceutical related units are responsible for planning this activity, establishing standardized digital bases, preparing the technology and equipment that will be used in the pharmaceutical field, strengthening management and financial support, and achieving diversified cooperation. The base should implement the process of teaching linkage, transforming the practical projects of major units, pharmaceutical cases obtained from hospitals, or other volunteers into reliable teaching resources to assist in teaching. At the same time, integrating into the system of master apprentice guidance, professional technicians teach apprentices techniques, improve students' technical proficiency, and strengthen their ability to tackle technical problems. Teachers preparing for the base also need to arrange theoretical courses reasonably based on the design of practical interaction, and organize students to participate in practical training in stages. Students are required to write internship logs and records, reflect regularly, and help strengthen teaching effectiveness.

### 3.2 Creating a Virtual Simulation Training Center

Due to the high technical difficulty in some pharmaceutical fields and the limited number of patient cases encountered, students still need to learn. At this point, it is necessary to establish a virtual simulation training center. The main purpose of building this center is to provide students with a highly simulated pharmaceutical diagnosis and treatment environment, as well as an immersive diagnosis and treatment platform. Including how to diagnose and treat diseases, how to write prescriptions, and how to conduct effective ingredient testing, a virtual training system is established. With the help of 3D modeling, VR technology, robot technology, etc., the real pharmaceutical service scene is standardized and restored, making it convenient for students to repeatedly operate and learn on a certain knowledge point. The intelligent management system supporting the center supports the recording and analysis of each student's training situation, inputs and analyzes all data in real time, provides real-time feedback and guidance, and can collect online data to optimize training design to better meet the needs of each student. This establishes a teaching model that combines online and offline learning. Students are first allowed to practice in a virtual environment, familiarize themselves with it, and then intern in pharmaceutical positions in enterprises to consolidate their knowledge and effectively enhance their practical abilities[5].

### 3.3 Expanding the scope of pharmaceutical services

With the support of digital technology, the scope of pharmaceutical services has also been significantly expanded. Schools need to leverage the current increasing demand for pharmaceutical services in society to promote a teaching model that combines medicine and education. Establish a digital pharmaceutical teaching internship platform within the school, arrange medical experts from major hospitals and other pharmaceutical institutions, and periodically organize students to demonstrate and observe the use of digital equipment, learn how to use digital equipment for drug research and development, experimentation, etc. Through the process of "expert on-site demonstration student observation expert observation and feedback student reflection and improvement", effectively enhance students' practical abilities. It is also possible to organize school teachers and students to participate in digital pharmacy free clinics in communities and other areas. During the free clinics, pharmaceutical health knowledge education can be carried out, and cases caused by improper drug use can be collected on site for reflection and learning with teaching materials, achieving the goal of linking theory with practice. This can also strengthen the connection between schools and communities. In addition, schools can establish a support mechanism with the pharmacy department of hospitals, regularly organize students and teachers for further learning, adapt to job content and needs in advance, and promote the improvement of students' learning enthusiasm.

### 3.4 Strengthen the construction of a dual qualified teaching staff team

Schools should pay attention to building a dual teacher team based on digitalization to support the development of innovative teaching models that integrate industry and education. On the one hand, schools should pay attention to strengthening the development of educational assessment work, highlighting the characteristics of dual teacher teaching staff, enhancing digital capabilities, and listing them as key indicators for ability assessment. At the same time, pharmaceutical experts, high-end R&D technicians, hospital physicians, etc. can be hired as part-time teachers, and expert lectures, on-site demonstrations, and other activities can be organized irregularly to strengthen students' learning of pharmaceutical knowledge and advanced digital technology applications. On the other hand, schools cooperate with pharmaceutical institutions and enterprises to jointly shape teacher training activities, organize learning and theoretical training in pharmaceutical technology and digital technology, or arrange teachers to observe and learn from pharmaceutical clinics, frontline pharmaceutical production enterprises, drug quality inspection departments, etc., track the practical situation of pharmaceutical majors, clarify their future development goals, and establish career plans.

### 3.5 Focus on Career Planning

College pharmacy teachers should pay attention to students' short-term development needs and value long-term development needs, not only material needs but also spiritual needs, such as the pursuit of value creation and ability enhancement. By conducting a survey and analysis of newly enrolled students and students entering the internship period, we aim to understand their views and requirements for future development needs, and adjust the content of their career planning accordingly. Yu Pharmaceutical Company is coordinating with students to participate in job rotation and exchange programs, allowing them to enter different positions, stimulate their enthusiasm, tap into their personal strengths, master diverse skills and knowledge, and gradually grow into versatile talents. Regular and reasonable job rotation communication can stimulate students to clarify their future development direction, improve their enthusiasm for learning and practice, and avoid students' laziness. Rotational communication requires rotation between different positions in different companies in the pharmaceutical industry. For positions with similar job responsibilities, AB positions should be arranged for students to rotate; Rotating between departments, mainly targeting middle-level managers, to go to each department in turn to learn and prepare for promotion to higher levels; Communication between enterprises, such as drug research and development companies, drug quality supervision agencies, etc., can be arranged to exchange with other pharmaceutical industry institutions, providing students with more development platforms. Attention should be paid to students who have achieved excellent results in daily

exams and pharmaceutical professional exams when participating in job exchanges, which is also a method of talent motivation. In addition, encourage students to actively participate in online education platforms, share learning experiences, participate in skill competitions, obtain qualifications related to the development of the pharmaceutical industry, provide reasonable suggestions for enterprise development, and establish reward measures to improve students' enthusiasm for learning.

## 4.Conclusion

With the continuous development of the times, the widespread application of advanced technology, and the development requirements of the pharmaceutical industry in the new era, the traditional teaching mode is no longer suitable for the innovative needs of pharmaceutical teaching in universities. This requires teachers in colleges and universities to actively innovate, break the shackles of traditional teaching mode, improve the accuracy, professionalism, practicality and progressiveness of course content design, so as to cultivate students' pharmaceutical professional technology and ability, master the latest pharmaceutical professional knowledge, and truly create application-oriented talents for the development of the regional pharmaceutical industry through effective curriculum.

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