# Practical Pathways for Talent Cultivation in Vocational Education under the Integration of General and Vocational Education in the Context of the Digital Economy and the Dual Circulation Development Pattern

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**Abstract: Against the backdrop of iterative upgrading in the digital economy and the deepening integration of the dual circulation development pattern, vocational education, as a critical bridge between the educational system and the labor market, has become an important vehicle for supporting industrial upgrading, facilitating talent mobility, smoothing the domestic economic cycle, and connecting the domestic and international cycles. The integration of general and vocational education provides a crucial opportunity to break the rigidity of the traditional divide between general and vocational tracks, reconstruct the ecosystem of talent cultivation in vocational education, and respond more effectively to the development needs of the digital economy and the dual circulation pattern. Based on three major economic theories—resource allocation, human capital, and market supply and demand—and in light of the characteristics of technological iteration in the digital economy and talent mobility requirements under the dual circulation pattern, this paper systematically analyzes the practical difficulties faced by vocational education talent cultivation in the context of the integration of general and vocational education. From four dimensions—resource allocation, human capital, market alignment, and regional coordination—it proposes targeted and practical pathways. The study is intended to provide useful reference for frontline reform in vocational education and for the implementation of educational initiatives, thereby helping vocational education better serve the development of the digital economy and the construction of the dual circulation pattern.**

**Keywords: Integration of General and Vocational Education; Talent Cultivation; Digital Economy; Dual Circulation Development Pattern; Economic Perspective**

## 1. Introduction

At present, China is at a critical stage marked by the rapid iteration of the digital economy and the accelerated formation of the dual circulation development pattern. In the process of transforming from a major manufacturing country into a manufacturing power, industrial upgrading has generated a demand for technical and skilled personnel characterized by both quantitative and qualitative growth, as well as by cross-disciplinary integration. Digital skills and composite competencies have become the core competitive strengths of talent. At the same time, the dual circulation pattern has put forward new requirements for the regional mobility of skilled workers and for the alignment between talent supply and demand. It has become urgent to address imbalances in talent distribution and the disconnect between supply and demand through the integration of general and vocational education. At present, the shortage of highly skilled personnel in China remains prominent. The contradiction between the talent supply provided by vocational education and the demands arising from the development of the digital economy and the dual circulation pattern is becoming increasingly evident. The rigidity of traditional vocational education models has found it difficult to adapt to the flexible demands created by rapid technological iteration and talent mobility.

The “14th Five-Year Plan” for the Development of Vocational Education identifies the integration of general and vocational education as a key approach to breaking the binary division between general and vocational tracks, alleviating the shortage and uneven distribution

 

of skilled talent, and connecting vocational education with the needs of the digital economy and the dual circulation pattern [1]. Its core lies in realizing diversified, precise, and agile talent cultivation through resource sharing, model innovation, and institutional restructuring, thereby providing strong support for improving the quality and efficiency of vocational education. How to rely on the integration of general and vocational education to respond to the practical challenges of rapid technological iteration in the digital economy and intensified talent mobility under the dual circulation pattern, how to improve the quality of talent cultivation, and how to enable vocational education to better fit the new economic landscape are important practical issues faced by frontline educators and decision-makers.

## 2. Analysis of the Compatibility between Economic Theories and the Integration of General and Vocational Education

The integration of general and vocational education is a systematic reform through which the educational system connects with the labor market and adapts to the digital economy and the dual circulation pattern. Its core issues—including resource allocation, human capital accumulation, supply-demand matching, and regional coordination—are highly compatible with economic theory. The three major theories of resource allocation, human capital, and market supply and demand, combined with the characteristics of rapid iteration in the digital economy and the internal-external linkage of the dual circulation pattern, constitute the core analytical framework for talent cultivation under the integration of general and vocational education [2,3].

### 2.1 Resource Allocation Theory: Efficiency as the Core and Compatibility with the Need for Resource Coordination under the Dual Circulation Pattern

Resource allocation theory takes the maximization of benefits from limited resources as its core and emphasizes the free flow and optimal allocation of resources. It is highly compatible with the requirements of regional resource complementarity under the dual circulation pattern and digital resource sharing under the digital economy [4]. The resources of vocational and general education are significantly complementary. Vocational education possesses stocks of practical training facilities and teachers, but often lacks sufficient digital capacity, whereas general education has a solid cultural foundation but is short of practical training resources.

By breaking the institutional barriers of the dual-track structure and integrating resources across all factors, the integration of general and vocational education promotes the efficient flow of teachers, equipment, courses, and digital resources across schools and regions. In this way, it achieves a threefold improvement in educational efficiency, training quality, and regional coordination. This represents an innovative application of resource allocation theory in the field of education [5].

### 2.2 Human Capital Theory: Value as the Core and Compatibility with the Need to Improve Talent Quality in the Digital Economy

Human capital theory holds that education is the key to the accumulation of human capital, and that the rate of return on educational investment depends on the degree of alignment with market demand [6,7]. Under the digital economy and the dual circulation pattern, talent must possess composite competencies that combine digital skills, professional skills, and general literacy.

Vocational education is highly targeted in its training, but it is often weak in cultivating broader literacy and digital competence, while general education has a strong academic foundation but insufficient skills training. The integration of general and vocational education promotes the transformation of human capital from a single-skill orientation to a composite orientation. By accurately connecting with job requirements and broadening development pathways, it can improve employment quality and educational returns, and better meet the needs of industrial upgrading and cross-regional talent mobility [8].

### 2.3 Market Supply and Demand Theory: Orientation as the Core and Compatibility with the Need for Supply-Demand Matching under the Dual Circulation Pattern

Market supply and demand theory emphasizes the dynamic matching of supply and demand so as to avoid structural mismatch. Under the digital economy, technology is updated rapidly and emerging occupations continue to appear.

 

The dual circulation pattern also places higher demands on regional balance in talent distribution and on cross-border adaptability. Traditional single-track educational models are no longer able to meet these requirements [9].

Through curriculum integration and industry-education collaboration, the integration of general and vocational education upgrades talent supply from a simple quantitative match to a multidimensional match involving quality, structure, region, and digital competence. Relying on the joint participation of industries, schools, enterprises, and digital platforms, it establishes a mechanism for the rapid capture of demand and enhances the agility of talent cultivation, thereby effectively adapting to the dynamic demands generated by the dual development pattern.

## 3. Practical Difficulties in Talent Cultivation in Vocational Education under the Integration of General and Vocational Education

### 3.1 Resource Allocation: Segmentation of the Dual Track, Obstructed Sharing, and Inadequate Adaptability

The long-standing binary division between general and vocational education has led to imbalanced resource allocation, making it difficult to adapt to the needs of the digital economy and the dual circulation pattern [1,2]. In terms of resource input, vocational education still cannot adequately meet the demand for digital skills training in terms of teachers, funding, digital equipment, and digital practical training. In terms of resource sharing, three major barriers exist. Administratively, general and vocational education are managed by different departments, and there is a lack of cross-regional and cross-departmental coordination mechanisms, which runs counter to the need for regional coordination under the dual circulation pattern. In terms of interests, general high schools worry that integration may "lower academic quality," while vocational schools are concerned that it may "increase operating costs." This leads to strategic games between the two sides and obstructs resource flow. Technically, the curriculum systems, evaluation standards, and digital resources of general and vocational education are incompatible, and there is a lack of a unified platform for resource sharing and articulation. As a result, such initiatives as mutual teacher appointment, mutual course recognition, and digital resource sharing are difficult to implement, and the development trend toward digitized and shared resources in the digital economy cannot be effectively matched.

### 3.2 Human Capital: Curriculum Disconnection, Low Returns, and Lack of Digital Literacy

The accumulation of human capital in vocational education is seriously disconnected from the needs of the digital economy and the dual circulation pattern, showing the characteristics of "lack of digital skills, insufficient composite capacity, and low returns on investment" [3]. In terms of curriculum content, new technologies such as artificial intelligence, big data, and digital twins have not been incorporated in a timely manner, resulting in a disconnect from the development of the digital economy. In practical teaching, training equipment is often insufficient and lacks precision, and digital training scenarios are absent, making it difficult to provide digital skills training in real-world contexts. In terms of quality cultivation, communication, collaboration, innovative thinking, digital literacy, and other core capabilities are inadequately developed, making it difficult to adapt to job upgrading in the digital economy and to talent mobility under the dual circulation pattern. Parents often have limited willingness to let their children choose vocational education, because expectations of "low salary and limited development" reduce their willingness to invest in this educational path, making enrollment in integrated general-vocational classes difficult.

### 3.3 Market Supply and Demand: Structural Mismatch, Delayed Response, and Insufficient Agility

There is a serious structural mismatch between the talent supply of vocational education and market demand under the digital economy and the dual circulation pattern, and the response is often delayed because agile adjustment mechanisms are lacking [4]. In terms of program offerings, there is both an oversupply of graduates in traditional majors and a shortage in emerging digital fields, and vocational education has failed to connect in time with new occupations generated by the digital economy. In terms of the training cycle, the

 

cycle of industrial upgrading and technological iteration has been shortened to two to three years, while adjustments in vocational education programs often take three to five years. This results in a situation in which "demand is strong when a program is established, but saturated by the time students graduate." In addition, curriculum adjustments in integrated classes often lag behind changes in the market and the iteration of digital technologies. The skills students acquire thus show an obvious gap with the latest enterprise needs and the requirements of digital economic development. Their corresponding employment rate is relatively low, and they find it difficult to meet the needs of domestic industrial coordination and international industrial linkage under the dual circulation pattern.

### 3.4 Regional Development: Imbalance, Weak Momentum, and Obstructed Mobility

Regional imbalances in the development of vocational education in China are significant, which stands in marked tension with the requirements of "regional coordination and talent mobility" under the dual circulation pattern. In practice, the integration of general and vocational education presents a pattern of "stronger in the east and weaker in the west" [5]. Developed regions are rich in resources and have more advanced digital industries, but in many cases integration remains only "superficial," and no deep collaborative mechanism for general-vocational integration has been established. Students in integrated classes often lack core competitiveness in digital skills and composite literacy and are therefore unable to meet the needs of high-end digital industries. Less-developed regions, by contrast, suffer from resource shortages and severe insufficiency of digital training equipment. The proportion of "dual-qualified" teachers, especially those with digital skills, is relatively low; mutual appointments of teachers between general and vocational schools have stagnated; and practical training is often limited to on-campus simulations, making it difficult to connect with real jobs and the needs of the digital economy. At the same time, there is a lack of unified standards for general-vocational integration, digital resource-sharing mechanisms, and talent mobility mechanisms across regions. The distribution pattern of skilled talent, which is "higher in the east and lower in the west," is therefore difficult to change, hindering cross-regional talent mobility and regional industrial coordination under the dual circulation pattern.

## 4. Practical Pathways for Talent Cultivation in Vocational Education through the Integration of General and Vocational Education

### 4.1 Optimizing Resource Allocation: From "Segmentation" to "Sharing," with Stronger Digital Adaptation and Regional Coordination

First, cross-regional and cross-departmental coordination mechanisms should be established. Municipal education departments should take the lead, together with departments responsible for human resources and social security, finance, industry and information technology, and digital governance, in setting up special task forces for reform in the integration of general and vocational education. These task forces should coordinate the planning and management of general and vocational educational resources and break the rigidity of the dual-track structure [1]. Cross-regional coordination mechanisms should also be developed in areas such as the Chengdu-Chongqing economic circle and between eastern and central-western regions, so as to promote the flow of resources across regions and to adapt to the needs for regional coordination under the dual circulation pattern. The integration of general and vocational education and the sharing of digital resources should be incorporated into local government education assessment systems so as to compel departments and regions to work collaboratively.

Second, digital platforms for resource sharing should be built. By integrating teachers, courses, practical training equipment, and digital resources from general and vocational institutions, an integrated digital platform covering "resource reservation, supply-demand matching, evaluation feedback, and efficiency monitoring" can be established. This platform would enable the sharing of digital resources, training equipment, and teaching staff across schools and regions. Digital tools should also be introduced to monitor resource-use efficiency in real time, guiding resources toward high-efficiency fields and less-developed areas,

 

improving the efficiency of resource use, and adapting to the trend toward digitization and sharing in the digital economy [2,3].

Third, resource input should be made more precise and resource channels should be diversified. The government should adjust the structure of educational investment and reduce the gap in per-student funding between general and vocational education. Key support should be given to shared digital training carriers and the development of digital skills curricula, and the value of practical training equipment and the level of digital equipment provision per student should be gradually increased. Through such approaches as public-private partnership, school-enterprise co-construction, and cooperation with digital enterprises, social capital should be attracted to jointly build digital skills training bases with technology companies, thereby compensating for insufficient government investment and better meeting the skill-development needs of the digital economy. Support for less-developed regions should be strengthened through special subsidies and resource donations so as to narrow regional resource gaps and promote coordinated regional development under the dual circulation pattern [4].

### 4.2 Upgrading Human Capital: From "Single Skills" to "Composite Literacy," with Stronger Digital Competence

A dynamic, digitalized, and composite curriculum system should be developed. Industry associations, digital enterprises, schools, and general high schools should jointly form curriculum development committees and establish a dynamic adjustment mechanism under which curricula are updated every two years, so that emerging technologies such as artificial intelligence, big data, and digital twins can be incorporated into teaching content in a timely way [5]. A curriculum integrating "cultural foundation, skill empowerment, quality enhancement, and digital integration" should be developed, and real digital projects from enterprises should be introduced so as to realize the integration of "job positions, courses, competitions, and certificates." In this way, composite talents equipped with professional skills, general literacy, and digital competence can be cultivated to meet the demands of the digital economy.

A high-level digitalized "dual-qualified" teaching force should also be built. The enterprise practice system for vocational school teachers should be strengthened so that teachers genuinely participate in enterprise work related to digital skills and thereby improve their digital teaching ability. A sound mechanism for mutual appointment between teachers in general and vocational education should be established, allowing teachers of cultural courses and digital literacy courses from general high schools to teach in vocational schools, while "dual-qualified" teachers from vocational schools offer vocational skills and digital skills electives in general high schools [6]. A pool of part-time enterprise teachers should also be developed to attract technical backbones from digital enterprises to participate in teaching. At the same time, a system for the training and assessment of teachers' digital competence should be improved so as to enhance the digital adaptability of the teaching staff.

A diversified and comprehensive evaluation system should further be established. The traditional evaluation model that focuses only on test scores should be replaced by a multidimensional system covering "skills, literacy, further education, employment, and digital competence." Enterprises, including digital enterprises, should be introduced into the evaluation process, and indicators such as digital skills, innovative thinking, and cross-regional adaptability should be included. In this way, talent cultivation can be ensured to fit job requirements, educational advancement needs, and the development trends of the digital economy and the dual circulation pattern [7].

### 4.3 Aligning with Market Demand: From "Passive Response" to "Proactive Response," Building an Agile Adaptation Mechanism

A digitalized mechanism for talent-demand forecasting and early warning should be established. Provincial education departments, together with human resources and social security departments, industry associations, and digital enterprises, should develop a talent-demand monitoring system under the digital economy. This system should integrate core indicators such as job vacancy rates, digital skill needs, and wage growth, and should publish annual talent-demand reports with particular attention to emerging occupations such as those related to artificial intelligence. Enrollment in urgently needed emerging digital

 

majors should be expanded so that program offerings can be matched more precisely with market demand, thereby adapting to the rapid technological iteration characteristic of the digital economy [8,9].

The tripartite order-based training model should also be deepened. Vocational schools, general high schools, and digital enterprises should sign tripartite agreements on order-based training, under which enterprises customize training plans according to job-related digital skill needs, schools implement tiered and differentiated teaching, and enterprises provide digital training equipment, internship positions, and scholarships. In this way, "enrollment means recruitment, and graduation means employment." At the same time, pathways for further academic study should be connected to provide students in order-based programs with opportunities for academic advancement and broader growth pathways, thereby adapting to the diversified development needs of talent under the dual circulation pattern.

Flexible and elastic training cycles should also be implemented. The rigid three-year training period should be broken, and a flexible model composed of "basic courses, modularized skill courses, and digital skill modules" should be adopted. Skill modules and digital modules should be dynamically adjusted in accordance with market demand and technological iteration.

A credit bank covering both general and vocational education should be established so that credits from general and vocational courses, practical training, skill certificates, and digital skills training can be mutually recognized and converted. This would improve the flexibility and agility of talent cultivation and make it more compatible with technological iteration in the digital economy and talent mobility under the dual circulation pattern [1].

### 4.4 Advancing Regional Coordination: From "Differentiation" to "Complementarity," Promoting Cross-Regional Talent Mobility

Developed regions should explore a development model characterized by "high-end orientation, integration, and digitization." Making use of their abundant resources and advanced digital industries, they should promote the mutual recognition of credits between general and vocational education and the mutual transfer of student status, thereby constructing an integrated progression pathway from "general-vocational integration" to "higher vocational college" and then to "vocational undergraduate education." They should establish deep collaborative talent cultivation mechanisms between general and vocational education, focus on sectors such as high-end manufacturing and the digital economy, and cultivate high-level composite technical and skilled personnel. They should also build regional digital resource-sharing platforms for the integration of general and vocational education and radiate high-quality digital resources, teacher resources, and school-running experience to less-developed regions, thus playing a leading and demonstrative role [2].

Less-developed regions should explore a development model characterized by "local orientation, distinctive features, and digitization." Majors should be set according to local characteristic industries and resource endowments so as to avoid homogeneous competition with developed regions. Relying on counterpart assistance from developed regions and on social capital, local and digitalized practical training bases should be established, and order-based training geared toward local industries should be carried out so as to cultivate local technical and skilled talent that can be retained and effectively utilized. General and vocational resources within the region should be integrated to realize small-scale but efficient resource sharing and digital-resource articulation, thereby consolidating the foundation for integrated schooling [3].

A nationwide counterpart assistance and regional coordination mechanism should also be established. Developed regions and less-developed regions should sign pairing assistance agreements for the integration of general and vocational education so as to realize cross-regional sharing of curriculum resources, teacher resources, digital resources, and educational experience. A national special support fund for the integration of general and vocational education should be set up, withpriority support directed to the updating of digital practical training equipment, the cultivation of "dual-qualified" teachers, and the development of digital skills curricula in less-developed regions. A unified nationwide mechanism for talent evaluation and mobility under general-vocational integration should be created to remove barriers to the regional

 

mobility of skilled personnel, address the imbalance in the distribution of talent between the eastern and western parts of the country, and meet the requirements of cross-regional talent mobility and regional industrial coordination under the dual circulation pattern [4,5].

The deep integration of the digital economy and the dual circulation pattern has put forward entirely new requirements for talent cultivation in vocational education. As a systematic reform that reconstructs the ecosystem of talent cultivation in vocational education, the integration of general and vocational education is an inevitable choice for adapting to these two major development trends, addressing the shortage and imbalance of skilled personnel, and promoting the high-quality development of vocational education [6-9].

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