

Vocational Education Reform Driven by the Trinity of Education, Technology, and Talent

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ABSTRACT

In the process of comprehensively promoting the integrated reform of the institutional mechanisms for education, technology and talent in China, it is emphasized to promote the in-depth integration of the industrial chain, innovation chain, and talent chain through the process reengineering, function integration, and system connection of the trinity of education, technology and talent, so as to realize a closed loop of institutional design and support the high-quality talent cultivation. On this basis, this paper will deeply consider the issues of vocational education reform and talent cultivation from a systematic perspective, clarify the internal relationship among education, technology and talent, define the scientific positioning of vocational education in the education, technology and talent strategies, and sort out the theoretical logic and practical paths of vocational education reform driven by the trinity of education, technology and talent, thus further promoting the reform of the talent development system and mechanism.

KEYWORDS

Trinity; Vocational education; Industry-education integration; Science-education integration

1 Introduction

The trinity strategy of education, technology and talent has pointed out a new direction and opened up a new pattern for the deepening reform and high-quality development of vocational education. Under this strategy, the role of vocational colleges can be redefined, transforming from traditional skill-training institutions into comprehensive platforms to achieve functional collaboration and facilitate the cultivation of diversified high-end talents. However, in the current process of vocational education reform and development, there are problems such as insufficient integration of educational resources and poor coordination among the subjects in the reform and development processes of vocational education, which affect the depth of industry-education integration and science-education integration, and are not conducive to the systematic layout and optimized development of vocational education. Based on this, driven by the trinity of education, technology and talent, exploring the paths and strategies for vocational education reform has certain practical necessity.

2 The Logic of Vocation Education Reform Driven by the Trinity of Education, Technology and Talent

The reform of vocational education should fully understand and properly handle the interrelationship among vocational education, science and technology, and talent cultivation. Specifically, relying on the collaborative effect of the dual mechanisms of industry-education integration and science-education integration, through practical measures such as cultivating and producing high-quality technical talents and facilitating the transformation of technological achievements, vocational education has become an important hub connecting scientific innovation and industrial development, and realized the deep integration of education, talent, and technology^[1]. The mechanism of science-education integration refers to the deep integration of education and teaching with technological research and development. From the perspective of scientific and technological innovation, vocational colleges build a technical transfer channel from laboratories to production lines to promote the innovation and transformation of scientific and technological achievements. From the perspective of the optimization of vocational education reform, vocational colleges guide students to participate in real research projects to enable to obtain and master cutting-edge technologies and application skills. The mechanism of industry-academia integration emphasizes deep cooperation between schools and enterprises to form an education community. Through joint development of courses, construction of practical training bases and industrial colleges, it strives to enhance the practicality and pertinence of technological innovation and talent cultivation, and achieves a precise matching between talent cultivation supply and demand^[2].

3 Practical Paths of Vocational Education Reform Driven by the Trinity of Education, Technology and Talent

3.1 Establish a Regional Vocational Education Alliance to Strengthen Collaborative Mechanisms

The vocational education reform driven by the trinity of education, technology and talents is a complex project involving multiple subjects and fields. Therefore, it is essential to strengthen top-level design and planning. Based on a

comprehensive understanding of national and regional strategies and policy requirements, it should closely focus on the development plans of local emerging industries, and the layout of leading industries and advantageous industries, mobilize the participation enthusiasm of industry enterprises, government, research institutions, and colleges, and actively build a collaborative education community involving government, enterprises, colleges and society, so as to establish a regional vocational education alliance and form a coordinated development network that balances interests, achieves win-win results, fuses data, and shares resources. In terms of data fusion, it can use big data and internet technology to build a large data center integrating industry, talent and technology, and leverage algorithm technology to generate a heat map of technical skills demand corresponding to the industrial structure, which will serve as a basis to guide the establishment and adjustment of professional courses in vocational colleges. In terms of resource sharing, it should fully integrate enterprise technical databases, favorable government policies, college training resources, and other resources, and rely on the cloud alliance platform to conduct joint patent applications, inter-college cooperation, and cross-institutional credit recognition. In terms of interest balance and sharing, based on the interests and demands of all collaborators, it should clearly define evaluation indicators and form a contribution point system. Specifically, vocational colleges can earn points through project participation, technical patents, technological innovation and enterprise services, and then exchange the points for government special funds, and usage time of premium enterprise equipment^[3].

3.2 Deepen School-Enterprise Cooperation and Industry-Education Integration to Support Talent Cultivation

Driven by the trinity of education, technology and talent, the reform of vocational education should focus on deepening school-enterprise cooperation and industry-education integration, which can be achieved through various means such as optimizing the collaborative education mechanism, improving the curriculum design, and innovating practical education.

Firstly, colleges should leverage their program characteristics and economic situations to build experimental and training bases to move the classroom to the training workshops and integrate the educational process and teaching practice with engineering construction, thus enabling colleges to serve the development of enterprises while introducing new concepts, technologies, and techniques into education and teaching. At the same time, college can implement the integrated teaching model of theory-practice integration, and teaching-learning-doing-research integration to enable students to deepen their understanding of theoretical knowledge, and refine and strengthen their technical skills through practical participation, thereby further supporting the cultivation of innovative and application-oriented talents, and improving the quality of technical and skilled personnel training^[4]. For example, vocational colleges can establish a long-term cooperative relationship with local leading enterprises to jointly build digital craftsman training bases. They can introduce cutting-edge technologies such as edge computing and 5G communication, and high-end equipment, and incorporate enterprise technical standards into the "1+X" certificate system to promote the development of computer majors and curriculum reform in vocational colleges. Furthermore, through organizing students to participate in real enterprise projects and applying the achievements to the enterprise product iteration, they can drive the mutual empowerment of education and industry, and achieve a win-win situation between vocational colleges and cooperative enterprises.

Secondly, in respond to future development trends, including the advancement of talent's technical operation skills and the de-stratification of talent structure, it is necessary to adhere to the actual talent demands of the industry as the core orientation, and continuously extend and expand based on deep cooperation between colleges and enterprises. Through various forms of cooperation, such order-based training, enterprise internship and training, modern apprenticeship system, introducing colleges into enterprises, and introducing enterprises into colleges, it can effectively break the inherent boundaries between the educational field and the industrial field, and build a deeply syncretic and collaboratively evolving new ecosystem of industry-education integration. This system is more flexible and adaptable, and is better able to adapt to the economic development characteristics and collaborative education needs of different regions, providing institutional guarantees and environmental support for cultivating high-quality technical and skilled personnel in line with future industry needs.

Thirdly, vocational colleges should maintain close contact with industry associations and enterprises, establish a curriculum research group composed of enterprise and industry experts, as well as backbone teachers, and obtain industry development trends through interviews and symposiums. On this basis, they can reorganize and improve the existing curriculum system, eliminate less practical content, and add new materials, new theories, and other cutting-edge knowledge. At the same time, according to the industry post requirements and the logic of production work, they should re-arrange and design courses, and build professional course groups, so as to further enhance the pertinence and effectiveness of courses.

3.3 Deepen Science-Education Integration Under Multi-Dimensional Drivers to Improve Education Quality

On the one hand, technology should be regarded as a powerful engine for innovation in teaching models and improvement of the talent cultivation quality in vocational colleges. Vocational colleges should actively introduce digital textbooks and build virtual laboratories and online learning platforms. Professional course teachers should be adept at introducing and applying advanced digital technologies and scientific means to empower teaching innovation, in order to obtain high-quality digital teaching resources, organize remote education, online classrooms, and immersive teaching, and explore diverse and innovative teaching models, so as to use technological innovation to feed back into educational and teaching development, support teaching activities, provide students with more vivid and interesting learning experiences, and further improve the quality and level of education and teaching.

On the other hand, vocational colleges should recognize their dominant position in the construction of the technological innovation system, continuously improve the levels of application-oriented research, achievement transformation, and industrialization, and solve problems such as being able to design but unable to manufacture, and having raw materials but lacking processed materials. They can establish and set up student innovation studios and clubs to provide platforms for students to engage in exploratory and innovative practices, and encourage them to carry out technical improvement and invention creation under the guidance of professional teachers, thus stimulating their innovative thinking and interest. In addition, they can encourage students from different majors and departments to independently form innovation and entrepreneurship teams, and create a knowledge and information sharing platform to enable free combination and matching of resource elements to generate new elements, fully exert the advantages and functions of collaborative innovation, and conduct innovative exploration in the management, business model, technology and product, and brand by drawing upon all useful opinions^[5]. Students can actively participate in research competitions and entrepreneurship competitions, such as the Youth Innovation Software Design Competition, the “Challenge Cup” National College Students’ Entrepreneurship Plan Competition, the National Undergraduate Electronic Design Contest, so that they can access and understand relatively novel research topics such as intelligent storage cloud, intelligent agricultural machinery, 3D reconstruction and machine vision, expand their academic horizons, and accumulate experience for their future innovation and entrepreneurship practice.

Colleges should also strengthen the construction of the pilot experiment link, and improve the construction of technology transfer and technological achievement transformation bases, to form a complete research exploration-achievement transformation-industrialization chain. In the pilot experiment link, equipment debugging, performance verification and other services should be provided. In the link of achievement verification, an evaluation committee composed of market experts, technical experts, and other professionals should be established, to conduct scientific assessment of the market prospects, intellectual property status and economic benefits of the achievements. Meanwhile, with the support of diversified financing from colleges, enterprises, and communities, exploratory transformation should be carried out, in order to improve the success rate of scientific research project transformation, bridge the “last mile” from the laboratory, practice base to the market. Through this way, it can comprehensively enhance the innovation ability and core competitiveness of vocational colleges, and better fulfill their responsibilities in serving the national technological innovation strategy.

3.4 Build a Dual-Qualified Teaching Team to Strengthen Talent Support

Teachers are the key force in promoting the science-education integration and industry-education integration, and facilitating the reform of vocational education. Therefore, strengthening the construction of the teaching team and building an excellent teaching team with solid theoretical knowledge, proficient technical skills, a reasonable structure, and an orderly system is of vital importance for the high-quality development of vocational education. Firstly, vocational colleges should clearly define the ability goals for teachers under the integration of industry, education, and science, and establish core ability indicators, including curriculum teaching, industry connection, and research service. The curriculum teaching dimension includes competencies such as teaching preparation, organization and implementation, curriculum development, and teaching evaluation. The industry connection dimension encompasses professional technology development, social services, industrial resource transformation, and school-enterprise cooperation practice capabilities. The research service dimension comprises approaches of academic research and innovation, and the ability to contribute to teaching and practice with research achievements. Secondly, vocational colleges should strengthen teacher training. They can use a combination of online and offline training to promote the update of teachers’ theoretical knowledge, and enable them to learn the latest industry knowledge and educational concepts. Meanwhile, they can encourage teachers to take temporary position and participate in actual enterprise projects, or engage in relevant scientific research and technology application promotion works in research institutes during vacations. Besides, they can encourage teachers to participate in educational reform, innovation practice projects, and provincial-level scientific research projects, so as to continuously improve teachers’ professional literacy, research capabilities, and innovative teaching abilities. In addition, colleges should regularly organize seminars and academic salons to promote in-depth communication and interaction

across regions and disciplines, aiming to provide a platform for interaction and experience sharing for teachers to stimulate their innovative thinking, and enable them to explore new breakthrough points in academic research and teaching practice. For example, they can invite experts from different fields to deliver keynote speeches, organize group discussions and workshops, and select academic problems, challenging research issues, and hot topics in professional fields to discuss and analyze from multiple dimensions, thus further enhancing the cooperation effect. They should also encourage teachers to share successful cases and best practices to promote the improvement of educational quality and academic progress^[6]. Thirdly, vocational colleges should improve the teacher assessment and incentive mechanism. They can build an evaluation mechanism that is in line with the characteristics of innovative and dual-qualified teachers, emphasize skills and achievements as the core, and conduct the comprehensive evaluation from multiple aspects such as research achievements, teaching effectiveness, and practical contributions. In addition, the government can jointly establish an incentive mechanism with enterprises and colleges to reward teachers who have achieved substantive results in technological innovation and scientific research, and promoted the integration of industry and education, thereby further motivating more teachers to participate in teaching and research, and comprehensively enhancing the overall quality of the teaching team.

4 Conclusion

In conclusion, to integrate vocational education into the national “trinity” strategy of education, technology, and talent, it is necessary to deeply understand the new positioning and mission of vocational education, systematically sort out new ideas for vocational education reform and development, and provide institutional and talent support should through the establishment of regional vocational education alliances and a dual-qualified teaching team. Furthermore, under the coordination of dual mechanisms of industry-education integration and science-education integration, it can promote the connection among education, technology, and talent, thereby improving the quality of vocational education, facilitating talent cultivation, and demonstrating new achievements of vocational education.

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References

- [1] ZENG Lingqi. Integrating Education, Technology and Talents to Promote High-quality Development of Vocational Education: Multiple Logics and Practical Approaches [J]. Vocational and Technical Education, 2024, 45 (34): 6-14.
- [2] SHI Shaojie, GUO Jing. Strategic Tasks and Basic Paths of the High-quality Development of Vocational Education from the Perspective of Integrated Development of Education, Technology and Talents [J]. Modern Education Management, 2024, (03): 118-128.
- [3] HUANG Qilin. Research on the Construction Path of a New Pattern of Integrated Development of Technology Talents in Secondary Vocational Education [J]. Way of Success, 2025, (34): 53-56.
- [4] ZHANG Yingxi. The "Three-in-One" Integration of Education, Technology, and Talent Empowers the Comprehensive Innovation System Mechanism [J]. Journal of Yanbian University (Social Sciences), 2025, 58 (02): 103-115+143.
- [5] LI Yingli. Deepen the Reform and Development of Vocational Education in the Advancement of the "Trinity" of Education, Technology and Talent [J]. Journal of National Academy of Education Administration, 2023, (07): 17-21.
- [6] WANG Yi, YANG Suhua, YU Cheng, et al. Research on the Training Path of "Dual-qualified" Teachers Based on the Integration of Industry, Education and Science [C]// Hubei Institute of Mechanical and Electrical Engineering. 2025 Proceedings of New Perspectives on Mechanical and Electrical Innovation and Industry-Education Integration. School of Mechanical and Electrical Engineering, Wuhan City Polytechnic; Technology Center, Dongfeng Motor Corporation; 2025: 318-321.