Employment-oriented Training Strategy for Pharmaceutical Preparation Technicians in Higher Vocational Colleges

Xuehua Li

Zibo Vocational Institute, Zibo, 255300, Shandong, China

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Abstract: This article aims to explore and put forward a set of employment-oriented training strategies for pharmaceutical preparation technical personnel in Higher Vocational Colleges (HVC), which closely meets the needs of the industry, in view of the problems existing in the current training of pharmaceutical preparation technical personnel in HVC, such as the disconnection between theory and practice, unclear employment orientation and insufficient cooperation between schools and enterprises. Firstly, this article combs the research status of pharmaceutical preparation technical personnel training in HVC, and makes clear the research direction and focus. Then, through questionnaires and field interviews, we collected opinions and suggestions from enterprises, HVC and graduates, which provided an empirical basis for strategy construction. The research shows that the optimized training strategy can effectively improve students' practical ability and professional quality, and enhance their employment competitiveness. At the same time, the cooperation between schools and enterprises has been deepened, and the effective integration of educational resources and industrial resources has been realized. The conclusion is that the employment-oriented training strategy of pharmaceutical preparation technical talents in HVC is feasible, which can deliver more high-quality technical and technical talents for the pharmaceutical industry and promote the sustained and healthy development of the industry.

1. Introduction

With the rapid development of global medical and health undertakings, especially the continuous progress in the fields of new drug research and development, biopharmaceuticals and precision medicine, pharmaceutical preparation technology, as a key link connecting drug research and development and production, has become increasingly important [1]. Pharmaceutical preparations are not only related to the effectiveness, safety and stability of drugs, but also directly affect the therapeutic effect and quality of life of patients [2]. In this context, vocational education, as an important position to cultivate high-quality technical and skilled talents, bears the heavy responsibility of transporting qualified pharmaceutical preparation technicians for the pharmaceutical industry [3]. However, at present, the training of pharmaceutical preparation technical talents in HVC faces many challenges, such as the disconnection between theory and practice, unclear employment orientation, and insufficient cooperation between schools and enterprises, which leads to a big gap between talent supply and market demand [4]. Therefore, the purpose of this study is to deeply explore the employment-oriented training strategy of pharmaceutical preparation technical personnel in HVC, with a view to improving the quality of personnel training, promoting the smooth employment of graduates, meeting the demand for high-quality technical personnel in the pharmaceutical industry and promoting the sustained and healthy development of the pharmaceutical industry.

The primary objective of this research is to devise and propose employment-focused talent development strategies tailored to industry demands, achieved through a comprehensive analysis of the existing conditions and challenges in training pharmaceutical preparation technicians at HVC. The study delves into several key issues: curriculum optimization to align educational content with industry realities, enhancing practical instruction to bolster students' hands-on skills and problem-solving capabilities, fostering deeper school-enterprise collaboration for seamless

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integration of educational and industrial assets, and ensuring strategy execution through policy backing and faculty development. Addressing these concerns, the research intends to offer valuable insights to vocational educational institutions, industry stakeholders, and policymakers.

2. Analysis on the current situation of pharmaceutical preparation technical personnel training in HVC

2.1. Industry demand and talent gap

In recent years, with the rapid development of the pharmaceutical industry, especially the continuous breakthroughs in the fields of biopharmaceuticals, modernization of traditional Chinese medicine, and innovation of pharmaceutical preparations, the demand for pharmaceutical preparation technicians has increased dramatically [5]. The industry needs not only R&D talents with a solid theoretical foundation, but also a large number of applied talents who can master the skills of pharmaceutical preparation production technology, quality control and equipment operation, as shown in Figure 1.

Figure 1 Cultivation of pharmaceutical preparation technical personnel

However, the number and quality of graduates majoring in pharmaceutical preparation technology in HVC are difficult to meet the needs of the industry, especially the shortage of high-end skilled talents [6]. This is mainly due to the disconnection between talent training and market demand, which leads to the lack of competitiveness of graduates in the job market.

2.2. Education model and curriculum

Currently, the educational approach for the pharmaceutical preparation technology major at HVC integrates both theoretical and practical instruction, yet it is plagued by an overemphasis on theory and a dearth of practical training [7]. While the curriculum encompasses fundamental subjects like medicinal chemistry, pharmacy, and pharmaceutical engineering, it frequently falls short in bridging the gap with industry's forefront technologies, leading to outdated curricula that fail to promptly mirror the industry's latest advancements. Furthermore, the curriculum heavily focuses on imparting theoretical knowledge, overlooking the nurturing of students' practical skills, innovative mindset, and professional prowess.

2.3. Practice teaching and school-enterprise cooperation

Practice teaching is an important part of pharmaceutical preparation technical personnel training

in HVC, but at present, there are widespread problems in practice teaching, such as insufficient resources and limited conditions, as shown in Figure 2:

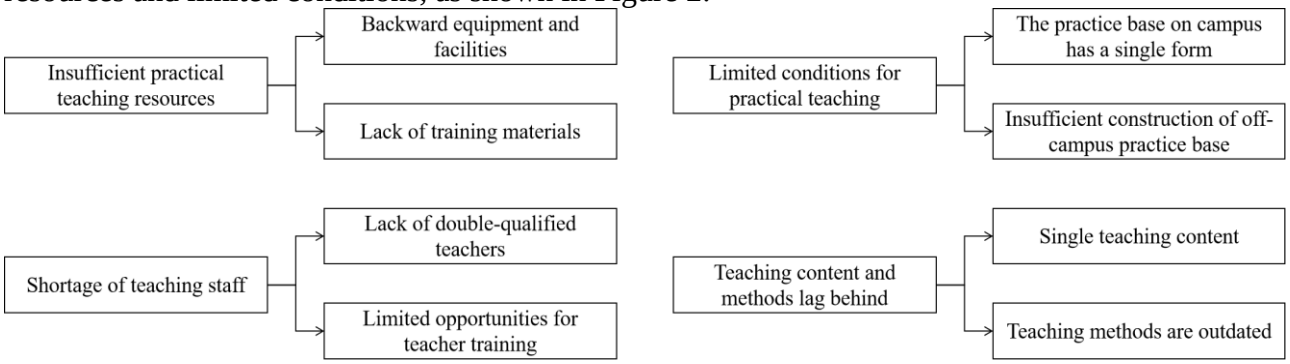

Figure 2 Shortcomings in practical teaching

As a bridge between education and industry, school-enterprise cooperation has promoted the docking of talent training and industrial demand to a certain extent, but the depth and breadth of cooperation still need to be improved [8]. At present, school-enterprise cooperation mostly stays at the level of internship and employment guidance, but there is less in-depth cooperation in curriculum development, textbook compilation and scientific research project cooperation, which makes it difficult to effectively bridge the gap between talent training and industry demand.

3. Construction of training strategy based on employment orientation

3.1. Curriculum system optimization

In order to build an employment-oriented talent training system for pharmaceutical preparation technology, the first task is to optimize the existing curriculum system. This includes the following aspects:

Pay equal attention to theory and practice: adjust the curriculum structure to ensure that both theoretical teaching and practical teaching are equally important, so that students can master a solid theoretical foundation and have skilled practical skills.

Modular curriculum design: introduce a modular curriculum system and divide the curriculum content into basic modules, professional modules and expansion modules to meet the learning needs and career development paths of different students.

Integration of cutting-edge technologies in the industry: regularly update the course content, integrate the latest technologies, processes and standards in the field of pharmaceutical preparations into the teaching, and ensure that the teaching content is closely connected with the needs of the industry.

Interdisciplinary integration: strengthen the integration of pharmaceutical preparation technology with other related disciplines (such as biotechnology, chemical engineering, information technology, etc.), and cultivate students' comprehensive quality and innovation ability.

3.2. Strengthening practical teaching

Practice teaching is the key link to cultivate students' practical ability and professional accomplishment. In order to strengthen practical teaching, the following measures can be taken:

Increase the proportion of practical teaching: increase the number of practical teaching hours to ensure that students have enough time for practical operation and skill training during school.

Building a high-level training base: invest funds and resources to build a training base with advanced equipment and real working environment to provide students with high-quality practical conditions.

Project-based learning: through project-based learning, students are allowed to participate in the actual research and development, production or quality control projects of pharmaceutical preparations, and their teamwork ability and problem-solving ability are cultivated.

Carry out skill competition and certification: organize students to participate in skill competition

and vocational qualification certification examination to motivate them to improve their practical skills and increase their employment competitiveness.

3.3. Deepening school-enterprise cooperation

School-enterprise collaboration serves as a pivotal means of fostering top-tier technical expertise. To enhance this partnership, several strategies may be employed:

Shared Facilities: Establish collaborative training bases and R&D centers with enterprises, facilitating resource sharing and leveraging complementary strengths.

Collaborative Research: Engage in joint research endeavors with industry, converting corporate needs into educational content and research themes, thereby fostering Industry-University-Research integration.

Customized Training: Implement demand-driven training programs tailored to enterprise hiring requirements.

Exchange Mechanism: Create a framework for regular visits between academia and industry, including inviting industry experts for lectures and organizing student internships, to bolster mutual understanding and cooperation.

4. Implementation strategy and safeguard measures

4.1. Policy support and system guarantee

Ensuring the comprehensive and effective implementation of employment-focused training necessitates the establishment of a multi-faceted collaborative and resource-sharing framework. This endeavor hinges on the tight cooperation and collective efforts of the government, educational institutions, and businesses, each contributing indispensably to reinforce every aspect of talent development.

Primarily, the government, as a policymaker, guides the overall direction and facilitates the deep integration of vocational training with industries. It should introduce incentive policies to spur corporate engagement in education, offering authentic professional settings and practical experiences to students. Additionally, by legislating or providing administrative direction, it clarifies the rights and responsibilities within school-enterprise partnerships, ensuring stability and continuity, thereby establishing a robust policy base for talent cultivation.

Secondly, educational institutions, as the direct executors of talent development, must refine their internal systems, including credit, tutorial, and practice management frameworks, to safeguard training quality.

Lastly, adequate financial backing is crucial for implementing these measures. The government and schools should establish dedicated funds for base construction, faculty development, and research collaboration. Efficient utilization of these funds ensures the seamless progression of talent training, ultimately supplying the market with more high-quality, skilled professionals.

4.2. Construction of teaching staff

Teachers are pivotal to talent development. To cultivate a high-caliber teaching faculty, several strategies can be employed:

Primarily, attracting exceptional talent forms the cornerstone of faculty construction. Wide-ranging recruitment drives should be conducted to engage outstanding individuals from various sectors, particularly those with extensive industry experience and senior positions. By offering competitive compensation packages and growth opportunities through talent acquisition policies, we can boost the faculty's appeal and cohesion.

Secondly, enhancing teacher education is crucial for elevating their proficiency. Regular professional training, academic exchanges, and teaching workshops should be organized to keep teachers informed about the latest educational advancements and methodologies.

Lastly, implementing motivational systems effectively stimulates teachers' enthusiasm and creativity. Schools ought to establish equitable incentive structures, including promotions and

reward schemes, to recognize and reward teachers for their teaching and research accomplishments. These incentives not only ignite teachers' work passion but also inspire them to innovate teaching approaches and content, thereby enhancing educational quality.

4.3. Evaluation and feedback mechanism

In order to ensure the quality of personnel training, it is needed to establish an effective evaluation and feedback mechanism. Specific measures include:

Establish an evaluation system: formulate a scientific and reasonable evaluation standard and index system to comprehensively evaluate students' learning achievements, practical ability and professional quality, as shown in Figure 3:

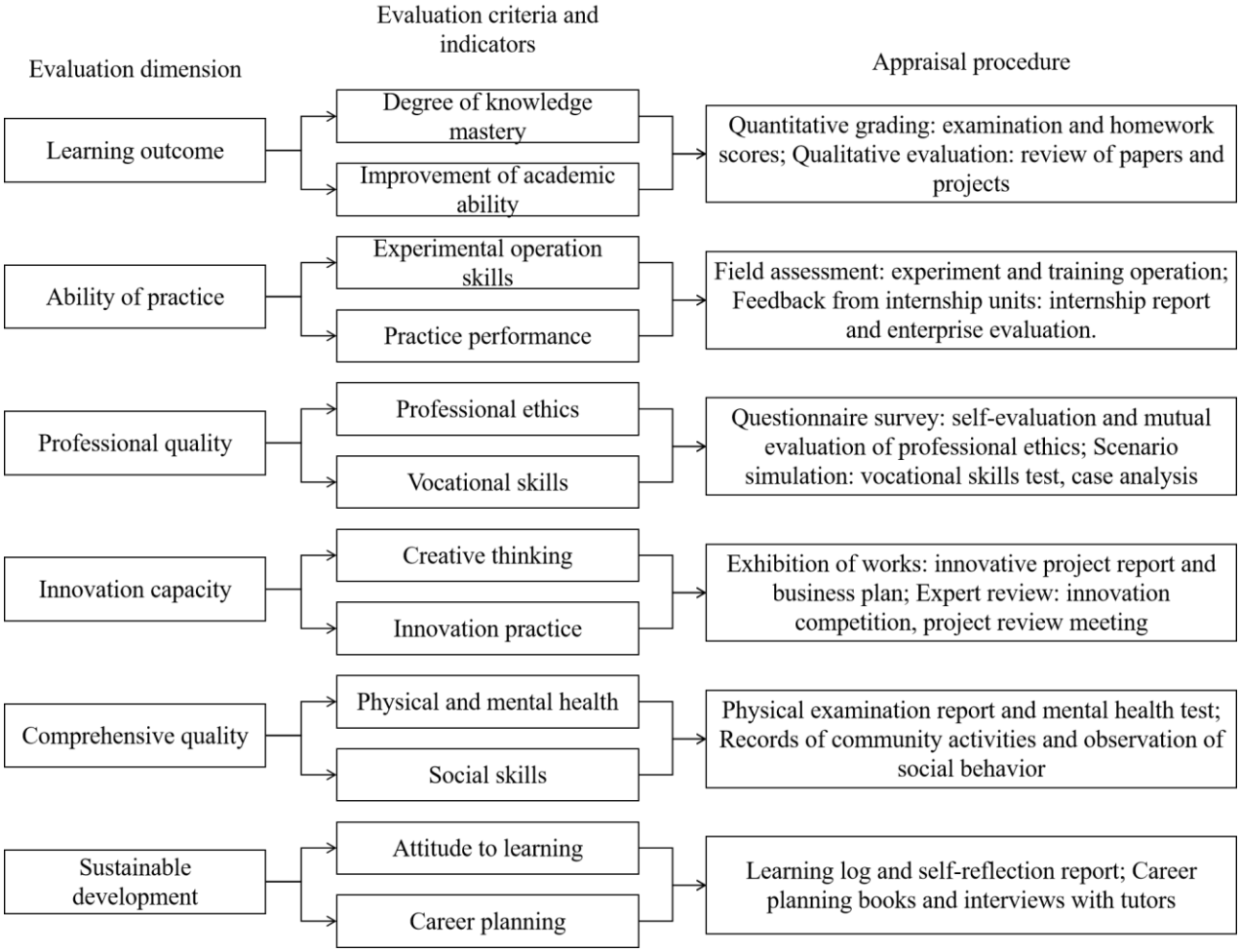

Figure 3 Construction of evaluation system

Implement regular evaluation: regularly evaluate the talent training work, including curriculum, practical teaching, school-enterprise cooperation, etc., and find problems in time and make improvements.

Establish a feedback mechanism: establish a feedback mechanism for students, teachers, enterprises and society, and collect opinions and suggestions from all parties in time to provide a basis for the continuous improvement of personnel training. At the same time, through the feedback mechanism, the training strategy can be adjusted in time to ensure that the talent training work always keeps pace with the industry demand and market changes.

5. Conclusions

This study delves into the pivotal challenges of training pharmaceutical preparation technicians in HVC, systematically identifying deficiencies in the existing training framework—particularly the disconnect between theory and practice, limited employment focus, and inadequate

school-enterprise collaboration. Consequently, the article introduces and applies employment-centric training approaches, encompassing curriculum refinement, practical teaching enhancement, and deepened school-enterprise partnerships. Findings reveal that these strategies markedly elevate students' practical skills, professional prowess, and employability, while aligning vocational education closer with industry demands. The research underscores the efficacy of employment-oriented training in enhancing the quality of pharmaceutical technician education in HVC.

Practically, this study offers a detailed, actionable guide for HVC's pharmaceutical technician training, enabling the adjustment of training goals, curricula, and teaching methods to align with industry needs, thereby nurturing more market-ready technical talents. Theoretically, it enriches the discourse on vocational education's talent training system, notably by integrating an employment-centric approach into pharmaceutical technician training, providing fresh insights and avenues for further research in the field.

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