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# Study on PBL Teaching Method of Logistics and supply chain management course in Higher Vocational Colleges

Hailin Chen

Wenzhou vocational and technical College, 325035, China.

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## Abstract

Combining with teaching practice, this paper introduces the ideas and measures of teaching method reform of Logistics and supply chain management course based on PBL in Higher Vocational colleges. Specific PBL-based teaching methods include: autonomous learning, group discussion and centralized guidance, game teaching, case analysis, social investigation, literature review and so on.

## Keywords

PBL; Logistics Management; Teaching Method; Higher Vocational Education.

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## 1. Introduction

In 1967, Barrows, a professor of Neurology in the United States, pioneered PBL, Problem-Based Learning, at McMaster University Medical College in Canada, which is often translated literally as "problem-based learning", also known as problem-based learning. It refers to the problem-based, student-centered and teacher-oriented group discussion teaching method in pre-clinical or clinical courses. It is characterized by breaking the boundaries of disciplines, compiling comprehensive courses around problems, aiming at shaping students' independence and autonomy, cultivating creativity and understanding, acquiring new knowledge, effectively using knowledge and solving new problems.

According to the degree of students' participation and the amount of background information about relevant cases, Barrows divides the PBL teaching method in medical education into five levels, namely, case explanation by teachers, case study by students according to the relevant case information obtained before class, and case analysis and discussion under the guidance of teachers. Discussions, in-depth discussion of cases one by one in order to improve the required conclusions of the improved case law, with the necessary help of teachers, students put forward solutions to the problem, students put forward and solve the problem after the method used in the process of re-evaluation of the problem cycle method. PBL is based on information processing psychology and cognitive psychology, "changing the passive learning method which is widely used nowadays to more active learning, including self-directed independent learning and tutorial guidance, to ensure lifelong continuous learning". It can be seen that PBL emphasizes that students should take the initiative to learn, rather than teachers' teaching in traditional teaching. It sets learning in complex and meaningful problem situations, so that learners can devote themselves to self-exploration and teamwork, maximize their enthusiasm for self-study, and stimulate and support learners' innovation. Consciousness and high-level thinking, so as to acquire the scientific knowledge hidden behind the problem, and ultimately form the skills to solve the problem and the ability to learn independently for life.

At present, this medical teaching method has been widely popular in the world. It is not only respected in medical schools and adopted by more than 1700 colleges, but also used for reference by management schools, business schools, engineering schools and education colleges of many comprehensive colleges to carry out teaching reform. Obviously, as a broad method of cultivating

internal motivation of learning, encouraging effective cooperation, developing autonomous learning and lifelong learning skills, the impact of PBL is not confined to undergraduate colleges, but also deserves to be further explored in the teaching of Higher Vocational colleges.

At present, the application of PBL in the teaching of Higher Vocational Colleges in China is rare. After reviewing the literature for nearly 20 years, there is no introduction of related work, and there is little experience worth learning. Although the work in this field is occasionally introduced in foreign countries, it is not suitable for the teaching situation of China's higher vocational education to completely adopt foreign experience, considering the wide differences in teaching mode, teaching method, cultural background, students' thinking mode, learning habits and other aspects at home and abroad, as well as the particularity of Higher Vocational education. Therefore, in recent years, on the basis of traditional teaching methods and based on the idea of PBL, we continue to explore new teaching methods of logistics management, and have achieved certain teaching results. Combining with teaching practice, this paper briefly introduces the ideas, measures and methods of teaching reform of Logistics and supply chain management course in Higher Vocational Colleges Based on PBL.

## 2. Teaching objectives

Logistics and supply chain management course is not only the basic course of logistics management specialty in Higher Vocational colleges, but also the compulsory course of specialty. To clarify the teaching objectives of this course, we must first define the training objectives of this major. Considering that on the one hand, vocational college students have poor foundation, short learning time, low interest in learning and inappropriate learning methods, on the other hand, they have strong practical ability, like novelty, are willing to perform, pay attention to the market, pay more attention to the effectiveness of learning, utilitarian and other characteristics, most vocational colleges have their own clear training objectives. Taking our university as an example, the training objectives of the students in higher vocational colleges are as follows: taking the social demand for logistics talents as the orientation, facing the first line of production, management and service of commercial enterprises, material circulation enterprises and industrial manufacturing enterprises, cultivating the specialty of firmly grasping computer and modern logistics technology for major logistics enterprises and bases. The basic theoretical knowledge and professional skills of industrial posts (groups) can be used as "wide-caliber, comprehensive and applied" junior and intermediate logistics operation and management personnel and high-quality workers who are engaged in warehousing management, cargo transportation, customs declaration, logistics control and material marketing.

Under the guidance of the above training objectives, the teaching objectives of this course are as follows:

- (1) Students should be able to correctly understand the basic concepts and theoretical system of logistics and logistics management, understand the historical evolution and future development trend of logistics, and initially establish the concept and vision of logistics, so as to lay the foundation for the follow-up course learning.
- (2) Preliminary training of students' ability of independent analysis and problem solving, team spirit, written and oral professional expression. When facing a specific logistics problem, we can draw up a basic and feasible research program, including literature research, on-site investigation, organization and implementation, report summary and so on, and initially have the ability of final implementation.
- (3) Develop students' interest and ability in self-improvement and lifelong learning. Book knowledge is very limited, and subject development is changing with each passing day. Students must have the interest of continuing to learn logistics management knowledge and engaging in logistics management profession, as well as the ability of lifelong learning, in order to become the labourer with strong ability, high quality and innovative consciousness.

### 3. Course description

With the development of modern logistics, it has become a business field of scientific system and a comprehensive field of multi-technology and multi-discipline. The disciplines and technologies involved include management, informatics, economics, mathematics, physics, computer science, electronic technology, mechanical manufacturing and so on. Therefore, the complexity of logistics management is far beyond the knowledge and technology level of traditional transportation or warehousing business. It is a multi-disciplinary and multi-field comprehensive management discipline that integrates modern transportation, information network, warehousing management, product back processing, marketing planning and many other contents. Moreover, the modern logistics industry is in a high-speed development stage, and various fresh theories and opinions are endless. Various advanced technologies and devices emerge in an endless stream, which can be said to be overwhelming.

As one of the basic courses of logistics management specialty in Higher Vocational colleges, Logistics and supply chain management course is usually completed in one semester, with about 60 hours. In such a short period of time, it is impossible to introduce all aspects of logistics management comprehensively and thoroughly; and as mentioned earlier, the development of logistics and logistics management is extremely rapid, "teaching people to fish is better than teaching people to fish". Teaching students the ability of self-improvement and lifelong learning is better than giving them some existing abilities. Knowledge is more important. Therefore, based on the idea of PBL, we have made some attempts in teaching methods.

### 4. Teaching Method Based on PBL

In the implementation of PBL teaching, we must fully consider the following disadvantages: first, the vast majority of our students are accustomed to the traditional teaching mode, lack of active learning skills, fail to grasp the key points in self-study, and lack of the ability to retrieve and analyze documents, which is particularly outstanding in vocational students with poor original foundation. Secondly, the vast majority of our students from school to school, lack of social experience, one-sided thinking, easy to go to extremes, poor hands-on ability, not good at comprehensive analysis, solve practical problems; Thirdly, students are still facing credit system, certificate examination, graduate employment pressure, and so on, some students are learning. Finally, Chinese teachers have long been teaching mainly, and there is a process of changing their role from dominant position to secondary position, and PBL teaching itself has higher requirements for teachers than traditional methods. If the students have just moved from high school to higher vocational college, they suddenly adopt the PBL teaching method throughout the course, which makes it difficult for them to adapt to this change. They will feel at a loss, spend too much energy, and fail to grasp the key points. Therefore, in the course arrangement, 2/3 of the class hours are still taught by traditional methods, while 1/3 of the class hours are based on PBL. Teaching methods are used in teaching. In fact, because the latter teaching method is student-centered, students mainly express themselves in various forms in 1/3 of the classroom time, and the ten-minute performance in the classroom often requires preparation a few days before class, so the PBL teaching method also indirectly plays a role in promoting students' learning. Specific methods are as follows:

(1) Self-regulated learning: In order to cultivate students' ability of independent learning, relatively easy chapters are selected, such as international logistics. Teachers guide students to carry out a planned and step-by-step "trilogy" of self-regulated learning. Firstly, teachers ask questions, then give a headline outline of self-regulated learning content, and provide bibliography for learning. Relevant requirements are also put forward, such as summarizing and comparing the corresponding contents in the form of tables and flow charts; then, students are required to study according to the self-study syllabus formulated by the teachers, complete the thinking and exercises attached to the textbooks, and then put forward the problems encountered in learning in written form. Teachers analyze and summarize the questions raised, focus on answering common questions in class, highlight the key

points and solve difficulties, and summarize them in sections. Finally, students are required to compile courseware in PowerPoint format according to their understanding of the relevant curriculum content, call names randomly in class, and adopt the way of "connecting dragons". By answering the teacher's questions one by one, the whole chapter is explained in sections. In order to stimulate students' interest, some fashionable elements are introduced, such as two students explaining the same paragraph named "PK", and other students voting for the winner. The strong sense of novelty effectively enlivens the classroom atmosphere.

(2) Group discussion and centralized guidance: The content of logistics cost management and control technology is difficult and boring. After introducing the basic principle of "inventory economy batch model", students are divided into groups according to 4-6 people. Each group provides a case, that is, a Problem, which is organized by students themselves for after-class discussion, and then the group leader. Represent the whole group to report the ideas and results of the analysis in 10 minutes in class. Teachers guide other students to find mistakes in the explanations of the students, find possible problems, discuss, explain and give targeted guidance, and change one person into a public comment. This form gives students the opportunity to show themselves, stimulates their interest in learning, and at the same time improves their ability of oral and written expression in the professional field. The author randomly set one of the two classes as a control class, using traditional teaching mode; the other class as an experimental class, using PBL teaching method, in order to measure the scoring rate of the same type of questions in the final examination, and to investigate the learning effect of this method.

Results Statistical analysis showed that the score rate of the experimental class was about 30% higher than that of the control class, and the difference between the two groups was highly significant ( $P < 0.01$ ).

(3) Game teaching: relying solely on classroom theory teaching can not effectively improve students' practical ability to solve problems. We must improve the mastery and learning of knowledge and skills through the operation of social practical cases. But if we teach in a rigid form, students may not be interested, but using game method can effectively improve students' practical ability to solve problems. Enhance the enthusiasm of students.

When introducing the "bullwhip effect" of supply chain, many students are incredible that "blind spots often exist in individual thinking, and small changes may lead to the collapse of the whole system". In this regard, we first ask the question, "4 boxes = 220 cars??" Then let the students start to play the "beer" game and experience the problem of demand variation enlargement, that is, a small demand vibration at the retail terminal, which enlarges the demand information deviation step by step. Through the multiplying function of the whole system, wholesalers and producers in the upstream supply chain can order. The problem of a dramatic and alarming increase in purchases. Students are stunned by the results of the game. Through such a classroom simulation game, they deeply understand the necessity of systematic thinking and logistics informatization. In short, heuristic game teaching combined with the actual social environment, on the one hand, can improve students' interest in learning, in line with the learning psychology of Higher Vocational students, on the other hand, it can also constantly update teaching resources to maintain the advanced nature of the course teaching.

(4) Case analysis: Case analysis means that teachers organize students to conduct research and discussion through the analysis of typical cases in class, guide students from individual to general, from concrete to abstract, and further understand and grasp the curriculum principles in practical cases. In fact, almost all the logistics management textbooks have a large number of case studies. The problem is that most of the cases are rigid, plain and direct, and students generally glance over as they read newspapers, and seldom think seriously. Therefore, when conducting case teaching, it is better for teachers to collect and organize by themselves, and then make full use of the audio-visual advantages of multimedia teaching, so as to have a strong pertinence.

For example, when introducing the security and significance of logistics, the question is raised: how to ensure the security of logistics? Then a pre-edited short film was shown to illustrate that during the Civil War, the United States Federal Army fought tenaciously on the battlefield, but in the early days

of the war, it was defeated and suffered tremendous losses because of the blind guns, grain mildew, fake and inferior medicines and black-hearted quilts supplied by logistics. Losses. Food, coffee and candy carried in military containers to the front are often mixed with half of the sand. The latter investigation was originally caused by the collusion of local profiteers, contractors of fake and inferior products, suppliers and corrupt officials mingled with the government and even the army, who were intent on making war wealth, national disaster and wealth, and by the rampant theft, fraud and transfer in the military logistics at that time. During the second war against Iraq in March 2003, the U.S. military logistics forces widely used the latest electronic software and hardware of the military model XXI. The instant information collected by satellite communication, electronic radio frequency identification (RFID) instrument and container tracking system provided transparency to the commanders and combat forces on the battlefield at any time. High logistics information, including military logistics name, quantity, packaging, box number, location, flow direction, start time, arrival time and place, not only has high efficiency, strong confidentiality, low cost, but also improves the combat effectiveness of the army to a considerable extent. Through this sharp contrast, the significance of "logistics transparency in transport state" to logistics security is revealed.

(5) Social Survey: Social Survey refers to a survey or management practice conducted by students on the spot. Its purpose is to help students understand logistics management practice activities, and to exercise students' coordination ability, communication ability and application ability of theoretical knowledge. It is an important teaching link to train students to understand and observe society, to train their application ability and operation skills, and to help them further improve their ability to analyze and solve problems.

But the social investigation here is not a practical course, but a link in the teaching of Logistics and supply chain management course, so it must be controlled reasonably in terms of time and scale. For example, students first put forward their own questions on how to operate a certain link of logistics, and then in an afternoon, through the cooperation of a large and medium-sized supermarket near the school, they investigate the current situation of logistics of the enterprise, including: purchasing logistics, supply chain management, warehousing practice, transportation practice, logistics information management. Management of logistics equipment, organize students to analyze the problems of the investigation, put forward the logistics improvement plan, and write the investigation report. On the one hand, the knowledge learnt is applied flexibly to solve practical problems. On the other hand, through investigation, students' ability of collecting and collating data is preliminarily exercised.

(6) Literature review: Logistics management teaching usually takes place in the first grade, and students have little knowledge of scientific research. By reviewing literature and writing a review on a certain issue, students can deepen their understanding of what they have learned, understand the development of a research field, and cultivate students' ability to consult literature and the habit of reading literature. Preliminary mastery of the structure and writing methods of the paper. The topic of the review is very important. The first time to write a literature review, the selected topic should be smaller. In this way, the number of documents is relatively small, and it is easy to summarize when writing. Otherwise, the topic selection is too large, the time spent in searching documents is too much, and it is difficult to summarize and sort out, which exceeds the students' ability level. Finally, even if it is barely completed, the quality is very poor. Maybe it's too big or too small to train soldiers. And if the topic is too big, there are hundreds of thousands of documents to read, it is very difficult to complete in a short time. With the characteristics of Higher Vocational students, it will immediately produce fear, and eventually perfunctory, and even some students may copy, which is counterproductive. In recent years, the author's topics include: modern logistics information tracking technology, logistics standardization, reverse logistics in e-commerce, collaborative logistics, regional logistics, agricultural products logistics distribution, catering industry logistics management, tobacco logistics, etc., because the literature on such topics is not much, students can easily understand, but also It has generated the interest of sorting out in accordance with their own ideas. Through this method of literature review, students' ability of literature review and summary has been

greatly improved, which lays a solid foundation for the high quality completion of graduation thesis. Some students even have the idea of consulting literature comprehensively and then writing for publication seriously, which should be fully encouraged and supported.

## 5. Assessment means

In the current education system, the implementation of teaching methods must rely on resolute means of assessment. In order to encourage students to invest in PBL with a positive attitude, the first class clearly announced that the final exam accounted for 60% of the total score, and the usual PBL study accounted for 40%. In fact, it is not difficult to objectively evaluate students' PBL learning. Most of the methods adopted at present have relatively clear results, such as discussion results, classroom expression, courseware, survey reports and reviews. However, in general, the work in this area needs to be further refined. Quantitative scoring of each achievement is a long-term goal, but it will greatly increase the workload of teachers. In addition, it is unreasonable for teachers to complete the evaluation of students' PBL learning outcomes. Team leaders, members of the same group and students themselves should all join in the evaluation, which is somewhat similar to the 360 degree evaluation method in management.

## 6. The Implementation Process of PBL Classroom Teaching Reform

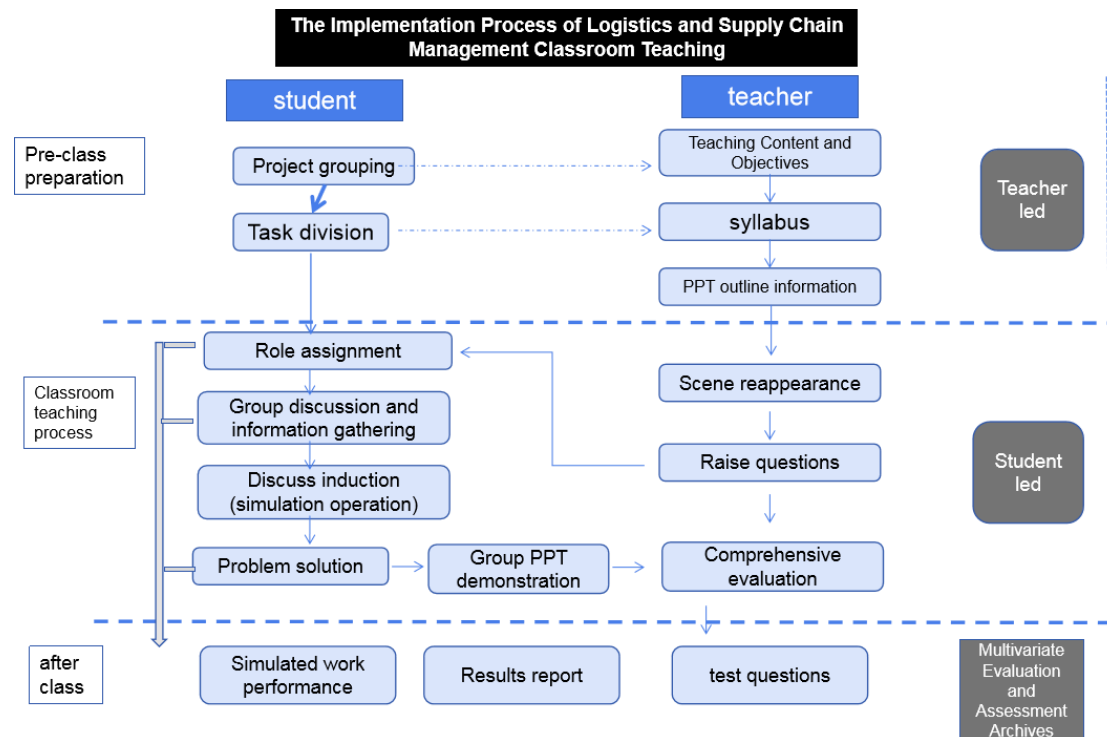
### (1) Preparations for Classroom Teaching

PBL teaching mode emphasizes problem-oriented and the improvement of students' problem-solving ability, which puts forward higher requirements for teachers and students. Teachers and students are required to do a lot of preparatory work before teaching and follow a certain process (Fig. 1), in order to ensure the implementation effect of PBL teaching method. The course "Operation Management of Distribution Center" mainly involves such modules as location planning, warehousing and inventory management, inward and outward management, distribution and processing (Figure 2). It has both basic knowledge and practical operation links. Before classroom teaching, teachers need to design tasks and set up problems according to teaching objectives, and combine basic knowledge with practical operation organically. Students need to assign roles according to their work tasks, set up different distribution enterprises, and carry out practical operations, so as to lay a good foundation for the improvement of classroom teaching effect.

### (2) Specific Implementation in Classroom Teaching

#### Scenario reappearance and problem derivation

PBL teaching mode pays attention to the cultivation of ability and emphasizes that the student-centered teaching mode replaces the teacher-centered teaching mode, which is conducive to improving students' ability to solve problems independently, making students take full advantage of modern scientific and technological means to participate highly, thus improving the teaching and learning effect. When designing problems, it is necessary to take into account the students' mastery of the original knowledge points and the students' understanding of the teaching content. Teachers should create scenarios in the context of entity enterprises and use multimedia technology to reproduce the scenarios. For example, "Logistics and Supply Management" on the location of food distribution centers, teachers can first collect relevant videos, news reports, cases, industry frontiers and other relevant information about food processing distribution centers, through the collation of information, to supplement the information for students, in order to facilitate students more. Have a good understanding of the problems to be solved. Secondly, according to the teaching objectives, it puts forward "problems", how to choose the location of different types of distribution centers, what factors and problems should be paid attention to in the location selection. In summary, the PBL-based teaching method plays a significant role in the teaching of Logistics and supply chain management courses in Higher Vocational colleges, but the systematic work in this field in China is still in progress. Few of them need further development.



The implementation Process of PBL Classroom in Logistics and Supply Chain Management course

### (3) Role division according to problems

This link is the key to the implementation of PBL teaching mode. Based on the understanding of the problems raised by the teachers, the group has a full discussion, and divides the roles according to the difficulty of the problems to be solved, so as to find a way to solve the problems. After a clear division of labor, autonomous learning and data collection are carried out. For example, when the course "Operation and Management of Distribution Centers" involves the internal planning of distribution centers, when teachers raise the question of "how to plan the internal layout of distribution centers for circulation", students divide their work according to their roles, collect information, and design after full discussion.

### (4) Program summary and demonstration, PPT demonstration and communication

After many analyses and discussions, the design plan was further improved to form the final written material. This link is the core of PBL teaching mode, and also the necessary link to further expand students' knowledge and professional ability. After summarizing and demonstrating the scheme, the relevant project managers use multimedia courseware to display the results. Other groups can learn and ask questions, exchange views, broaden students' horizons, and enhance students' ability to find, analyze and solve problems.

### (5) Assessment Archives after Classroom Teaching

Scientific and perfect evaluation and assessment system plays an important role in classroom teaching reform and improving teaching quality. In "Operation and Management of Distribution Centers", the evaluation and assessment of students mainly involves three aspects: teachers' evaluation of students (course results), performance evaluation of group roles, and professional quality of training enterprises. Assessment. The requirement of logistics talents for enterprises is not only limited to knowledge accumulation and operation skills, but also requires organizational coordination, teamwork and information processing capabilities. Establish "assessment files" for the assessment results involved in the course, take the professional standards of the society and employers as the important basis for the evaluation of the course teaching quality, and quantify the students' professional level, innovation ability and professional quality. "Assessment archives" can also be used as a reference for the follow-up professional courses, and play an important role in further improving the teaching effect and improving the curriculum system.

### (6) Use Multimedia Technology to Play the Role of Course Database

Logistics specialty course has strong practicality, especially Distribution Center Operation Management as a specialty course. As a classroom teaching, it is usually unable to go deep into enterprises for centralized training due to various restrictions, but there are many facilities and equipment involved in the curriculum and specific practical operation links. It is particularly important to use multimedia technology to establish curriculum database. Teachers should make full use of it in the course of teaching. Media images, audio, video and so on, will be the project task scene to reproduce. In Logistics and Supply Chain Management, pictures, videos and questions are set up. Teachers can query and demonstrate according to the teaching content, so that students can better understand the classroom teaching content and further improve the teaching effect of PBL teaching mode.

In summary, PBL-based teaching method plays a significant role in the teaching of Logistics and supply chain management courses in Higher Vocational colleges, but there is little systematic work in this field in China, which needs further development.

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