

Innovation of Logistics Management Talents Training Model in Application-Oriented Universities under the Background of New Liberal Arts

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Abstract—The construction of new liberal arts is an active exploration of higher education power in China, and it is also an important measure to innovate the talent training mechanism. Based on the present situation and existing problems of logistics management talents training in application-oriented undergraduate universities in China, combined with the objectives and requirements of new liberal arts construction and integrated the characteristics of logistics management disciplines, this research takes the talent training model as a breakthrough point, the industrial colleges and school-enterprise practice bases as carriers, and combines with the apprenticeship model, the diversified education model of government, industry, universities, and enterprises is put forward, as well as the credit system and tutorial system. It also put forward innovative paths and measures for the training mode of logistics talents of applied-oriented undergraduates under the background of new liberal arts from four aspects of training objectives, training process, training system and training evaluation. This research aims to provide reference for the practice of new liberal arts construction.

Keywords—new liberal arts, applied undergraduate universities, logistics management, student cultivation model

I. INTRODUCTION

On November 3, 2020, a new liberal arts construction conference was held in Shandong University (Weihai Campus), which sponsored by the New Liberal Arts Construction Working Group of China's Ministry of Education. A comprehensive plan for the construction of new liberal arts was made during the conference, and it also mentioned that the construction field of new liberal arts included literature, history, economics, management, etc. The fundamental task of the construction was to cultivate new people of the times, and one of the three major starting points of the construction was model innovation. Logistics management major belongs to the discipline of economics and management, and it is an

applied new major formed by the mutual infiltration of natural science, social science, and technical science, with the characteristics of comprehensiveness and cross-cutting. The talent training goal of it is to cultivate applied, compound, and innovative talents. But at present, the development of logistics management major is lagging behind and the interdisciplinary integration and cultivation of new talents is also insufficient. Therefore, under the background of "new liberal arts", it is of great significance to realize the innovation of talent training mode and promote professional development while combining the characteristics of major.

At present, about the academic research on talent training mode in application-oriented undergraduate colleges, for the research abroad, it mainly focuses on the areas of students' admission standard, talent training mechanism, training standard, training process and training evaluation, etc., and pays attention to students' practical and innovative training. For domestic research, it mainly focuses on the areas of talent training objectives, systems, model construction, case studies, etc., emphasizing the research of framework construction and case implementation. For example, Yang [1] took four transformation pilot application-oriented undergraduate colleges in L province as an example and proposed that schools should reform the talent training mode from three levels: school, government, and enterprise. Xu [2], taking C university in Chongqing City as an example, proposed the innovation of talent training concept and talent training mode in application-oriented undergraduate colleges under the background of new liberal arts. There are also scholars who study the talent training mode of applied undergraduate colleges in Shanghai [3], Fujian [4] and Hebei [5]. Alves, Carvalho, and Carvalho [6] proposed that for higher education, it should not only take responsibility of cultural construction, but also should contribute to regional economic development through its active participation. Sacchi [7] analyzed the demand of Swiss enterprises for the third stage education (higher education) from the perspective of employment and affirmed the positive significance of applied science for the

employment of students. For the research of a professional talent training mode under the background of new liberal arts construction, at present, the research at home and abroad mainly focuses on case study and theoretical research. For the case studies, most of them take a foreign country as an example, such as Germany, Britain and the United States. While at home, it mainly focuses on the research of application-oriented undergraduate colleges and their specialties which are well developed, representative and characteristic in various provinces and cities. For the theory research, it mainly focuses on the ways and methods of personnel training. For example, Zhao [8] conducted in-depth research and analysis on the educational mechanism of school-enterprise cooperation in newly-built application-oriented undergraduate colleges under the new liberal arts concept, and put forward a reasonable strategy of school-enterprise cooperation mechanism. Gao and Qi [9] took the professional training goal as the breakthrough point and put forward suggestions in four aspects, which are training goal, curriculum system, teaching staff construction and practical teaching. Yan, Yin, and He [10] studied the talent training mode of logistics management specialty under the background of new liberal arts from the perspective of the integration of industry and education.

Based on the current research situation at home and abroad, there are still some problems that exist in the training mode of a professional in application-oriented undergraduate colleges, such as outdated training objectives, training process, training system, training evaluation, etc., which are lack of deep integration and innovation with cross-disciplines, enterprise practice and new liberal arts ideas. Combining with the goal and requirements of new liberal arts construction, this research studies logistics management major in application-oriented undergraduate colleges. On the one hand, it can enrich the research of professional talents training mode in application-oriented undergraduate colleges under the background of new liberal arts construction, and provide theoretical reference and ideas for its development and innovation research. On the other hand, it can improve the tendentiousness problems caused by common case studies, and provide the research value for the cultivation of economic and management professionals under the construction of new liberal arts.

II. CURRENT SITUATION AND EXISTING PROBLEMS

With the rapid development of economy in China, the logistics industry has risen and developed rapidly. At the same time, logistics talents have been listed as one of the twelve shortage talents in China.

A. Overall Opening Situation of Logistics Management and Engineering Majors for Undergraduates in China

The establishment of logistics major was relatively late in China. It was approved by the Ministry of Education to set up logistics management major in 1993. Since then, Beijing Technology and Business University and Beijing Materials College have started enrolling students.

Although the logistics major was set up late in China, it developed rapidly in the later period. By 2021, according to the official website statistics, the details of logistics majors offered by undergraduate colleges in China are shown in Table I.

TABLE I. THE OPENING SITUATION OF LOGISTICS MAJOR IN UNDERGRADUATE COLLEGES IN CHINA

Professional category	Professional code	Professional name	Number of institutions opened
Logistics management and engineering	120601	Logistics management	528
Logistics management and engineering	120602	Logistics Engineering	135
Logistics management and engineering	120603T	Purchasing Management	6
Logistics management and engineering	120604T	Supply Chain Management	29

Data Source: Data collation by the author from the website of Sunshine gaokao.com.

As can be seen from Table I, there are 528 universities which set up the logistics management major (with professional code of 120601), followed by logistics engineering major, with 135 universities offering this major. As newly established majors, the number of universities which set up procurement management and supply chain management major are relatively few.

Among them, the distribution of universities offering logistics management majors in various regions of China is as follows.

Distribution of the number of colleges offering logistics management specialty in China

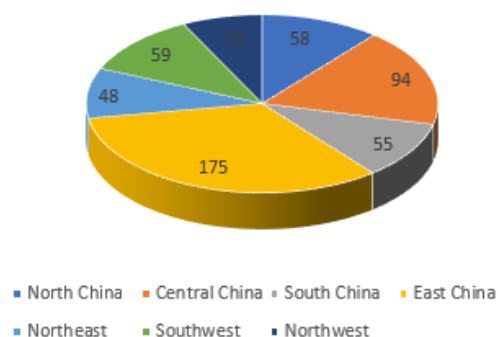


Figure 1. Distribution of the number of colleges offering logistics management specialty in China. Data sources: Collation by the author from the website of Sunshine gaokao.com.

According to Fig. 1 and specific data, among the major regions, Henan and Hubei provinces offer the largest number of logistics management colleges, with number of 38, followed by Jiangsu, with number of 37. The transportation in these three provinces is extremely developed, which is also in line with the high demand of logistics development for geographical location.

B. Scale and Employment Situation of Graduates Majoring in Logistics Management in Undergraduate Colleges in China

According to official statistics, by 2021, the number of graduates from logistics management colleges and universities in China is 38,000–40,000, with the ratio of male to female being 38%: 62%. The graduates are mainly

employed by civil servants, public institutions, university teachers, purchasing specialists/assistant bank accountants/teller sales representatives and sales representatives. At the same time, according to the career survey of the career platform, the average salary of graduates within three years after graduation is generally shown in Fig. 2.

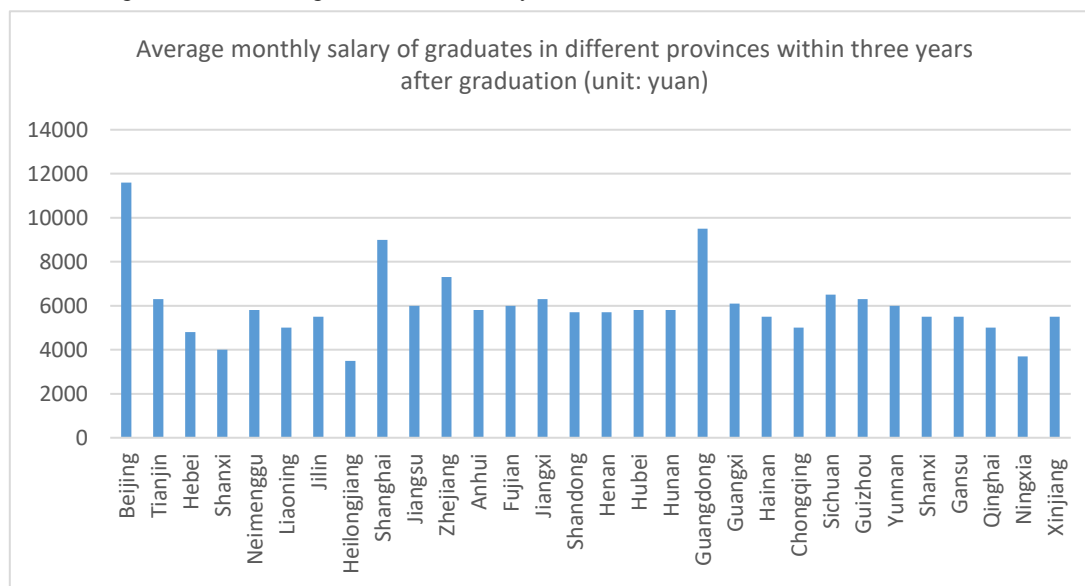


Figure 2. Average monthly salary of graduates from different provinces in China within three years after graduation. Data sources: Data collation by the author from the career platform.

As can be seen from Fig. 2, in most cities, the graduation salary level of students majoring in logistics management is 4,000-6,000 RMB, but in first-tier cities such as Beijing and Shanghai, the salary level can reach about 10,000 RMB.

C. Development Situation of Logistics Management Talents Training in Application-Oriented Universities in China

Combined with Table I, at present, more than 80% of the universities offering logistics management major in China have set their talent training objectives as application oriented. Under the guidance of this major orientation, its professional goal is to train senior applied talents who have basic theories and professional skills in logistics enterprise management, logistics system planning and design and related disciplines, train senior applied talents who have solid basic theoretical knowledge in operations research, management, economics, logistics and international transportation regulations, and can skillfully use foreign languages and modern management techniques and methods to handle logistics management business.

Based on the orientation of logistics management major and the training goal of professionals, the courses offered at present include theoretical courses and practical teaching. Among them, theoretical courses include general education, basic courses, professional compulsory courses, professional elective courses, practical training courses and innovation and entrepreneurship courses. To keep up with the development of the times, many colleges and

universities have also added professional elective courses such as international logistics, cold chain logistics, cross-border e-commerce logistics, intelligent logistics, Internet of Things technology, and big data analysis. Practice teaching mainly depends on professional experimental bases, experimental training rooms, etc., and relevant practice teaching is carried out around curriculum design. At the same time, with the help of off-campus practice bases, on-campus joint laboratories, etc., relevant practice teaching is carried out by means of probation, practical training, and on-the-job training. They also set up relevant industry classes and innovation classes in many colleges and universities. In terms of teachers, at present, most of the teachers majoring in logistics management in undergraduate colleges still come from research universities with Doctor's or master's degree, and the weak practical ability and lack of practical skills are still the common difficulties for them. Some colleges and universities have strengthened teachers' practical teaching ability by adding the requirements of enterprise practical experience in the recruitment process, issuing various incentive policies to already-employed teachers to encourage them to obtain vocational qualification certificates and skill certificates, and encouraging teachers to go to enterprises for temporary training with the help of industry and enterprise strength. In terms of student training, application-oriented undergraduate colleges mainly focus on three modes: "ability training and skill textual research + discipline competition + entrepreneurial practice", and integrate the cultivation of knowledge

ability, practical ability, and innovative ability of logistics management students into the talent training system.

D. Problems Existing in the Cultivation of Logistics Management Talents for Applied Undergraduate Students in China under the New Liberal arts Background

Logistics management major belongs to the economics and management discipline, with the characteristic of comprehensive and cross-cutting. The goal of its talent training is to cultivate applied, compound, and innovative talents. At present, under the background of new liberal arts, the development of logistics management major is lagging and lacking in interdisciplinary integration and cultivating new talents.

First, in terms of training objectives, although the current training objectives of professional talents are advanced applied talents, with the rapid development of logistics industry, the connotation and requirements of application are constantly changing, and the essence and requirements of application must be closely linked with the development of industry and enterprises, the accurate positioning can be achieved only through timely and rigorous research and demonstration. In addition, the training objectives of talents include not only knowledge and skills objectives, but also include five-education objectives, etc. On the one hand, the existing training objectives of logistics management professionals lack communication with industries and enterprises, and scholars and experts on campus agree on their own, which tends to be theoretical. On the other hand, they also lack

guidance on moral education and aesthetic education. Secondly, in the training process, because most teachers lack the practical experience of enterprises, it is normal that the contents taught are theoretical and lack of application in the process of training. Besides, due to the separation from industries and enterprises, the training process is still mostly completed by schools, and poor practical ability and lack of professional quality of students in employment are also common problems. Third, for the training system, on the one hand, because most of the students are in school, the learning and training system is still more in compliance with the provisions of the university learning system, lacking flexibility and individual applicability. On the other hand, the makers and executors of the professional personnel training system are still professional leaders and related teachers, lacking the participation of industry and enterprise personnel, which further leads to the singleness and lag of the training process. Finally, in the aspect of training evaluation, at present, the evaluation of professional talents training is manifested in curriculum learning evaluation, graduation practice evaluation, graduation thesis evaluation, etc. The proportion of theoretical knowledge learning evaluation is high, and the evaluation method is biased towards outcome evaluation. The main body of evaluation is colleges and universities, with less participation of industries and enterprises.

III. INNOVATION OF LOGISTICS MANAGEMENT TALENTS TRAINING MODEL BASED ON MODERN APPRENTICESHIP AND MULTI-EDUCATION MODEL

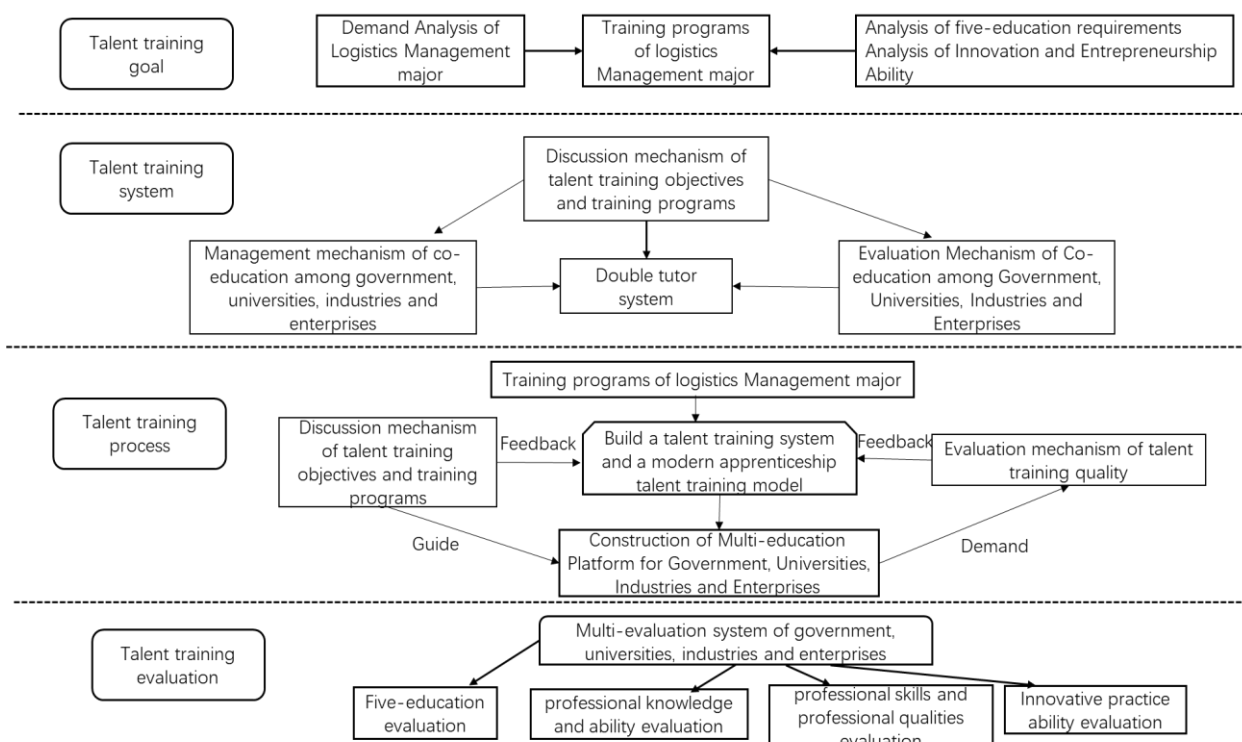


Figure 3. Training scheme of compound talents for logistics management major of applied undergraduate. Data sources: Information sorted out by the author.

As an important part of the national higher education strategy in the new era, the new liberal arts is a concept corresponding to the traditional liberal arts. In terms of talent cultivation, it is required to break through the limitations of the traditional majors and disciplines and carry out multidisciplinary collaboration to meet the needs of modern society, so as to create new liberal arts talents with technical and professional compound skills and creative vision. Major optimization, curriculum quality improvement and model innovation are the three key points in the construction of new liberal arts. From the perspective of innovation of professional talents training mode, based on the current situation and existing problems of logistics management talents training in application-oriented undergraduate colleges in China, combined with the requirements of new liberal arts construction, this research puts forward an innovative logistics talents training mode based on apprenticeship and multiple co-education mode from four aspects: talent training objectives, training system, training process and training evaluation, and constructs a compound talents training scheme for logistics management in application-oriented undergraduate colleges, as shown in Fig. 3.

A. Innovation of Training Objectives

With the transformation and upgrading of the logistics industry, the continuous emergence of new logistics technologies, new modes and new formats, and the logistics reform brought about by the outbreak of COVID-19, new requirements are put forward for the training objectives of logistics management major. Combined with the problems existing in the training of logistics management talents in application-oriented universities in China, in terms of talent training objectives, they should unite the power of government, industry and enterprises on the existing basis, set up a special team of experts for analyzing the needs of logistics management professionals, the requirements of five-education and the ability of innovation and entrepreneurship every year, and integrate the above analysis results into the training scheme of logistics management major. In short, the goal of talent training should be in line with the actual needs of industry enterprises, combined with the needs of new liberal arts construction, and fully consider the cultivation of students' five-education, innovation, and entrepreneurship practice ability, etc.

B. Innovation of Training System

Combined with the current situation of logistics management talents training for application-oriented undergraduate students in China, in terms of training system innovation, firstly, as for the executive body, it should be fully incorporated into the government, industry and enterprises, and under the guidance of the mutual discussion mechanism of talent training objectives and training programs, the management mechanism and evaluation mechanism of jointly educating logistics talents by government, universities, industries and enterprises should be jointly agreed, and the implementation of relevant systems should be jointly guaranteed. Secondly,

in terms of the content of the training system, under the guidance of the training objectives and training programs, the government, industries, enterprises, and universities should jointly reform and innovate the traditional training mechanism, taking into account the requirements of new liberal arts construction. At the same time, the advanced educational concepts from developed countries can be introduced, while combining the actual training situation of logistics management major in China, the double tutorial system under the modern apprenticeship model can be considered to implement.

C. Innovation of Training Process

The training quality of logistics major is the fundamental guarantee to decide whether to establish a replicable talent training model, and the training process is also the key to determine the final training quality. Combined with the problems existing in the training of logistics management professionals in application-oriented universities in China and the requirements of new liberal arts construction, it made innovations in the training process from the aspects of teaching system, curriculum system and teacher construction.

First, combined with the modern apprenticeship model, government, industry, and enterprises are given full play to build a training model of multi-party co-education during training process, as shown in Fig. 4.

As shown in Fig. 4, the government, industry, enterprises and universities each bear the responsibility of logistics management personnel training, and jointly complete the whole process of personnel training.

Secondly, around the above-mentioned talent training mode, in terms of teachers' composition, the teachers of logistics management major are no longer only from universities. Instead, the government, industry, enterprises and universities can jointly build a professional expert database. Teachers from the expert database can undertake the education and teaching task of students and participate in the whole process of training students. For example, government and industry experts can teach logistics management students the cutting-edge knowledge or technology in the industry and explain the latest scientific research and development in the industry. Industry and enterprise teachers teach the professional quality requirements or professional practice knowledge and skills for students; Teachers from universities can mainly explain professional theoretical knowledge to students, and lead students to participate in relevant training practices. In addition, according to the learning needs of students in different academic years, experts from government, industry and enterprises can be arranged to attend the universities to give lectures. In terms of curriculum system, a new curriculum system covering general education, subject education, professional education, and practical education is constructed, and new requirements are put forward in combination with the requirements of new liberal arts construction and the multi-education characteristics of politics, administration, enterprises, and universities, as shown in Fig. 5.

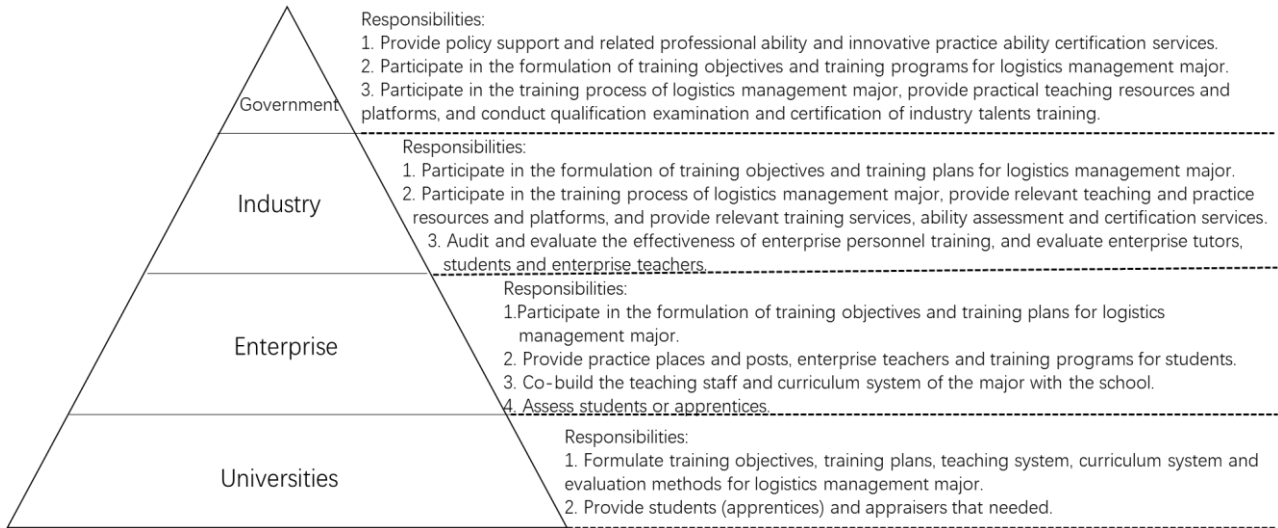


Figure 4. Modern apprenticeship talent training mode of multi-education among government, industry, enterprises and universities. Data sources: Information sorted out by the author.

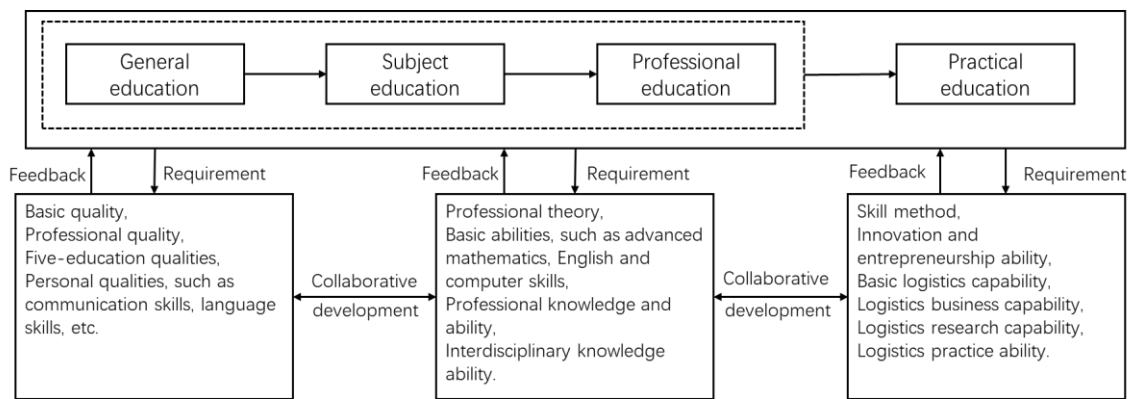


Figure 5. Construction of curriculum system of logistics management specialty in application-oriented universities. Sources: Information sorted out by author.

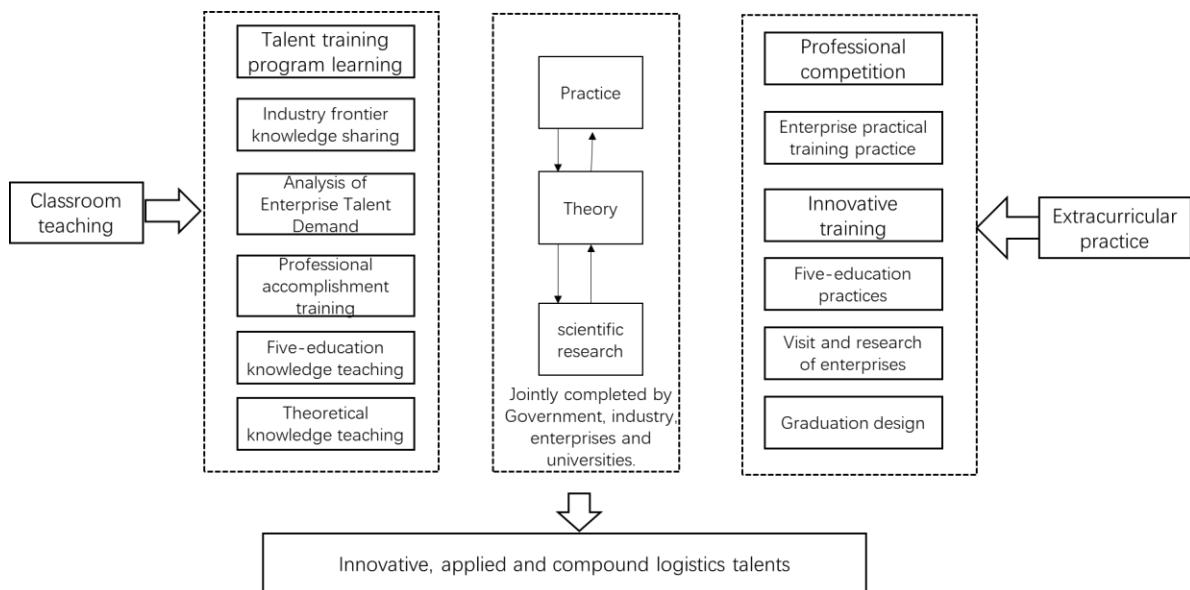


Figure 6. Course completion mode of logistics management major for applied undergraduate students. Data sources: Information sorted out by the author.

According to the curriculum system construction diagram of Fig. 5, students' whole curriculum implementation can be divided into two ways: in-class and out-of-class, as shown in Fig. 6.

Combined with the characteristics of the modern academic system, in Fig. 6, the knowledge learning in enterprise practice of students is divided into two aspects of learning: what you should know and what you should do. The part you should know mainly corresponds to the classroom learning part in Fig. 6, and the part you should do mainly corresponds to the extracurricular practice part in Fig. 6.

D. Innovation of Evaluation

Traditional logistics management professional training quality is usually investigated from the aspects of theoretical knowledge, lacking in the investigation of innovation, entrepreneurship, creative thinking, five-education quality, professional quality, etc., and the training process lacks the participation of employers, which lead to the training evaluation is single and one-sided. Combined with the modern apprenticeship training mode, with the help of the above-mentioned forces of politics, industry, enterprises and universities, the evaluation of students training quality can be diversified and process oriented. The evaluation content can be assessed from multiple dimensions of classroom and extracurricular activities. The main body of evaluation can be conducted by the government, industry, enterprises and universities. The evaluation index of training quality can be carried out by comprehensive evaluation of academic performance, the results of five-education practices, the effectiveness of innovative practice ability, and the effectiveness of professional quality training. In the end, after multi-party evaluation, students can obtain academic degree certificates, academic certificates, professional ability certification certificates issued by industries and enterprises, and even professional qualification certificates issued by the government. Through the above reform of training quality evaluation, the training effect of students can really meet the requirements of high quality and be close to the actual needs of industry enterprises.

IV. CONCLUSION

The concept of new liberal arts construction is an important carrier for the development of philosophy and social sciences in the new era, and the construction of new liberal arts has pointed out the direction for higher education to shift from discipline-oriented to demand-oriented in specialty construction and talent cultivation in China. Under the background of new liberal arts, combined with the current situation and existing problems of logistics management talents training in applied undergraduate universities in China, this research puts forward an innovative mode of logistics talents training based on apprenticeship and multi-education mode from four aspects, which are talent training objectives, training system, training content and training evaluation, and constructs a compound talent training scheme for applied undergraduate logistics management majors, pointing out the specific implementation methods, and finally which aiming at providing ideas and reference for logistics management talents training in applied undergraduate

universities of China under the background of new liberal arts.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Hui Ming conducted the research, Min Lu analyzed the relevant theory, Huichuan Dai analyzed the data; Hui Ming wrote the paper. All authors had approved the final version.

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