



Research on the Mode of Integrating Industry and Education of Professional Characteristic Colleges Based on the "Double-Carbon" Goal

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Abstract. In 2020, China announced to the world its goal of achieving carbon peak by 2030 and carbon neutrality by 2060 (the "double-carbon" goal). To achieve the "double-carbon" goal is a major strategic decision of the CPC Central Committee based on the new stage of development, implement the new development concept, build a new development pattern, and promote high-quality development. Achieving the goal of "double carbon" requires the support of strong professionals. The state education department supports colleges and universities in building demonstration colleges with distinctive specialties based on distinctive disciplines and majors. This paper takes the construction of modern logistics characteristic college as an example, around the professional characteristics of "green and low-carbon cold-chain logistics", the new model of industry and education integration is studied, a platform of integrated education has been built. The research results provide an important reference for the construction of characteristic colleges in China.

Keywords: Higher education, integration of production and education, Education mode, Characteristic college.

1 Introduction

Zhan Ting and others proposed that characteristic professional colleges refer to the secondary teaching units of higher vocational colleges with professional groups that are suitable for the development of regional pillar industries. The professional groups can fully reflect the orientation of running a school, and have a high educational level, good social benefits and distinct school-running characteristics^[1].

According to the Administrative Measures for the Construction of Demonstration Characteristic Colleges issued by the General Office of the Ministry of Education, professional characteristic colleges are secondary colleges with new organizational mode and flexible institutional mechanism and are supported by special national policies in order to cultivate all kinds of outstanding talents. National government departments have issued a series of policies and measures to support colleges and

universities in building demonstration majors and characteristic colleges based on distinctive disciplines and majors, so as to further improve the level of distinctive education^[2].

The Ministry of Education and other "Adjustment and Optimization of General Higher Education Majors" proposed to "strengthen the construction of professional colleges", support universities to build demonstration professional characteristic colleges based on the characteristic advantages of disciplines and majors, and further improve the characteristic level of colleges and universities^[3].

Therefore, how to give full play to their own disciplinary advantages and professional characteristics, and cultivate the green and low-carbon applied professional talents urgently needed by the society as soon as possible, is the urgent requirement for China to achieve the "double-carbon goal", and also the inevitable choice for the high-quality transformation and development of colleges and universities. Shandong Modern University (hereinafter referred to as "the University"), as an application-oriented undergraduate university, Implementing the development strategy of "building schools with quality and running schools with characteristics", A basic pattern of coordinated development of medicine and engineering as the main body, and of medicine, engineering, management and education has initially taken shape. The University relying on the advantages and characteristics of logistics management and automobile service engineering, Establish the Modern Logistics Characteristic College (hereinafter referred to as the "Characteristic college"), to build a professional characteristic and well-known brand of "green and low-carbon cold chain logistics" is a major strategic decision for the university to actively respond to national policies and measures and realize the high-quality transformation and development of disciplines and majors.

2 Construction Background of Characteristic College

2.1 National Policy Background

In July 2024, The State Council issued the Opinions on Accelerating the Comprehensive Green Transformation of Economic and Social Development, which proposed that promoting green and low-carbon economic and social development is an important symbol of the Party's new concept and practice of governance in the new era, the key to achieving high-quality development, and the inherent requirement for building a harmonious coexistence between man and nature^[4].

The General Office of the State Council proposed several Opinions on Deepening the Integration of Industry and Education that the main objectives of deepening the integration of industry and education are as follows: Gradually improve the industry enterprises to participate in educational degree, improve the diversified system, comprehensive implementing collaborative education between colleges, in 10 years time, the basic formation of education and industry as a whole fusion, the development pattern of benign interaction, improve the demand oriented talent training mode, basically solve the talent education supply and industrial demand major structural contradictions, higher education contribution to economic development and industrial

upgrading significantly enhanced. Therefore, based on the national strategy of the "double-carbon" goal, The realization of green and low-carbon transformation and development is the primary problem to be considered and solved^[5].

2.2 Industry Development Background

Under the background of the "double-carbon" goal, cold chain logistics, as an industrial field with high energy consumption and high emission, is facing the prominent contradiction between scale expansion and carbon emission control, and it is urgent to accelerate the pace of emission reduction and low-carbon transformation. Therefore, the national "difference" cold chain logistics development plan "put forward to implement" cold chain logistics innovation low carbon development project ", accelerate the process of cold chain logistics greening, encourage institutions of higher learning further docking industry demand, improve the government production with a combination of multi-level cold chain logistics personnel training system, speed up the cultivation of high quality cold chain logistics talents^[6].

2.3 Discipline and Professional Background

The characteristic college is built by the integration of logistics management and automotive service engineering. logistics Management has a high-level teaching team. It has established the professional direction of "green and low-carbon cold chain logistics", and established the virtual teaching and research section of modern logistics. Centering on the goal of applied talents training, it has comprehensively carried out the integration of teaching and research, and achieved fruitful results. The major of Automotive Service Engineering is the construction point of first-class undergraduate majors in Shandong Province, with good practical and teaching conditions. It has 17 professional laboratories such as new energy vehicle laboratory, and jointly builds a productive training base with Inspur Group.

3 Innovation of the Talent Training Mode of the Characteristic College

3.1 Construction Objectives of the Characteristic College

Characteristic college grasps the green low carbon development concept, focusing on the people's livelihood big health industry demand, accurate docking food, medicine industry cold chain logistics demand, continuous innovation "production fusion, collaborative education" mode, comprehensively deepen education teaching reform, improve teaching and social service ability and level, cultivate economic and social in urgent need of high level applied professionals, strive to build in five years "green low carbon cold chain logistics" characteristic of exemplary professional characteristics^[7].

3.2 Innovation of the Talent Training Mode of the Characteristic College

HuJun et al Study the "new project" under the background of industry education integration collaborative training mode, points out that under the guidance of the national main strategy, economic and social development in colleges and universities, enterprises, government collaborative training high level professional engineering talents, can effectively improve the students' innovation ability, improve market awareness, so as to promote sustainable development^[8].

Based on the above research results, In order to realize the construction goal of the characteristic college, the college focuses on the goal of training high-quality applied professionals, according to the basic idea of "system thinking, closed-loop control and continuous improvement", deepen the school-enterprise cooperation, to form a new ecological integration of production and education and collaborative education mode, its basic logical structure is shown in Figure 1.

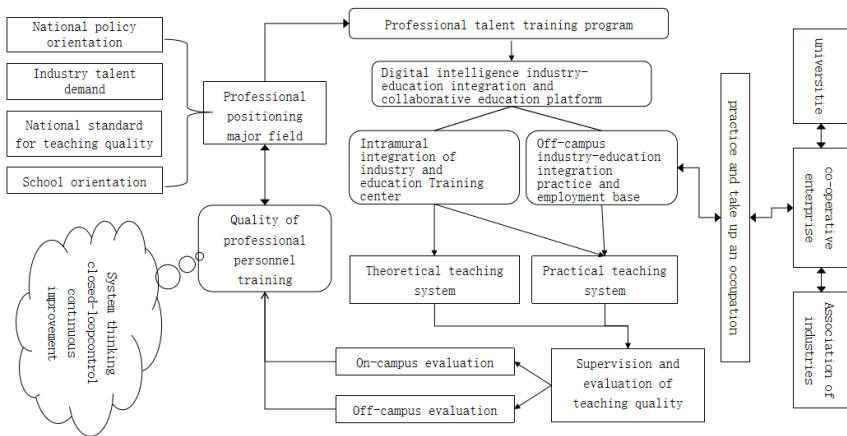


Fig. 1. The basic logical structure of the mode of industry-education integration and collaborative education

This model is jointly operated by the school, the enterprise and the industry association. First of all, the college and Jinan Jinyu Medical Laboratory Center jointly built the "College of Pharmaceutical Cold Chain Logistics Industry". According to the needs of the pharmaceutical logistics industry, both sides have carried out the comprehensive and in-depth integration of industry-university-research and application, and achieved remarkable results. Secondly, the college and Shandong SF Express Co., Ltd. jointly build the "Cold Chain Logistics Practice and Employment Base". Relying on the actual production of the enterprise, it mainly builds the on-campus training center and off-campus practice and employment base for the integration of industry and education. Thirdly, the college has established a long-term and stable cooperative relationship with Shandong Modern Logistics Association and other industry associations, and the association provides a real and reliable industry

development situation and accurate talent demand situation for the development of the college.

4 The Construction of the Campus Practice Teaching Platform

Leovani Guimarães and Renato Lima Introduced the problem-based course learning (PBL) practice, teachers and students can design their own PBL courses through the problem scenarios and theoretical framework. The results show that more than 91% of students like the practical teaching mode of PBL to improve the students' learning level^[9].

Based on the above-mentioned studies and the actual needs of campus logistics, according to the basic principles of "advanced technology, prominent characteristics, virtual and real integration", the campus practice teaching platform mainly builds three sub-platforms: low-carbon cold chain logistics training platform, digital intelligence supply chain virtual imitation real training platform and innovation and entrepreneurship practice platform. The school cooperates with enterprises to build a "local leading, domestic first-class, distinctive" industry-education integration training center.

Based on the basic theory and core process of cold chain logistics, the low-carbon cold chain logistics training platform will build an innovative cold chain logistics training platform to meet the teaching, scientific research and social services of cold chain logistics, and finally build a regional cold chain logistics education demonstration center.

Digital intelligent supply chain virtual imitation reality training platform integrates the application of virtual reality and other modern information technologies, to build a virtual supply chain management practice teaching platform, so that students can carry out virtual imitation reality training of supply chain management in a safe environment.

Based on the physical operation needs of campus express, the innovation and entrepreneurship practice platform will build a physical operation scene of "smart express station + new retail", innovatively apply the low-carbon campus express mode, build a high-quality campus life service complex, and finally build a demonstration base for the integration of ecological campus express production and education.

Through the construction of the campus teaching practice platform, it highlights the characteristic brand of "green and low-carbon cold chain logistics", promotes the integrated development of "teaching and research", and provides a real comprehensive practical training environment for the training of high-quality applied professionals.

5 Achievements of the Construction of Modern Logistics Characteristic College

The university and the enterprise jointly built the "School of Pharmaceutical Cold Chain Logistics Industry" and "Internship and Employment Base", and have achieved fruitful results in professional construction, daily teaching, teaching and research.

The Characteristic Colleges has a provincial first-class undergraduate major construction point, built a "double teacher and double ability type" professional teacher team, and set up a "green logistics industry and education integrated development practice teaching team". Presided over 15 provincial and ministerial scientific research projects such as "Construction of Carbon Emission Calculation Standard System in Shandong Province"; published 6 academic monographs entitled "Selection and Application of Key Technology Equipment of Low-carbonized Fruit and Vegetable Cold Chain Logistics System". It has completed 10 teaching and research reform projects at all levels, and published more than 20 academic papers.

Guided students to set up 4 research projects, participated in 22 academic competitions at all levels; In practice teaching link, by the graduation practice, graduation design practice teaching task, the implementation of "graduation + employment" superposition effect, such as the 2024 graduate zhang classmates during the internship, at the end of the internship was the company straight hired as business director, become a typical representative of applied talents training quality.

6 Conclusion

Based on the background of national "two-carbon goal", this paper takes the construction of modern logistics characteristic college as an example, focuses on the new mode of professional characteristic college construction, and puts forward the construction content of campus practice teaching platform. Through the construction of professional characteristic colleges, it is a major strategic decision for the university to further optimize the high-quality transformation and innovation of the integration of industry and education, and create the professional characteristics and famous brand of "green and high-carbon cold chain logistics". It provides an important reference for the construction of characteristic universities.

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