

# Research on the Integrated Training Path of Secondary Vocational, Vocational, and Undergraduate Talents Based on Modern Vocational Education Group

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**Abstract:** Accelerating the construction of modern vocational education groups and promoting the integrated training of secondary vocational, vocational, and undergraduate talents, providing talent support for regional economic development, are inevitable choices to enhance the adaptability of vocational education. Based on the new development and requirements in the new situation, vocational colleges actively explore the path of connecting and cultivating secondary vocational, vocational, and undergraduate talents in accordance with the talent needs of local economic development and industrial system development. The linkage between government, school, and enterprise is established to build a modern vocational education group, aiming to build a professional chain in the industrial chain and promote innovative development of the new industrial system. Relying on the development needs of professional clusters, a multi-level system of connecting and cultivating secondary vocational, vocational, and undergraduate talents is constructed, which is in line with industry and enterprise standards. It is also necessary to build a “post-course competition certification” talent training model for connecting secondary vocational, vocational, and undergraduate students, rely on the advantages of multiple schools and enterprises, establish a platform for integrating industry and education, and innovate the evaluation system for connecting secondary vocational, vocational, and undergraduate students.

**Keywords:** Modern vocational education group; Integrated training; Vocational education; Talent cultivation

**Online publication:** November 23, 2023

## 1. Introduction

Establishing a modern vocational education system is an important measure for Chinese vocational education to develop and improve itself, and connect with the world<sup>[1]</sup>. It is an important guarantee for effectively promoting the reform of vocational education in China and ensuring the healthy development of vocational education. In order to implement the spirit of the Decision of the State Council on Accelerating the Development of Modern

Vocational Education, six ministries and commissions including the Ministry of Education of the People's Republic of China have organized the preparation of the Plan for the Construction of Modern Vocational Education System, which clearly proposes that China should build a modern vocational education system with world level and Chinese characteristics, open-up the channels for the integration of middle and high school (secondary vocational, vocational, undergraduate), and promote the coordinated development of vocational education. Ultimately, a comprehensive and scientifically feasible modern vocational education system will be formed <sup>[2]</sup>. Chen Ziji, Director of the Department of Vocational Education and Adult Education of the Ministry of Education, pointed out that building an integrated vocational education system is conducive to opening-up channels for the growth and development of technical and skilled talents <sup>[3]</sup>. The integration of the school system is the cornerstone, consolidating the basic position of secondary vocational education, promoting the improvement of quality and excellence in vocational colleges, steadily developing undergraduate level vocational education, and improving the education system that integrates training forms such as the five-year consistent system and highly integrated base <sup>[4]</sup>. In the context of the current construction of a new industrial system, it is necessary to actively explore new models of integrated talent cultivation in vocational education, enhance the adaptability of vocational education, provide theoretical support and guidance for the transformation and development of vocational education, and provide theoretical support for the transformation and development of local vocational colleges, in order to provide certain guidelines and visits for improving the structure of higher education and the modern vocational education system. At the same time, this study can provide practical strategic suggestions for secondary vocational colleges, vocational colleges, and application-oriented undergraduate colleges to re-examine their educational positioning, training objectives, and reconstruct the training system for technical application-oriented talents. It can help vocational colleges to overcome development difficulties and promote the reform of integrated talent training models in vocational colleges. Resolving the development problems of vocational colleges based on demand and promoting the reform of talent cultivation models oriented toward vocational education will also alleviate the structural mismatch between the supply of vocational college graduates and the demand for social talents.

## **2. Current situation of talent integration and training in secondary vocational and vocational education**

From the current situation, although the country and government emphasize the construction of a modern vocational education system that integrates secondary vocational, vocational, undergraduate education, the breadth and depth of relevant research are still insufficient, and the process of practical research is still slow. At present, China has implemented the 3+4 pilot program for vocational and undergraduate education, including the 3+2 model for secondary vocational and vocational education, the 3+2 model for vocational and undergraduate education, and the separate enrollment of vocational colleges and applied undergraduate colleges for vocational schools, which has opened-up the growth channel for applied talents <sup>[5]</sup>. However, it is not optimistic that the talent cultivation models of secondary vocational, vocational, undergraduate universities are mostly based on the needs of talent cultivation at this level, as well as the teaching conditions and resource conditions of the university. They do not adapt to the correlation and gradual growth of students' own knowledge and skills, which affects the quality of talent cultivation <sup>[6]</sup>. Based on the specific requirements of promoting the comprehensive training of secondary vocational, vocational, undergraduate talents by the country, promoting the transformation and development of local universities, and accelerating the cultivation of artisanal professional talents, a systematic study of the current situation of comprehensive training of secondary vocational, vocational, undergraduate talents in vocational education, analyzing the existing problems, and

proposing corresponding measures and solutions, has become an important topic in the current reform and development of vocational education in China.

Regarding the research on the cultivation mode of modern vocational education system integration and connection, 154 research papers were searched on CNKI using the keywords “secondary vocational,” “vocational,” “undergraduate,” and “integration/connection,” mainly focusing on the following four aspects.

## **2.1. System connectivity**

In countries with developed vocational education, the integration of training models and curriculum systems in vocational schools, vocational colleges, and applied undergraduate colleges has formed many operational models, and achieved good results in practice<sup>[7]</sup>. In recent years, China’s vocational education has also attracted widespread attention from the academic community regarding various issues such as talent cultivation models, curriculum system integration, integrated standards, and talent cultivation evaluation. Due to the fact that higher vocational education and undergraduate education belong to the same level of higher education, the integration method often adopts a mechanism of mutual recognition and transfer of credit. Vocational education often adopts measures such as mutual recognition of credits and vertical integration of vocational qualifications among vocational schools. However, the talent cultivation models, curriculum system integration, integrated standards, and talent cultivation evaluation of middle, high, and primary schools are still in an independent and fragmented state, failing to achieve vertical and horizontal interconnection. The academic community has conducted extensive research on the connection between the curriculum system of vocational education and applied undergraduate education, but has neglected the connection between vocational education and applied undergraduate education. At the same time, relevant research often focuses on the vertical system aspect, and insufficient attention is paid to the horizontal integration.

## **2.2. Significance of integration and connection**

Tang Weiguang pointed out that promoting the integration of talent cultivation models and curriculum systems in vocational schools, vocational colleges, and applied undergraduate colleges has important practical significance. Firstly, it can help to adapt to the changes in China’s economic development and cultivate high skilled and versatile talents that meet the needs of social development. Secondly, China’s economic structure is facing deep adjustment, promoting the healthy and sustainable development of vocational education, and achieving innovation and improvement in talent cultivation models is an inevitable direction for the current development of vocational education in China. The third significance is to promote the sustained and healthy development of continuing education, which is crucial for building a learning society and improving the lifelong education system<sup>[8]</sup>.

Liu Qi proposed new ideas and perspectives on the “connection between middle and high vocational education” and emphasized the need to abandon the traditional follow-up study mode in the process of “connection between middle and high vocational education,” and strive to adopt a separate class mode<sup>[9]</sup>. According to Tang Weiguang’s research, there are currently two types of school system connection in China: “consistent system connection” and “segmented and continuous connection.” The “consistent system connection” has various forms such as a four-year consistent system, a five-year consistent system, and a six-year consistent system, which are divided into two teaching stages corresponding to the middle and higher vocational levels<sup>[10]</sup>. Segmented connection refers to students entering vocational colleges for further education through exams after completing their studies in vocational schools (or ordinary high schools). In the specific implementation process, the connecting schools are no longer independent secondary vocational and vocational colleges, but exist in a

collaborative manner. The educational goals of the two stages are both coherent and hierarchical <sup>[11]</sup>.

### **2.3. Problems and strategies of integration and connection**

Wang Yitao used multiple schools in Jiangsu Province as an example to analyze the current situation and bottlenecks in the connection between vocational education levels, such as secondary vocational education, vocational education, undergraduate education, and master's education. They proposed to improve the multi-level vocational education talent cultivation system of "middle and high vocational education, undergraduate education, and master's education," establish an integrated talent cultivation connection mechanism, standardize teaching connection management and assessment mechanisms, and explore the integration and communication mechanism inside and outside the system, and strengthen the guarantee mechanism of the connection system <sup>[12]</sup>. Zhang Hongrui conducted a comprehensive analysis of the current development status of the connection between higher education and undergraduate education in vocational education in China, pointed out the problems in the connection, and proposed constructive strategies such as starting from talent cultivation goals and school positioning, emphasizing the combination of professional settings and local economic development, matching teacher teaching and teaching models, and forming an integrated talent cultivation model through school-enterprise cooperation. On the basis of discussing the current implementation status and quality supervision of the connection between middle and high schools, Gao Huanqing explored strategies for promoting the connection between middle and high schools in terms of quality standard construction, organizational implementation mode, monitoring, and improvement <sup>[13]</sup>.

## **3. Problems in the comprehensive cultivation of talents in secondary vocational, vocational, and undergraduate education**

Developed countries around the world have experienced years of exploration in the connection between secondary vocational, vocational, and undergraduate education, gradually forming mature theoretical achievements and practical models. However, the overall achievements and practical models of various countries are mostly based on their actual implementation. So far, there has not been a universally applicable model for connecting and cultivating secondary vocational, vocational, and undergraduate talents. At present, research on the cultivation of integrated talents in secondary vocational, vocational, and undergraduate education in China is still in its infancy. Although certain research results have been achieved, due to various reasons such as practical conditions, there are several problems, as follows.

### **3.1. Lack of practical research**

At present, there is a lot of macro theoretical research on the problems and countermeasures of connecting secondary vocational, vocational, and undergraduate education, but there is a lack of on-site investigation and practical research on the actual situation. Many studies provide countermeasures and suggestions based on mainstream consciousness from a macro perspective and overall level. Therefore, the proposed research model and path inevitably lean towards the national policy level, and the proposed strategies are relatively general and lack empirical research, thus greatly reducing their practicality.

### **3.2. Insufficient efforts in continuous cultivation**

The talent cultivation models and curriculum systems of secondary vocational, vocational, and undergraduate colleges are still in an independent construction state, failing to achieve vertical integration of talent cultivation goals, curriculum systems, assessment and evaluation, and horizontal integration with vocational qualification

certificates at the primary, intermediate, and advanced levels. It is difficult to meet the gradual growth of students' knowledge and skills, and the need for correlation with the external environment. At the same time, relevant research mainly focuses on the vertical system aspect, and insufficient attention is paid to horizontal integration. The goal of talent integration and training is unclear, the channels of integration are not smooth, and a complete framework for integration has not been formed. Secondary vocational, vocational, and undergraduate schools at all levels are fighting independently in the construction of talent cultivation systems, with disconnected talent cultivation goals, lack of innovation in talent cultivation models, lack of vertical integration of curriculum systems, and serious duplication of curriculum resources. This not only wastes educational resources, but also affects the enthusiasm of teaching and learning.

### **3.3. Lack of empirical research**

In the context of the construction of a new industrial system, there is relatively little research on the integration of vocational education in middle and high schools, and there is even less research on the integration and connection of individuals based on local economic and social development, and the characteristics of vocational colleges, combined with professional reality. At present, Chinese economy is in a critical period of transforming its development mode and optimizing its economic structure, and the industry is in a critical period of transforming old and new driving forces. There is an urgent demand for technical and skilled talents at different levels. Empowering industrial development, promoting local economic adaptability, and enhancing the adaptability of vocational education are important reforms faced by vocational education. The new industrial system requires vocational education to cultivate composite talents with solid technical skills, interdisciplinary knowledge structure system, and strong practical skills. This puts forward new requirements for the talent cultivation mode and specifications of vocational education.

## **4. Research and practice on the talent cultivation path of connecting secondary vocational, vocational, and undergraduate education based on modern vocational education group**

### **4.1. Cooperation between government, industry, schools, and enterprises to establish a modern vocational education group**

Chengdu Agricultural Technology Vocational College adheres to the strategy of promoting the development of modern agriculture and rural revitalization in Sichuan Province, and has led the establishment of the Sichuan Modern Agriculture Vocational Education Group, consisting of 130 voluntary units from the government, industry, universities, and enterprises. The group will actively explore a modern vocational education development model that combines industry, academia, and research based on Sichuan's agricultural industries and enterprises to meet the market needs. Through talent cultivation, professional construction, teacher training, scientific and technological cooperation, social services, and other aspects of business exchanges, the group will promote the deep integration of production, teaching, research, application, and innovation, and promote the cultivation of highly skilled agricultural talents and support the development of modern agricultural industry. It will also make contributions to promoting the structural reform of the agricultural supply side in Sichuan Province.

### **4.2. Targeting the industrial chain and building a professional chain to promote the innovative development of new industrial systems**

Chengdu Agricultural Science and Technology Vocational College focuses on the 10+3 modern agricultural

industry system in Sichuan and the 4+6 urban modern agricultural industry system in Chengdu. Following the principles of industry-oriented, professional chain, and industrial chain integration, it integrates the advantages of the school's agricultural professional resources. In the process of deepening the integration of industry and education, it gradually forms a talent training system that integrates professional chain and industrial chain, and constructs a leisure agriculture, animal husbandry, and veterinary medicine, agricultural equipment, and service for the entire agricultural industry chain. It also includes featured and advantageous professional groups such as landscape architecture, offering 37 vocational and technical majors. The school actively integrates the advantageous resources of vocational education, strengthens deep cooperation with local governments, research institutes, industry associations, and well-known enterprises through the construction of characteristic industry colleges, industry-education integration training bases, skill training bases, technology innovation platforms, and skill master studios. Building multiple industrial parks, including the Chongzhou Modern Agriculture Innovation and Entrepreneurship Demonstration Park and the Pengzhou Gexianshan Industry Education Integration Park, that combine technology research, talent cultivation, and innovation and entrepreneurship functions, reflects the school's characteristics of industry-education integration. The school fully leverages the social service function of vocational education, caters to the needs of regional industries and enterprises, carries out order-based talent training such as Tongwei Class and Agricultural Machinery Craftsman Class, and fully promotes the innovative development of the agricultural industry system.

#### **4.3. Building a multi-level secondary vocational, vocational, and undergraduate comprehensive training system based on the needs of professional cluster development**

The school relies on the development needs of professional clusters, and through research of talent demand and analysis of professional industry fit, forms a comprehensive training system from vocational school to vocational college to undergraduate level. It sets quality standards for seven aspects, including professional setting, talent cultivation, curriculum construction, teaching staff, academic quality, practical training base construction, and professional literacy, at a high level. Focusing on rural revitalization and digital development, with the cultivation of modern agricultural professionals as the core, and the upgrading of agricultural industry technology, docking with industrial chains and frontline positions, we will build professional groups that serve the agricultural industry chain, and promote the overall construction and breakthrough of professional groups. In terms of talent cultivation, professional construction, curriculum construction, teacher team construction, educational models and systems, and teaching conditions construction, we will carry out three-dimensional, multi-dimensional, and multi-angle reforms and practical work in modern vocational education, achieving the unity of industry standards, professional standards, and teaching evaluation at all levels of vocational education, as well as the continuity of teaching content and methods, promoting the systematic and continuous development of secondary vocational, vocational, and undergraduate education.

#### **4.4. Connecting with industry and enterprise standards, and constructing a comprehensive talent training model**

Faced with the trend of the integration and deep embedding of the new generation of information technology into various industries, there is an urgent need for a large number of technical and skilled composite talents. The school analyzes and summarizes the skill characteristics of each typical job position based on the skill needs of professional position of industries and enterprises, and break them down into basic general skills, basic job skills, core job skills, job expansion skills, and comprehensive practical skills.

According to the integrated design concept of positions, courses, competitions, and certificates, integrating the 1+X professional qualification certification standards and skill competition standards, we have set up modules of public basic courses, professional foundation, professional core courses, professional expansion courses, and comprehensive practical courses, and constructed a “2 platform + 5 module” integrated course system. At the same time, in line with the new standards, new processes, and new requirements of industry enterprises, the curriculum content and assessment standards for different stages are determined based on the basic, intermediate, and advanced standards of the 1+X vocational qualification certificate at different training stages within the framework of the professional group curriculum system. Corresponding integration designs are carried out to preliminarily form an integrated curriculum system for middle and high school students, achieving vertical connection and integration of knowledge and skills. Through a platform-based and modular professional curriculum system, subject and skill competition activities, and vocational qualification certificates, multi-level communication, education, and joint teaching and research are implemented to establish a comprehensive training and research mechanism for secondary vocational, vocational, and undergraduate education. The focus is on the sustainable development and comprehensive improvement of students’ academic performance, and the achievement and effectiveness of students’ academic and skill levels are evaluated through academic quality assessment and vocational skill improvement.

#### **4.5. Relying on the advantages of multiple schools and enterprises, establishing a platform for industry-education integration and sharing**

In the era of rapid digital development, openness and integration are the key to big platforms. Empowering schools with a large platform development model can break the bottleneck constraints of leapfrog development. Relying on the advantages of modern vocational education groups in resource sharing and integration, we will accelerate the breakthrough of constraints on factor resources and physical boundaries in government, vocational schools, vocational colleges, and undergraduate colleges. We will lead a profound transformation in vocational education, gather and integrate resources in an open and shared spirit, break through the closed and self-sufficient supply system of traditional education, and build an open, diversified, and jointly built and shared industry-education integration platform to promote the government, industry enterprises, scientific research institutions, universities, parks, and communities to jointly build open and integrated innovation platforms to achieve the aggregation and development of more localized resources. Relying on digital platforms, we will build a digital ecosystem of production services, education and teaching, technological innovation, and economic and social development, thus breaking through the constraints of physical platforms in terms of time and space, breaking the bottleneck constraints of leapfrog development, promoting value creation and sharing, and empowering broader services and development.

#### **4.6. Innovative integrated training and evaluation system for secondary vocational, vocational, and undergraduate education**

We need to strengthen the quality management of secondary vocational education, vocational education, and undergraduate education, and adopt diversified methods to carry out teaching quality management and evaluation. The first method is to promote the pilot reform of the dual certificate integration program, achieving a deep integration of academic education and vocational qualification systems. While cultivating students’ professional abilities, it also opens-up a “green channel” for students to further their studies and meet the dual needs of education and employment. The second method is to conduct research and pilot

projects on credit banks for secondary vocational, vocational, and undergraduate education, establish credit storage, recognition, and conversion systems, promote the storage and use of learning outcomes, and promote the development of vocational education towards lifelong education. The third method is to introduce the 1+X vocational qualification certificate system, which closely integrates the 1+X vocational qualification certificate with the construction of secondary vocational, vocational, and undergraduate integrated majors, curriculum construction, teaching team construction, and industry-university research and application construction. The industry and professional position standards are integrated into the evaluation content design of vocational skill level certificates, making the content of skilled talent training more in line with the needs of practical positions and social development. It also includes promoting the organic connection between 1 and X, enhancing students' vocational and employment abilities, promoting high-quality development of vocational education, and promoting comprehensive economic and social development.

## Funding

- (1) 2022–2024 Sichuan Provincial Department of Education Vocational Education Talent Training and Education Reform Research Project General Project (Project number: Chuanjiaohan [2023] No. 100, GZJG2022-107; Host: Li Hui): Comprehensive Education Research and Practice of “Post-Course Competition Certificate” in Higher Vocational Digital Media Majors from the Perspective of “Four Chains” Integration
- (2) 2023 Sichuan Provincial Education and Research Project (Key Project) (Project number: Chuanjiaohan [2023] -67; Host: Li Hui): Based on the "Three Double, Three Stage, and Four Integration" Vocational Digital Media Professional Education Path Research and Practice of the Skills Master Studio
- (3) 2022 Chengdu Agricultural College Key Education and Teaching Reform Project (JG-202202-11)
- (4) The Education Reform Project of Chengdu Agricultural College in 2021 (21JG-29)
- (5) The 2022 Chengdu Education and Research Planning Project (CY2022ZZ31)

## Disclosure statement

The authors declare no conflict of interest.

## Author contributions

*H.L. conceived the idea of the study. X.D. performed the experiments. H.L. and J.Y. analyzed the data and wrote the paper.*

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