



# Research on the Course System of Pharmaceutical Supply Chain Management Based on OBE

Xin Wen<sup>a</sup>, Siying Zhang<sup>b\*</sup>, Wangyue Huang<sup>c</sup>

School of Management, Hubei University of Chinese Medicine, Wuhan, 430065, Hubei, PR China

<sup>a</sup>2460808293@qq.com; <sup>b\*</sup>siying8548@qq.com;  
<sup>c</sup>15171530726@163.com

**Abstract.** In the face of rapid digital transformation and regulatory changes in the pharmaceutical industry, supply chain management is crucial for ensuring safe and efficient drug supply. However, current education falls short in producing the needed high - quality, versatile talents due to the theory-practice gap and slow content updates. This study suggests integrating OBE into the pharmaceutical supply chain management curriculum. By clarifying learning outcomes, strengthening the curriculum, and diversifying teaching methods with a focus on practice, it aims to cultivate talents meeting industry demands, offering new educational reform ideas.

**Keywords:** OBE (Outcome-Based Education), Pharmaceutical Supply Chain Management, Industry-Academia-Research-Competition

## 1 Introduction

With the rapid development of the pharmaceutical industry, pharmaceutical supply chain management is gaining prominence. National and local governments are promoting its high-quality development. Policies like the "14th Five-Year Plan for Pharmaceutical Industry Development" and the "Guidelines for Improving the Supply Chain Management Level of Manufacturing Enterprises (Trial)" stress enhancing pharmaceutical supply chain digitization and collaboration<sup>[1]</sup>. The upcoming CPIT'2025 in Chengdu will focus on pharmaceutical supply chain and ecosystem building. Currently, 99 Chinese universities offer supply chain management majors. Hunan College of Medicine stands out with its pharmaceutical-focused program, aiming to produce talents with both medical knowledge and supply chain skills. Given the pharmaceutical industry's urgent need for supply chain professionals, especially in digital transformation and regulatory changes, medical schools can deliver the urgently needed compound talents, meeting national and industrial demand.

OBE, is a student-centered, goal-oriented educational model emphasizing continuous improvement and the integration of teaching, learning, and practice. It advocates combining theory with practice, using theory to guide practice and practice to verify

and develop theory. Research on OBE abroad is mature. Spady (1995) defined it as organizing the education system around post-graduation success goals. In China, studies began in 2003 when Jiang Bo viewed it as a systematic, innovative method<sup>[2]</sup>. In 2014, Li Zhiyi applied it to teaching reform. Since then, scholars have done many practical studies in professional development and curriculum optimization. For instance, Xu Caihong et al. (2017) optimized the Food Science and Engineering curriculum<sup>[3]</sup>; Zhu Wenjuan (2022) constructed a Logistics Management curriculum<sup>[4]</sup>; Liu Qiang et al. (2024) explored Acupuncture Therapy teaching methods<sup>[5]</sup>. These efforts have enriched OBE's application in China.

This paper introduces the OBE philosophy into the curriculum design of the Supply Chain Management major and actively applies for the new Supply Chain Management major based on this approach. This initiative is of great theoretical and practical significance for developing a composite talent training system in Supply Chain Management with medical characteristics.

## **2 Current Issues in Pharmaceutical Supply Chain Management Education**

At present, the teaching of pharmaceutical supply chain management is closely centered on the particularities and complexities of the pharmaceutical industry, as well Pharmaceutical supply-chain management teaching focuses on the industry's uniqueness, complexity, and supply-chain management theory and practice. Universities and training institutions have developed diverse courses and programs with solid theoretical teaching, vivid case analysis, and practical application to meet the demand for high-quality professionals. However, existing teaching systems have problems that restrict effectiveness and student development.

### **2.1 Lag in Curriculum Updates**

As the pharma industry advances rapidly with new tech like blockchain and AI<sup>[6]</sup>, the teaching content of pharma supply chain management lags behind, failing to reflect industry frontiers. Teaching in key areas such as drug quality management and cold-chain transport is insufficient, creating a gap between students' understanding and industry needs. This affects students' grasp of supply chain complexity and limits their practical and innovative skills.

### **2.2 Lack of Interdisciplinary Integration**

As a comprehensive discipline, pharmaceutical supply chain management involves multiple fields, including logistics management, quality management, and pharmaceutical regulations. The complexity of this field determines that its teaching process requires in-depth interdisciplinary integration<sup>[7]</sup>. However, such integration is often lacking in current teaching, leading to fragmented knowledge systems among students and preventing them from forming systematic thinking. Moreover, insufficient explanations

of the regulations and standards involved in pharmaceutical supply chains leave students ill-prepared to face complex regulatory environments. This teaching status limits students' deep understanding of actual industry needs and may also affect their competitiveness in future career development.

### **2.3 Disconnection Between Theory and Practice**

The current teaching of pharmaceutical supply chain management focuses on the systematic transmission of theoretical knowledge but still falls short in integrating with real business scenarios, making it difficult for students to apply theories flexibly to solve practical problems. The practical teaching component is weak, lacking authentic and representative supply chain cases, such as pharmaceutical logistics customer service management, cold-chain transportation, and vaccine warehousing and distribution integration. Additionally, the absence of highly realistic simulation environments limits students' understanding of the complexity and dynamics of supply chains. These issues not only hinder students' in-depth understanding of knowledge but also affect their ability to solve practical problems, failing to meet the pharmaceutical industry's demand for high-quality, applied talents.

### **2.4 Insufficient Comprehensive Ability Cultivation**

In the current teaching of pharmaceutical supply chain management, the cultivation of students' comprehensive abilities is still insufficient. For example, key qualities such as teamwork, problem-solving, and innovation have not been given sufficient attention. When facing complex supply chain problems, students often lack the ability to think independently and solve problems. Moreover, the cultivation of students' professional ethics and professional quality is also weak, failing to meet the pharmaceutical industry's urgent demand for high-quality, specialized talents. This not only restricts students' comprehensive development but also affects their future career competitiveness and adaptability.

## **3 Strategies for Constructing a Pharmaceutical Supply Chain Management Curriculum Based on OBE**

The pharmaceutical supply chain, covering procurement, storage, transportation, and sales, is crucial for drug quality, patient safety, and corporate benefits. Therefore, the management of it requires high-level compound talents and poses higher demands on the teaching system, which needs comprehensive consideration from multiple aspects. This paper, based on the OBE concept, aims to cultivate compound talents in supply chain management at medical colleges by constructing a student-centered curriculum system. By establishing a diversified, competency-oriented evaluation mechanism, optimizing course content and teaching methods, and building an industry-education integration practice course system that covers the whole process and aspects of "industry-

academia-research-competition", this paper strives to meet the pharmaceutical industry's demand for high-quality, applied talents.

### 3.1 Clarifying Learning Outcomes Orientation

Under OBE, the pharmaceutical supply chain management curriculum should focus on students' learning outcomes and set clear training objectives. By researching industry needs, it determines the core competencies students should have and cultivates compound talents with "ideological and political concepts + engineering foundation + management literacy + medical thinking + practical ability + innovative consciousness". These competencies guide curriculum design and teaching to ensure students quickly meet industry demands upon graduation. The curriculum should establish a dynamic update mechanism to regularly check if the content covers new industry regulations, technological developments, and management concepts<sup>[8]</sup>. Also, a student feedback system should be set up for timely teaching content adjustment. Introducing industry cases and cutting-edge technology applications keeps the teaching content updated and improves students' professional quality and practical abilities.

### 3.2 Strengthening the Pharmaceutical Supply Chain Curriculum System

Based on the OBE philosophy, a curriculum cluster of general education, management, medicine, data analysis, and comprehensive practice courses is constructed to effectively achieve the interdisciplinary integration of theoretical courses. Through interdisciplinary course design, traditional disciplinary barriers are broken down to avoid fragmented knowledge systems. This enables students to not only master professional knowledge in pharmaceutical supply chain management but also possess a broader range of interdisciplinary knowledge and comprehensive application abilities, as shown in table 1.

**Table 1.** Interdisciplinary Integrated Curriculum System of Supply Chain Management

Course Category	Course Name	Integrated Disciplines	Course Objectives
General Education Courses	Basic Principles of Marxism, Ideological and Moral Education and Rule of Law, Outline of Modern Chinese History, Situation and Policy, College English, Advanced Mathematics, Physical Education, Labor Education,etc	Philosophy, Political Science, History, Law, Ethics	Enhance students' political literacy and philosophical thinking abilities; strengthen their historical consciousness and cultural confidence; cultivate their legal awareness and moral concepts.
Management Courses	Supply Chain Management, Purchasing and Supply Management, Supply Chain Strategic Management,	Management, Economics	Master the basic principles and methods of supply chain management; under-

Course Category	Course Name	Integrated Disciplines	Course Objectives
	Supply Chain Risk Management, Business Negotiation Theory and Practice,etc		stand the formulation and implementation of supply chain strategies; improve business negotiation skills and communication abilities.
Medical Courses	Introduction to Modern Basic Medicine, Introduction to Pharmacy, Medical Marketing, Pharmacoeconomics,etc	Medicine, Economics, Pharmacy	Gain an understanding of basic medical knowledge to provide a medical background for supply chain management; comprehend the principles of pharmacoeconomics to evaluate the economic value of pharmaceuticals.
Data Analysis Courses	Operations Research, Intelligent Supply Chain Information Technology and Application, Intelligent Supply Chain Equipment and Application, Python for Big Data Analysis and Visualization, Supply Chain Modeling and Simulation, ERP Sandtable Simulation,etc	Computer Science, Statistics, Information Technology, Sociology	Master data analysis tools for data mining and visualization; apply information technology to optimize supply chain management.
Comprehensive Practice Courses:	Military Training, Social Practice, Comprehensive Practice, Course, Graduation Internship,etc	Military Science, Sociology, Entrepreneurship, Internship Units	Enhance students' practical abilities and team spirit; improve their innovation capabilities and professional qualities.

### 3.3 Strengthening Practical Teaching

Under OBE, practical teaching is key to equipping students with real-world problem-solving skills. A practice-based curriculum integrating industry, academia, research, and competition is built. Real cases and simulations are introduced to strengthen industry-education collaboration<sup>[9]</sup>. First, close industry ties clarify talent requirements, guiding course design. The curriculum covers essential theories while stressing practical skills, enabling students to solve real problems via corporate projects. Competitions also foster innovation and teamwork, offering a platform for showcasing achievements and peer review. Finally, the curriculum is refined based on feedback and performance, ensuring education aligns with industry needs and producing work - ready professionals, as shown in table 2.

**Table 2.** "Industry-Academia-Research-Competition" Practical Training Course System

Practice Links	Specific Activities	Objectives and Outcomes
Industry (Industry Cooperation)	Joint School-Enterprise Order-style Training: Enterprises "Set Questions", Schools "Provide Answers"	Personnel trained serve enterprise development and industrial progress, achieving integration of industry, education, research, and application
Academia (Learning Achievements)	Professional Basic Ability, General Ability, Professional Practice Ability, Professional Comprehensive Ability, Innovation Ability, and Entrepreneurship Ability	Based on social surveys, students should develop abilities to adapt to various occupations
Research (Research Exploration)	Integrating Information Technology with Teaching: Developing High-quality Teaching Resources and Innovative Teaching Methods	Enhance teaching quality and address key, difficult, doubtful, and examination-focused issues in the teaching and learning process
Competition (Competitive Improvement)	Participating in pharmaceutical logistics supply chain competitions to enhance comprehensive application ability in pharmaceutical supply chain knowledge	Cultivate students' innovative application ability in pharmaceutical supply chain management knowledge

### 3.4 Diversified Training Methods

Under OBE, assessment focuses on student learning outcomes, emphasizing process- and competency-based evaluation. It abandons traditional single exams, favoring practical operation and case-analysis assessments. Varied methods like coursework and group projects evaluate students' theory-to-practice application, especially real-world problem-solving. Integrated assessment questions require multidisciplinary knowledge to solve complex pharmaceutical supply-chain problems. Course content is modularized, clarifying cross-disciplinary knowledge points, and team projects and course designs assess comprehensive application and innovation abilities in such contexts. Targeted evaluation criteria, focusing on students' core competencies, are designed: project practice for supply-chain optimization, case analysis for problem-solving, and team projects for collaboration. Combining formative and summative assessments helps students identify strengths and weaknesses for all-round development. Regular analysis of evaluation results informs teaching improvements.

## 4 Conclusions

Integrating OBE into the pharmaceutical supply chain curriculum aims to cultivate high-level compound talents. The course design stresses soft skills like pharmaceutical ethics and cross-disciplinary cooperation, nurturing talents with technical skills, managerial thinking, and professional responsibility. A diversified evaluation system is established. Evaluation from teachers, students, employers, and students themselves is integrated to improve evaluation standards and ensure students' professional abilities.

This approach aligns course content with industry standards, enhancing the training quality of pharmaceutical supply-chain talents.

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