

Research and application of the talent training mechanism in the integration of industry and education in private colleges under the new situation

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Abstract: The integration of industry and education, as well as collaborative talent development in higher education, is an effective approach for deep collaboration between applied undergraduate institutions and enterprises in the new era. It represents a new direction for achieving talent development goals in private colleges. However, there are still some shortcomings in the current integration of industry and education and collaborative talent development, such as insufficient understanding of the subject, a single educational model, lagging faculty development, and incomplete quality assurance and evaluation systems. In response to these problems and based on the current status of the integration of industry and education in private undergraduate institutions, this paper explores a new path for talent development through industry-education integration and school-enterprise cooperation, aiming to build a favorable environment for the steady development of private colleges.

Key words: applied private college; industry-education integration model; collaborative talent development mechanism

1 Introduction

Driven by the strategic needs of the transformation and development of higher education, private colleges are particularly inclined to prioritize the construction of universities that are application-oriented, practical, and at the forefront. In order to achieve the goal of cultivating applied technical talents and integrating resources for talent development, private colleges need to explore the path of collaborative education through industry-education integration.

From a strategic perspective, collaborative education through industry-education integration is a crucial form of high-quality talent development in universities and an effective approach to promoting rapid local economic development. From the perspective of the talent development process, collaborative education through industry-education integration is an intrinsic development based on the premise of improving the quality of talent development, representing an essential path to enhancing the quality of talent cultivation. Looking at the direction of educational development, the operation of the joint talent development system through government, academia, and industry collaboration has achieved a "win-win" situation, promoting the dual development of local education and local industries. Therefore, exploring new ideas for collaborative education through industry-education integration is a crucial approach in the new era for the modernization of education and the diversification of talents.

2 The practical significance of the talent cultivation mechanism in private colleges

Education is the cornerstone of a nation's long-term development, and the fundamental starting point of educational work is to prioritize talent cultivation. The *Outline of National Medium and Long-term Education Reform and Development Plan (2010-2020)* emphasizes that the central task of talent cultivation and university work is to give priority to the cultivation of individuals and to cultivate high-quality professionals with both moral integrity and rich knowledge, as well as a solid foundation in basic skills. This includes fostering innovative individuals who are able to adapt to the needs of national and social development [1].

Private colleges, as a vital component of China's higher education system, possess a flexible structure in talent cultivation. They exhibit a strong emphasis on cultivating applied talents, with professional course designs that are geared towards social practice and job adaptation. This approach has resulted in the development of a significant number of outstanding talents, thereby addressing the imbalances in China's higher education development. Private colleges have undertaken their responsibilities and obligations diligently.

2.1 The fundamental connotation of collaborative education through industry-education integration

In the current context, collaborative education through industry-education integration involves the unified organization of various universities, government departments, private enterprises, and research institutions. By fully exploring resources and advantages, and basing actions on mutual trust and agreements, the aim is to meet market needs. The central focus is on the educational philosophy of collaborative education, driven by the goal of win-win cooperation. The main theme is the collaboration between universities and enterprises, relying on project cooperation, technology transfer, and joint development. It represents a talent cultivation model with coordinated efforts among various entities. Collaborative education involves the key players at each stage of talent cultivation with the fundamental purpose of talent development and utilization. Within this system, each entity enjoys resources, accumulates energy, and generates interactive effects. Collaborative education through industry-education integration is a highlight of recent educational reforms and an innovative practical application of the talent cultivation model in educational bases. Establishing a rational talent cultivation mechanism and innovating the collaborative education philosophy through industry-education integration are crucial for improving the quality of talent cultivation in private colleges [2].

2.2 The supporting basis of collaborative education through industry-education integration

In recent years, the nation has placed significant emphasis on the collaborative development of the education industry and the cooperative cultivation of talents through industry-education integration and school-enterprise cooperation. Various documents, including the *Decision of the Central Committee of the Communist Party of China on Several Major Issues Concerning Comprehensively Deepening the Reform of Education*, the *Decision of the State Council on Accelerating the Development of Modern Vocational Education* and the *Opinions on Comprehensive Improvement of Higher Education Quality*, as well as strategic development outlines such as the *Decision on Comprehensively Deepening Reforms in the Field of Education* passed at the Third Plenary Session of the Nineteenth Central Committee, unanimously advocate the necessity of adopting collaborative education through industry-education integration to achieve the cultivation of applied talents [3]. Additionally, some cities, such as Ningbo, Dalian, Suzhou, and Shanghai, have issued constructive documents to encourage and promote the in-depth development of collaborative education through industry-education integration, thus playing a stimulating role in the deepening of such integration.

3 Current issues and status of collaborative education through industry-education integration

3.1 Insufficient understanding

Despite several years of implementation of collaborative education through industry-education integration in universities, it has not been effectively reflected and implemented in the teaching process. This is mainly attributed to the inadequate interpretation and understanding of the essence of collaborative education through industry-education integration by university teachers [4].

3.1.1 Reasons on the university side

As a new educational concept, some university teachers lack practical experience, making it challenging to effectively demonstrate enterprise technologies, processes, and improvements in the classroom. The teaching process still relies heavily on textbooks, and integrating real-world industrial conditions into teaching remains difficult. Additionally, university teachers tend to believe that classroom teaching is the only effective way for students to acquire knowledge, thereby neglecting the crucial role of practical experience in talent cultivation.

Another significant aspect is that, during the year-end performance evaluation, few performance assessment indicators related to teachers' efforts and contributions to collaborative education through industry-education integration are included. The lack of a robust incentive mechanism for the rapid advancement of collaborative education through industry-education integration is evident.

3.1.2 Reasons on the enterprise side

Due to a lack of understanding of the importance of collaborative education through industry-education integration in enhancing technological levels and promoting regional economic growth, some enterprises only consider their current situations. They fail to recognize the strength of university research capabilities and the cutting-edge perspectives in exploring new technologies. Consequently, they are unwilling to participate in university teaching processes.

The mismatch in understanding between these two key players has hindered the progress of collaborative education through industry-education integration in some universities, resulting in minimal achievements.

3.2 Limited collaboration models

Examining the current collaborative education through industry-education integration models, the focus is still predominantly on establishing jointly built school-enterprise internship bases, cultivating order-based employees, and facilitating in-enterprise internships. Some universities are gradually establishing new framework models, such as collaborative internship demonstration bases, building on-campus student internship rooms, and establishing engineering and technology research centers. However, these models are still insufficient in terms of the forms, content, and depth of collaboration.

3.3 Lack of qualified teaching staff

While teachers in private colleges generally possess certain teaching and practical methods, they often lack practical experience in enterprises, impacting their effectiveness in activities such as participating in technological updates and research and development. On the other hand, engineers from enterprises, although experienced in practical applications, lack corresponding teaching methods and relevant theories, making them less effective in teaching roles. Teacher evaluations often prioritize research projects and funding as performance assessment criteria, neglecting the contribution of collaborative education through industry-education integration activities. As a result, such activities are often overlooked due to the lack of an intrinsic driving force.

In accordance with the laws of talent development and cultivation, the development of high-quality talents and highly skilled individuals requires university teachers to strengthen the cultivation of students' basic qualities and practical skills. This includes: (1) Vigorously cultivating students' entrepreneurial spirit, strengthening entrepreneurial awareness, and

improving entrepreneurial quality. (2) Enhancing school-enterprise cooperation, participating in enterprise internships, and promoting students' vocational skills training, and practical ability. (3) Regularly organizing innovation and entrepreneurship competitions to cultivate students' professional interests, stimulate their innovative desires, and ignite their entrepreneurial enthusiasm. (4) Establishing innovation and entrepreneurship incubation bases and innovation and entrepreneurship funds jointly with enterprises, accelerating the transformation of innovation and entrepreneurship achievements, and implementing projects.

However, concerning the current composition and structure of the teaching staff in private colleges, most new teachers have recently graduated from universities, with almost zero work experience. Their knowledge structure mainly consists of theoretical knowledge, and they lack or have no experience working in enterprises. In the context of teacher evaluation, the quantity of papers is often used as the criterion for teacher title evaluation and remuneration definition. Consequently, the phenomenon of teachers prioritizing research over practice is becoming increasingly common. Relying on such a teacher team makes it difficult to cultivate a high-quality talent pool.

3.4 Incomplete quality assurance and evaluation systems

At various stages of the collaborative education through industry-education integration model in private colleges, there are shortcomings in quality assurance and weak execution of teaching evaluation systems. The lack of systematic research on the construction of talent cultivation mechanisms has left many private colleges in a state of disorder, weakness, and lack of supervision in collaborative education through industry-education integration, making it challenging to ensure the quality of talent cultivation.

4 Establishing a reasonable, legal, and scientific mechanism for collaborative education through industry-education integration in private colleges

Based on the current issues and status of collaborative education through industry-education integration mentioned above, constructing a mechanism for collaborative education through industry-education integration is the only way to overcome the low output in talent cultivation. Therefore, achieving the sharing of educational resources and reshaping the basic framework of collaborative education through industry-education integration to keep pace with the times requires cooperation and mutual benefits. As private colleges, achieving the updated educational concept of collaborative education through industry-education integration requires a strong emphasis on the following aspects:

4.1 Facilitating government coordination and legal intervention mechanisms

To avoid information asymmetry in school-enterprise cooperation, the government should take the lead, and multiple parties involved in school-enterprise cooperation should cooperate to establish a public network information exchange platform. This will promote the sharing of resources on the information platform and establish an expert committee and expert database. This will facilitate the transformation of roles from the object of cooperation to the subject of cooperation between the government and enterprises in collaborative education through industry-education integration affairs. During information exchange and intention communication, the natural advantages of organizational members in the industry should be fully utilized, thus creating a green channel for collaborative education through industry-education integration.

Using legal regulations as a constraint mechanism, clarifying the rights and obligations of all parties involved in school-enterprise cooperation, and implementing preferential support policies will fully mobilize the enthusiasm of all participating parties. It also needs to coordinate public resources from schools and enterprises, establish strategic goals, implement policy measures, and address process difficulties, so that the orderly implementation of collaborative education through industry-education integration work can be ensured.

4.2 Establishing a favorable internal and external operating environment

4.2.1 Building a new educational model

We should also adhere to the development concept of collaborative education through industry-education integration, rely on school-enterprise cooperation and university teaching units, strengthen university-government cooperation, and university-enterprise cooperation, and introduce a new education model of "government-school-enterprise collaboration, integration of production and utilization". This will gradually form a functional management department with the collaboration of "government-school-enterprise" as the main body, integrating guidance, employment, and policy orientation. This will jointly promote the development of collaborative education through industry-education integration.

4.2.2 Involving shareholding in business operation

Projects declared by school-enterprise cooperation for provincial-level science and technology entrepreneurship parks can be incubated and grow into advanced cutting-edge technologies. Through refinement and improvement, they can contribute to teaching, providing rare opportunities for students' entrepreneurship and employment. Simultaneously, it promotes the transformation of teachers' research achievements and serves local economic development and technological upgrading. This creates a new pattern of "innovation on campus, entrepreneurship in the park, and development based on the platform", promoting the development of the local economy and society.

4.3 Building a strategic mechanism for high-quality talent cultivation in private colleges

4.3.1 Developing a scientific and rational plan for high-quality talent cultivation

The plan for cultivating high-quality and innovative talents is the vision and blueprint for formulating talent cultivation plans in various universities. It serves as a guide for implementing the goals of talent cultivation and is a crucial guarantee for improving the quality of high-quality talent cultivation.

For private colleges aiming to cultivate outstanding entrepreneurs and highly skilled professionals, it is necessary to formulate a comprehensive, scientifically reasonable, and easily implementable talent cultivation plan. This plan should be based on the social environment, the economic development level, the curriculum system of private colleges, the laws and characteristics of cultivating highly skilled professionals, and optimize and integrate the curriculum system. The goal is to achieve a reasonable balance between theoretical and practical teaching, increase the emphasis on practical teaching, incorporate more skill-based teaching elements, focus on innovative and entrepreneurial training courses, motivate teachers to use diverse teaching methods, and encourage the participation of technical personnel from enterprises in curriculum revision and design. This approach enriches the objectives of talent cultivation.

4.3.2 Emphasizing "double-qualified teacher and double-talented teacher" in faculty development

An essential factor in the quality assurance system for talent cultivation is the composition of the teaching staff. Building a "double-qualified teacher and double-talented teacher" teaching team is a crucial guarantee for cultivating high-quality professional skills. Urgent actions are required to promote the rational composition of the teaching staff and strengthen the construction of a "double-qualified teacher and double-talented teacher" teaching team. Through years of practical exploration, the following aspects have been identified:

In order to utilize the school-enterprise cooperation platform to establish communication channels, it is necessary to plan regular assignments for internal professional teachers to immerse themselves in relevant enterprises for practical training, thus enhancing teachers' practical application and adaptability to job requirements.

In order to encourage internal teachers to actively participate in learning entrepreneurial and innovative courses, it is essential to provide substantial financial support for internal professional teachers to participate in entrepreneurship and innovation course study, and organize various entrepreneurship and innovation teacher training sessions regularly, so that

professional teachers can master and apply advanced teaching methods globally and understand the latest trends and developments in domestic and international industries, and acquire new knowledge, ideas, and methods for innovation and entrepreneurship education.

To employ senior executives or production engineers from relevant enterprises as part-time teachers to enrich the "double-qualified teacher and double-talented teacher" teaching team, the private colleges could regularly invite enterprise executives or production engineers to campus for forums or interviews, providing students with guidance for internships and practical training directly from the industry, expanding students' knowledge.

4.3.3 Innovation and entrepreneurship education are the strongest voice of the times

The sustainability of private colleges' development depends on whether they can cultivate a batch of high-quality and highly skilled professionals. Strengthening innovation and entrepreneurship education is a crucial approach for private colleges to overcome challenges, achieve high-quality talent cultivation, implement the concept of sustainable development, and pursue a green development path.

For private colleges, establishing the development concept of innovation and entrepreneurship education not only helps them overcome various shortcomings and narrow the natural gap with other colleges but also serves as a remedy for private colleges to take a unique path and expand their influence.

However, innovation and entrepreneurship education cannot be simplistically considered as a general course in general education. It needs to form a complete education system. In the process, it needs to deliberately and consciously cultivate students' flexible, sharp, and innovative thinking, emphasize the exercise of entrepreneurial psychological qualities, promote the deep integration of professional education and innovation and entrepreneurship education, build a school-enterprise cooperation platform, increase the intensity of practical aspects, enhance practical operational capabilities, and lay a solid foundation for students to naturally integrate into enterprises.

4.3.4 Continuous efforts in collaborative education through industry-education integration

The cultivation of high-quality talents is deeply dependent on the school-enterprise cooperation platform. Private colleges should actively participate in local corporate and industry economic construction, incorporate the concept of collaborative education through industry-education integration into educational principles, build diverse internship and practical teaching platforms, revise training plans for student practical operations, identify and propose problems through practical operations, and attempt to solve these problems. In the process of school-enterprise cooperation and practice, it needs to continually experiment and explore new models and methods for deep integration with enterprises, and infuse more effective methods throughout various stages of teaching during the practical teaching process.

4.4 Building a new model of industry-education integration

Application-oriented undergraduate colleges, in collaboration with local governments, higher education institutions, and public-private enterprises, have jointly established mixed-ownership industry-oriented colleges, co-built "industry-education application" bases, established university-led innovation and entrepreneurship guidance centers, and founded vocational pre-job training institutions as platforms for industry-education integration. This has gradually formed a school-enterprise cooperation model that emphasizes industry-education integration teaching, a new apprenticeship practice, complementary learning and work experience, technology research and development services, and pre-job skills training. It embodies advanced concepts in the operation of new educational models.

4.5 Promoting a school-enterprise mutual employment and co-training mechanism

The establishment of a "double-qualified teacher" faculty team and the implementing a "young teachers' rotation in engineering practice" system, take a three-year cycle as a rotation period. At the same time, it is necessary to encourage on-

the-job technical personnel or engineers from enterprises to serve as part-time lecturers, advocate for joint completion of teaching tasks and research and innovation between schools and enterprises, strengthen the transformation of teaching achievements, and better serve economic and social development.

4.6 Improving multiple evaluation and supervision mechanisms

4.6.1 Establishing competency-based evaluation mechanism

It is necessary to implement a "competency-based" assessment standard for students, comprehensively assess students' learning, working, and job adaptation abilities, and explore the incorporation of third-party assessment mechanisms through a multi-party participation evaluation model that combines evaluations from schools, enterprises, and society. And the evaluation methods may include written exams, on-site defenses, thesis writing, practical operations, and results demonstrations.

4.6.2 Promoting a collaborative teaching governance mechanism

It is necessary to innovate the teaching governance mechanism and refine the teaching process, introduce refined management into teaching management, and use the "Gantt chart" method to decompose and map the long-term, medium-term, and short-term goals of talent cultivation. This can be broken down precisely into specific courses, experimental training project content, and various stages. The teaching process is strictly controlled to ensure the rigour of teaching, and enterprises are allowed to send special persons to follow up and check the implementation of the teaching process, which is recorded to ensure the quality of teaching.

4.6.3 Innovating the service mechanism

Teaching work conferences with the participation of multiple parties, including the government, schools, and enterprises, should be regularly convened, and industry experts as members of the guidance workgroup for professional development should be incorporated. Industry inspection reports and expert guidance opinions on talent cultivation plans, curriculum development, faculty team construction, and quality assessment should be carefully listened to.

5 Conclusion

This article focuses on the exploration and innovation of the "industry - education - research" school-enterprise cooperation mechanism in talent cultivation. To some extent, it accelerates the innovative process of school-enterprise collaborative education, ensures the quality of talent cultivation, alleviates the contradiction between talent supply and demand, and facilitates the direct connection and alignment between university talent cultivation and the demands of the talent market. However, challenges still exist in the current school-enterprise cooperation, such as low collaboration levels, insufficient depth, especially in areas like joint curriculum development, teaching process design, cross-location faculty exchanges, and internship collaboration. There is a lack of incentive mechanisms, policy guidance, and long-term talent cultivation mechanisms for all parties involved in school-enterprise cooperation. As long as we adhere to the concept of collaborative education through school-enterprise cooperation, continuously optimize talent cultivation programs in private universities, refine practical teaching components, and implement educational reform measures, the improvement of talent cultivation quality in private colleges is expected to be just around the corner.

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Conflicts of interest

The author declares no conflicts of interest regarding the publication of this paper.

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