

Research on the Optimization Strategies for Professional Adjustment in Higher Vocational Colleges Based on Serving the New Quality Productive Forces: Taking Zibo City as an Example

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Abstract: This study delves into the necessity for curriculum realignment within vocational higher education institutions, spurred by the advent of the new quality productive forces. It critically examines the prevailing issues in vocational college course offerings and, leveraging insights from successful realignment initiatives across several institutions, puts forth a series of enhancement strategies. These encompass the establishment of a responsive adjustment framework, fostering deeper synergy between academia and industry, bolstering faculty expertise, and overhauling the curriculum structure. The overarching goal is to furnish vocational colleges with both theoretical insights and actionable strategies to bolster their contribution to the new quality productive forces.

Keywords: New Quality Productive Forces; Higher Vocational Colleges; Professional Adjustment; Optimization Strategies

1. Introduction

In the wake of swift technological advancements and profound industrial restructuring, the new quality productive forces have emerged as the primary catalyst for socio-economic advancement. These forces, underpinned by scientific and technological innovation, epitomize cutting-edge technology, superior efficiency, and exceptional quality.

They necessitate a workforce endowed with advanced technical skills and expertise. Consequently, vocational higher education institutions must align their course offerings with the trajectory of these forces to effectively cater to regional economic growth and industrial modernization. Nevertheless, the current course configurations in numerous vocational colleges are plagued by delays and a lack of strategic direction, hindering their ability to fulfill the talent requirements of the new quality

productive forces. Hence, investigating strategies to optimize curriculum realignment in vocational colleges in response to these forces assumes paramount importance.

2. Demand for Professional Adjustment in Higher Vocational Colleges from the New Quality Productive Forces

2.1 Connotation and Characteristics of the New Quality Productive Forces

The new quality productive forces represent a sophisticated stage of productivity, with innovation at its helm, diverging from conventional economic growth paradigms. They are distinguished by their utilization of state-of-the-art technology, operational efficiency, and product excellence. Rooted in scientific and technological breakthroughs, they span burgeoning sectors such as information technology, AI, the low-altitude economy, big data analytics, biotechnology, and renewable energy, exerting a far-reaching influence on the economic and social fabric. The evolution of these forces not only propels industries towards intelligent, eco-friendly, and service-centric transformations but also sets new benchmarks for the requisite knowledge, skills, and innovative capabilities of the workforce [1].

2.2 Challenges of the New Quality Productive Forces to Professional Adjustment in Higher Vocational Colleges

The surge of the new quality productive forces presents myriad challenges for curriculum realignment in vocational colleges. On one front, the emergence of novel industries mandates the swift introduction of pertinent courses to nurture the technical and skilled personnel required by these sectors. For instance, the proliferation of AI applications has spurred a surge in demand for experts in AI and big data analytics. Conversely, the metamorphosis of traditional industries necessitates the revamp and

modernization of existing courses to elevate students' professional acumen and innovative prowess [2]. The intelligent reconfiguration of the manufacturing sector, for example, underscores the need for vocational colleges to fortify programs in intelligent manufacturing and industrial robotics. Yet, the current course offerings in many vocational colleges lag behind the evolution of the new quality productive forces, plagued by outdated content, obsolete pedagogical frameworks, and underprepared faculty, thereby struggling to meet the demand for elite technical and skilled professionals.

3. Problems in the Current Professional Settings of Higher Vocational Colleges

3.1 Disconnection between Professional Settings and Market Demand

In the process of professional settings, some higher vocational colleges lack in-depth market research and forward-looking predictions, resulting in a disconnection between professional settings and market demand [3]. Some popular majors are blindly set up, while majors related to emerging industries are not promptly established. For example, majors such as accounting and e-commerce are widely offered in various higher vocational colleges with relatively large enrollment scales, but graduates face fierce employment competition. In contrast, emerging majors such as artificial intelligence and big data are rarely offered, making it difficult to meet market demand for relevant talents.

3.2 Long Professional Update Cycles

The update speed of professional settings in higher vocational colleges often lags behind market demand and technological innovation. Due to factors such as long approval processes for professional adjustments, adjustments in resource allocation, and changes in the teaching staff, the optimization and updating of the professional structure are difficult to complete in a timely manner [4]. This leads to a certain degree of disconnection between the education model and training direction of higher vocational colleges and the actual needs of socio-economic development, affecting graduates' employment competitiveness and industry adaptability.

3.3 Low Matching Degree of Teaching Staff

Although some higher vocational colleges have

adjusted their professional settings according to market demand, the existing teaching staff may not fully support the development of new or adjusted majors [5]. Especially for majors in emerging industries or technical fields, there is a large gap between the professional backgrounds, practical experience, and teaching methods of the teaching staff and the latest requirements in these fields. For example, teachers in emerging majors such as artificial intelligence and big data lack relevant practical experience and teaching abilities, making it difficult to effectively carry out teaching activities and affecting the quality of professional teaching and talent cultivation.

4. Analysis of Practical Cases of Professional Adjustment in Vocational Colleges

4.1 Professional Construction Practice of Zibo Polytechnic University

Zibo Polytechnic University closely aligns with major national strategies and the development of key regional industries, constructing a professional layout that focuses on engineering, features business, and integrates engineering, business, medicine, art, and cultural tourism. The university currently offers 68 majors, including 6 undergraduate majors in higher vocational education and 62 junior college majors in higher vocational education, with 38 key majors approved at the provincial level or above. In the process of professional adjustment, the university has improved its dynamic professional adjustment mechanism, dynamically optimized its professional layout, and planned to establish majors related to emerging industries such as low-altitude economy and new energy, such as unmanned aerial vehicle technology application and hydrogen energy technology application, while cutting back on outdated and surplus majors. At the same time, the university has deepened the upgrading and transformation of majors, promoting the quality improvement of professional connotations and driving the intelligent and digital transformation of traditional majors such as chemical engineering through "digital technology +". In addition, the university has strengthened industry-university-research cooperation with local enterprises, constructed a collaborative development ecosystem of "government-industry-university-research-application," and implemented order-based talent cultivation to provide customized

talent cultivation plans for enterprises and improve the pertinence and adaptability of talent cultivation.

4.2 Professional Optimization Practice of Shandong Vocational College of Industry

Shandong Vocational College of Industry closely focuses on the demands of provincial and municipal pillar industries and has constructed a professional layout with the characteristics of the college. The college has formed characteristic major clusters such as the "green steel production major cluster" and the "high-end equipment intelligent manufacturing-related major cluster," and has established three "3+2" undergraduate-junior college integrated cultivation majors in mechanical manufacturing and automation, material forming and control technology, etc. In the process of professional adjustment, the college has emphasized in-depth cooperation with enterprises, establishing platforms such as the Zibo High-end Electromechanical Equipment Industry-Education Consortium and the National Steel Intelligent Manufacturing Industry-Education Integration Community to jointly carry out talent cultivation, technological research and development, and achievement transformation with enterprises. At the same time, according to the development needs of regional industries, the college has precisely laid out emerging majors, planning to add emerging majors such as new energy vehicle technology and intelligent robots that have a high degree of match with industries, while cutting back on majors such as all-media advertising planning and marketing that are disconnected from industries. In addition, the college has strengthened the construction of practical teaching conditions, upgraded virtual-real combined training bases, and implemented a "teaching-training-production" three-in-one school-enterprise co-constructed training base model to improve students' practical abilities and professional qualities.

4.3 Professional Adjustment Practice of Shandong Vocational College of Light Industry

Shandong Vocational College of Light Industry adheres to the school-running philosophy of "relying on industries to establish majors and promoting industries through well-established majors" and dynamically adjusts its professional layout. The college has cancelled six majors

such as environmental monitoring technology that have a weak fit with industries and added three majors such as intelligent manufacturing equipment technology. Focusing on the modern industrial system of "6997" in the province, the college actively promotes the optimization and transformation of traditional industry majors such as textile and garment and continuously updates the adaptability of majors related to advantageous industries such as modern food. At the same time, the college promptly adds new majors in emerging and future industries, having established two provincial-level high-level major clusters, two brand major clusters, and four "3+2" undergraduate-junior college integrated majors. In terms of curriculum system reform, the college promotes the development of "digital intelligence +" and "green +" majors, creates a fashion full-industry chain online digital virtual simulation platform and a hyper-sensory space and other all-domain digital teaching environments, and comprehensively promotes interdisciplinary and major integration through "virtual-real fusion," "scenario simulation," and "human-machine collaboration." In addition, the college has strengthened the construction of a "double-qualified" teaching staff, creating a tiered cultivation mechanism of "new teaching staff - double-qualified teachers - backbone teachers - young skilled famous teachers - teaching famous teachers" to improve the overall quality of the teaching staff.

4.4 Professional Adjustment Practice of Zibo Normal College

As a local college rooted in Zibo, Zibo Normal College actively responds to the instructions of the municipal party committee and government on the coordinated development of professional settings and industrial matching, striving for the in-depth integration of the professional chain and talent chain with the local industrial chain and innovation chain. The college currently offers 30 majors covering fields such as education and sports, electronic information, and culture and art, with a prominent advantage in normal majors. Adhering to the concepts of new normal education and new liberal arts construction, the college strengthens the characteristics of normal majors, invests heavily in the renovation and upgrading of experimental and training rooms, and co-constructs a mathematical science intelligent training base with the Shandong National Center for Applied

Mathematics to promote the integration of industry-university-research-application. At the same time, the college precisely meets the talent demand for integrated toddler care and elderly care services and management in Zibo, setting up relevant emerging majors, and actively serves Zibo's "four strong" industries and 20 key industrial chains by setting up majors such as "big data technology" and "microelectronics technology" to promote the integration of traditional majors and emerging industries. In addition, the college has constructed a discipline and major system with education as the main focus and multi-disciplinary integration to provide solid talent support for regional economic and social development.

4.5 Professional Adjustment Practice of Zibo Technician College

Zibo Technician College closely focuses on Zibo's "15th Five-Year Plan" industrial development plan, adheres to the purpose of serving the regional economy, continuously optimizes its professional structure, and constructs and dynamically optimizes a "323" major cluster layout, that is, strengthening core major clusters such as intelligent manufacturing, intelligent control, and new energy vehicle technology, making distinctive special major clusters such as modern catering and tourism services and new-generation information technology, and optimizing auxiliary major clusters such as digital commerce, pharmaceutical and chemical technology, and cultural creativity. Each major cluster in the college precisely aligns with key industries. Majors such as numerical control technology and intelligent manufacturing technology application closely align with the intelligent equipment industrial chain, while majors such as computer network application and Internet of Things application technology serve new-generation information technology and smart city construction. Through measures such as co-constructing industrial colleges, deepening order-based talent cultivation, and co-constructing and sharing training bases, the college creates a deeply integrated industry-education fusion model. At the same time, the college strengthens the construction of the teaching staff, deepens curriculum teaching reform, and upgrades the practical teaching system to provide solid technical and skilled talent support for regional industrial

development.

4.6 The Practice of Professional Adjustment at Shandong Technician College of Water Conservancy

Shandong Technician College of Water Conservancy, based on the industrial demands of Zibo City and guided by the "15th Five-Year Plan" for professional construction, has established a dynamic professional adjustment mechanism characterized by "dual-wheel driving and precise adaptation." Focusing on six core industrial chains, namely intelligent equipment, new energy vehicles, green energy, healthcare and elderly care, among others, the college has implemented the "cluster-chain alignment" project to form professional clusters that are deeply integrated with regional industries. For instance, in response to the new energy vehicle industrial chain, the college has jointly established the "Tangjun Automobile Industry College" with Geely New Energy Commercial Vehicles. It has invested over 10 million yuan in constructing a practical training center for automobile manufacturing processes and plans to introduce a new energy vehicle (hydrogen energy direction) major in 2027, achieving full-chain coverage from manufacturing to hydrogen energy technology. In the field of green energy, the college has collaborated with Zibo Thermal Power Group to build a smart power practical training base. In 2026, it intends to introduce a new direction, "Installation and Maintenance of New Energy Equipment," within the Power Supply and Distribution Technology major, precisely aligning with the industrial demands for photovoltaics and energy storage. Meanwhile, the college has established a closed-loop system of "research- demonstration- adjustment-upgrading." It conducts annual assessments of industrial demands and has added 10 urgently needed majors, such as Artificial Intelligence Technology Application and Nursing, while phasing out outdated ones in the past two years. This has resulted in a dynamic adjustment pattern featuring "support from core professional clusters, leadership from distinctive professional clusters, and supplementation from auxiliary professional clusters." Through the co-construction and sharing of public practical training bases and the deepening of "order-based" talent cultivation, the college has achieved a 92% match rate between its professional offerings and regional industries.

The employment rate of graduates remaining in Zibo has exceeded 30% for three consecutive years, providing strong talent support for the industrial upgrading of Zibo City.

5. Optimization Strategies for Professional Adjustment in Higher Vocational Colleges Based on Serving the New Quality Productive Forces

5.1 Construct a Dynamic Professional Adjustment Mechanism

Higher vocational colleges should establish a "three-linkage" mechanism for professional settings, enrollment plans, employment quality, and industrial demand, and regularly conduct professional evaluations and market demand research. According to the development needs of the new quality productive forces and changes in the regional industrial structure, they should promptly adjust professional settings and optimize the professional structure [7]. For example, a professional early warning and exit mechanism can be established to issue early warnings, reduce enrollment, or suspend enrollment for majors with low employment rates and disconnection from industries; for majors with strong market demand and relevance to emerging industries, enrollment can be increased to promote the precise alignment of the professional structure with the regional industrial structure. At the same time, a rapid response mechanism for professional adjustment should be established to simplify the approval process for professional adjustments and improve the flexibility and timeliness of professional adjustments.

5.2 Deepen Industry-Education Integration

Industry-education integration is an important way for professional adjustment in higher vocational colleges. Higher vocational colleges should strengthen in-depth cooperation with enterprises and jointly build industry-education integration platforms such as industrial colleges, industry-education consortia, and industry-education integration communities [8]. Through platform construction, the organic connection of the education chain, talent chain, industrial chain, and innovation chain can be achieved. For example, they can jointly formulate talent cultivation plans, develop curriculum materials, and build internship and training bases with enterprises to achieve seamless alignment

between talent cultivation and enterprise needs. At the same time, they should strengthen cooperation with industry associations and research institutions to timely understand industry development trends and technological innovation dynamics, providing a scientific basis for professional adjustment. In addition, order-based talent cultivation can be carried out to customize talent cultivation plans according to enterprise needs and improve students' employment competitiveness and industry adaptability.

5.3 Strengthen the Construction of the Teaching Staff

The teaching staff is the key to professional adjustment in higher vocational colleges. Higher vocational colleges should strengthen the construction of a "double-qualified" teaching staff and improve teachers' practical abilities and teaching levels. On the one hand, they can enrich the "double-qualified" teaching staff by introducing high-level talents and technical backbones from enterprises; on the other hand, they can strengthen the training and further education of existing teachers and encourage teachers to take part-time positions in enterprises to accumulate practical experience. At the same time, three major projects for teacher teaching development can be established to carry out full-chain teacher teaching training in a classified and hierarchical manner to improve teachers' professional qualities and teaching abilities [9]. In addition, positions such as industrial professors and enterprise mentors can be set up to flexibly introduce professionals from enterprises to participate in professional construction and talent cultivation.

5.4 Promote Curriculum System Reform

Curriculum system reform is an important part of professional adjustment in higher vocational colleges. Higher vocational colleges should promptly update the curriculum system according to the development needs of the new quality productive forces and changes in the regional industrial structure, integrating new technologies, new processes, new norms, and new standards into the curriculum content. For example, a curriculum system can be constructed that "aligns with the four new aspects and is based on a competence map," focusing on core positions, sorting out core position competencies, drawing competence maps, and

building a modular curriculum system of vocational competencies centered on students and using digital technology as a means, incorporating elements of curriculum ideological and political education and enterprise "four new aspects" to develop vocational competence modules. At the same time, the practical teaching links should be strengthened, virtual simulation training bases should be built to solve the practical training problems of high cost, high consumption, high risk, and "invisibility and intangibility," and expand the depth and breadth of practical teaching. In addition, high-quality curriculum resources can be developed, timely elimination of outdated content can be carried out in line with industrial structure adjustment and technological innovation iteration, and industry frontier knowledge, technical cases, and practical projects should be actively introduced to improve the quality of curriculum teaching.

5.5 Strengthen the Construction of Practical Teaching Conditions

Practical teaching conditions are an important guarantee for professional adjustment in higher vocational colleges. Higher vocational colleges should increase investment in practical teaching and improve practical teaching conditions. On the one hand, they can strengthen the construction of on-campus training bases, update training equipment, and build advanced training centers and laboratories to meet the teaching needs of new and adjusted majors; on the other hand, they can expand off-campus internship bases and establish cooperative relationships with more enterprises to provide students with more internship and training opportunities [10]. At the same time, practical teaching management should be strengthened, and a practical teaching quality monitoring system should be established to ensure the quality and effectiveness of practical teaching. In addition, the sharing of practical teaching resources can be promoted, and a practical teaching resource-sharing platform can be established to achieve the optimal configuration and efficient utilization of on- and off-campus practical teaching resources [11].

5.6 Strengthen Policy Support and Resource Integration

Higher vocational colleges should actively communicate with local governments to secure special funding support for the construction of

emerging majors, the upgrading of practical training equipment, and faculty training. The government can introduce policies such as tax incentives and subsidies to encourage enterprises to participate in the major construction of higher vocational colleges. For instance, enterprises that collaborate with higher vocational colleges in talent cultivation and technological research and development can be granted tax reductions. Meanwhile, the government can formulate relevant policies to guide higher vocational colleges in adjusting their majors according to regional industrial development plans, and recognize and reward those colleges that achieve remarkable results in major adjustments. Within higher vocational colleges, resource sharing among different majors should be enhanced to break down major barriers and achieve optimal allocation of teaching facilities, faculty strength, and curriculum resources. For example, establishing cross-major practical training centers to provide practical teaching venues for multiple majors; organizing teachers to engage in cross-major teaching seminars and collaborative teaching to promote the integration and exchange of knowledge. In addition, higher vocational colleges should actively integrate external resources by establishing long-term and stable cooperative relationships with research institutions and enterprises to jointly conduct scientific research projects, tackle technological challenges, and cultivate talents, thereby realizing resource complementarity and sharing.

5.7 Establish a Feedback and Continuous Improvement Mechanism for Major Adjustment

A multi-dimensional feedback system encompassing student feedback, enterprise feedback, industry feedback, and social feedback should be established. By regularly conducting student satisfaction surveys and graduate follow-up surveys, insights into students' opinions and suggestions regarding major curriculum design, teaching content, and teaching methods can be obtained. A regular communication mechanism with enterprises should be established to collect feedback on graduates' professional skills, professional qualities, and innovation capabilities. It is essential to pay attention to industry dynamics and development reports released by industry associations to promptly grasp changes in industry talent demands. Simultaneously, attention should be paid to

social opinions on the major setup of higher vocational colleges and their expectations. Based on the feedback information, continuous improvements should be made to major adjustments. For issues raised by students, teaching content and methods should be promptly adjusted, and the curriculum system optimized. In response to enterprise demands, practical teaching sessions should be strengthened to enhance students' practical abilities and professional qualities. According to industry dynamics and social needs, major setups should be updated in a timely manner to ensure the adaptability and forward-looking nature of the majors. Meanwhile, a tracking and evaluation mechanism for major adjustments should be established to regularly assess the effects of major adjustments. Based on the evaluation results, major adjustment strategies should be further refined and improved, forming a virtuous cycle of major adjustment.

6. Conclusion

The development of the new quality productive forces has put forward new requirements and challenges for professional adjustment in higher vocational colleges. Higher vocational colleges should closely follow the development pace of the new quality productive forces, promptly adjust professional settings, and optimize the professional structure to better serve regional economic development and industrial upgrading. Through strategies such as constructing a dynamic professional adjustment mechanism, deepening industry-education integration, strengthening the construction of the teaching staff, promoting curriculum system reform, and strengthening the construction of practical teaching conditions, higher vocational colleges can improve the fit between professional settings and the new quality productive forces and enhance the quality of talent cultivation and employment competitiveness. In the future, higher vocational colleges should continue to strengthen cooperation with governments, enterprises, industry associations, and other parties to jointly promote professional adjustment and optimization work and provide strong talent support for the development of the new quality productive forces. At the same time, higher vocational colleges should also continuously explore and innovate professional adjustment models and methods to adapt to constantly changing market demand and

technological innovation and achieve their own sustainable development.

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