Optimization Strategy of University Practical Teaching System Based on the Integration of Industry and Education

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Abstract: In the context of economic globalization and rapid technological progress, industry-education integration is essential for reforming university practical teaching. This study analyzes the current system, identifying key issues: uneven resource distribution, superficial university-enterprise cooperation, and a mismatch between teaching content and industrial demands. Root causes are explored from institutional, mechanistic, and enterprise participation aspects. Accordingly, optimization strategies are proposed, including refining curriculum design, deepening school-enterprise cooperation, enhancing the "double-qualified" faculty, strengthening policy support, and establishing a diversified evaluation system. These measures aim to improve teaching quality and foster high-caliber applied talents. In summary, industry-education integration drives practical teaching development, necessitating continuous system optimization for economic and social progress.

Keywords: Industry-education integration;University practical teaching;Optimization; School-enterprise cooperation;Double-qualified faculty

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1 Introduction

In the era of global economic integration and rapid technological development, the demand for high-quality applied talents is becoming more urgent due to industrial upgrading and technological innovation. China is in a crucial stage of economic restructuring and industrial transformation. Emerging industries are constantly emerging, and traditional industries are accelerating their transformation, which puts forward higher requirements for the quality of talent cultivation in universities[1]. However, currently, there are problems such as the disconnection between practical teaching in universities and industrial needs, and the weakness of practical links. As a talent cultivation model that deeply integrates industrial development and education and teaching, the integration of industry and education has become an important way to solve this contradiction. It emphasizes the collaborative cooperation between universities and enterprises in talent cultivation, scientific research, technological innovation, etc., and is of great significance for promoting the reform of practical teaching in universities and improving the quality of talent cultivation[2].

1 Basic Connotation and Theoretical Basis of the Integration of Industry and Education

1.1 Definition and Development Process of the Integration of Industry and Education

The integration of industry and education refers to the deep integration of industry and education. It breaks the barriers between traditional education and industry, enabling organic connection and collaborative development between educational institutions (mainly universities) and enterprises in aspects such as talent cultivation objectives, curriculum settings, teaching contents, and practical teaching. In China, the development of the integration of industry and education has gone through several stages. In the early stage, the cooperation between universities and enterprises mainly existed in simple forms such as internships and training, with limited depth and breadth of cooperation. With the development of the economy and society, the state has begun to attach importance to the integration of industry and education, and a series of policy documents have

been issued to promote deeper cooperation between universities and enterprises in talent cultivation, technological research and development, etc. In recent years, the integration of industry and education has entered a stage of comprehensive deepening, and the cooperation models between universities and enterprises have been continuously innovated, forming various forms of industry-education integration communities[3].

1.2 Characteristics of Practical Teaching in Universities

Practical teaching in universities has characteristics such as practicality, comprehensiveness, openness, and innovativeness. Practicality is its most essential feature, which emphasizes that students apply theoretical knowledge to practical operations through personal participation in practical activities to improve their ability to solve practical problems. Comprehensiveness is reflected in that the content of practical teaching covers knowledge and skills from multiple disciplinary fields, requiring students to comprehensively use the knowledge they have learned to solve complex problems. Openness is manifested in that the places, contents, and forms of practical teaching are no longer limited to campuses and classrooms, but are closely connected with enterprises and society. Innovativeness encourages students to put forward new ideas and solutions during the practical process, cultivating innovative thinking and innovative abilities.

2 Analysis of the Current Situation of the Practical Teaching System in Universities

2.1 Structure and Content Composition of the Current Practical Teaching System

At present, the practical teaching system in Chinese universities mainly consists of links such as curriculum experiments, professional internships, and graduation design (thesis). Curriculum experiments are practical teaching links set up to verify and consolidate theoretical knowledge during the teaching process of theoretical courses, usually completed in laboratories. Professional internships are generally arranged in the senior year. Students enter enterprises or relevant units to participate in practical work, understand the current situation of industry development and the operation mode of enterprises, and improve their professional practical abilities. Graduation design (thesis) is a comprehensive examination of students' ability to comprehensively use the knowledge and skills they have learned to solve practical problems. Under the guidance of teachers, students select topics related to their majors for research and practice.

In terms of teaching content, curriculum experiments mainly revolve around the knowledge points of theoretical courses and are mainly verification experiments; the content of professional internships is arranged according to the actual needs of enterprises and students' major directions, but there is a problem that the internship content is not closely combined with the professional cultivation objectives; some topics of graduation design (thesis) come from actual enterprise problems, but many topics lack practical value and innovativeness.

2.2 Main Existing Problems

(1)Uneven Allocation of Resources: There is an obvious imbalance in the allocation of practical teaching resources in universities. On the one hand, there are large differences in resources among different disciplines and majors. Some popular majors can obtain more practical teaching funds, equipment, and internship base resources, while some unpopular majors are short of resources, seriously affecting the quality of practical teaching. On the other hand, the integration of internal practical teaching resources in universities and external enterprise practical resources is insufficient. The update of laboratory equipment on campus is slow, making it difficult to meet the practical teaching needs of new technologies and processes in enterprises; the number of off-campus internship bases is limited, and the cooperation of some bases is unstable, unable to provide sufficient practical opportunities for students.

(2)Shallow Cooperation between Universities and Enterprises: Currently, the cooperation between universities and enterprises mostly stays at a superficial level, lacking depth and breadth. Enterprises have a low enthusiasm for participating in practical teaching in universities. The main reason is that it is difficult for enterprises to obtain direct economic benefits from the cooperation, and at the same time, they have to bear the safety risks and management costs brought by student internships. There is a lack of a long-term effective cooperation mechanism between universities and enterprises. The cooperation projects are often short-term and fragmented, lacking systematicness and continuity, and unable to achieve in-depth integration and collaborative development between universities and enterprises.

(3)Disconnection between Practical Teaching Content and Industrial Needs: The practical teaching content in universities is updated slowly and cannot timely reflect the new technologies, new methods, and new needs of industrial development. Curriculum experiments are mainly verification experiments, lacking comprehensive, design-oriented, and innovative experiments; there is a gap between the content of professional internships and the actual work processes and job requirements of enterprises, making it difficult for students to access the core business and key technologies of enterprises during internships; the topics of graduation design (thesis) are not closely combined with actual enterprise problems, and the research results lack practical application value and cannot solve practical problems for enterprises.

2.3 Analysis of the Reasons

(1)Institutional Level: At present, there is a lack of a perfect legal, regulatory, and policy system for the integration of industry and education in China. The rights and obligations of enterprises participating in practical teaching in universities are not clearly defined, and there is a lack of corresponding incentive mechanisms and guarantee measures. There are also imperfections in the internal practical teaching management system of universities. For example, the practical teaching quality evaluation system is not sound, and the assessment and incentive for teachers' practical teaching work are insufficient, resulting in teachers' low enthusiasm for carrying out practical teaching.

(2)Mechanism Level: There is a lack of an effective communication and coordination mechanism between universities and enterprises. There is information asymmetry between the two sides in aspects such as talent cultivation objectives, curriculum settings, and teaching contents, making it difficult to reach a consensus. At the same time, the interest distribution mechanism between universities and enterprises is unreasonable. Enterprises invest a large amount of human, material, and financial resources in the cooperation but obtain limited returns, affecting the enthusiasm of enterprises to participate in the integration of industry and education.

(3)Enterprise Participation: As the main body of the market economy, enterprises mainly pursue economic benefits. Under the current integration of industry and education model, the cost for enterprises to participate in practical teaching in universities is high, while the benefits are not obvious, making enterprises lack the motivation to participate in the integration of industry and education. In addition, some enterprises do not fully recognize the importance of talent cultivation in universities and do not realize that cooperation with universities can cultivate high-quality talents for enterprises and improve the innovation ability and competitiveness of enterprises.

3 Optimization Path of the Practical Teaching System in Universities from the Perspective of the Integration of Industry and Education

3.1 Optimize the Curriculum System Design and Strengthen the Proportion of Practical Content

Universities should comprehensively optimize the existing curriculum system according to the development needs of industries and the requirements of professional job capabilities. In curriculum settings, increase the proportion of practical courses, reduce the class hours of theoretical courses, and construct a curriculum system that combines theory and practice and progresses step by step. For example, set more comprehensive and design-oriented experimental projects in professional courses, introduce actual enterprise cases into classroom teaching, and let students learn and practice in simulated real work scenarios. At the same time, develop practical curriculum modules closely combined with industrial development, such as offering elective courses on new technologies, new processes, and new methods, broadening students' knowledge scope and vision, and improving their practical and innovative abilities.

3.2 Deepen the School-Enterprise Cooperation Mechanism and Promote the Construction of a Collaborative Education Platform

Establish and improve a long-term school-enterprise cooperation mechanism, and clearly define the rights and obligations of both universities and enterprises in talent cultivation, scientific research, technological innovation, etc. Through forms such as signing cooperation agreements, jointly building industrial colleges, and establishing school-enterprise cooperation councils, strengthen communication and coordination between universities and enterprises to

achieve resource sharing and complementary advantages. Promote the construction of a collaborative education platform. Universities and enterprises jointly formulate talent cultivation plans, develop curriculum materials, build practical bases, and carry out teaching research. For example, enterprises can provide internship positions, practical equipment, and technical guidance for universities, and universities can provide talent support, technological research and development, and employee training services for enterprises, forming a good situation of school-enterprise collaborative education.

3.3 Improve the Quality of the Construction of "Double-Qualified" Faculty

Strengthening the construction of a "double-qualified" faculty is the key to improving the quality of practical teaching in universities. Universities should formulate relevant policies to encourage teachers to take temporary posts in enterprises, participate in the production practice and technological research and development activities of enterprises, and improve teachers' practical teaching abilities and professional skills. At the same time, actively introduce excellent technical talents and management talents from enterprises to serve as part-time teachers, enriching the practical teaching faculty of universities. Establish an evaluation system for "double-qualified" teachers, incorporate teachers' practical teaching abilities, work experience in enterprises, technological research and development achievements, etc. into the teacher assessment and evaluation index system, and encourage teachers to continuously improve their practical teaching levels and professional qualities.

3.4 Strengthen Policy Support and Institutional Guarantee

The government should increase policy support for the integration of industry and education, issue relevant laws, regulations, and policy documents, clearly define the responsibilities and obligations of enterprises participating in practical teaching in universities, and establish and improve incentive mechanisms and guarantee measures for enterprises to participate in the integration of industry and education. For example, provide policy support such as tax preferences, financial subsidies, and project support for enterprises participating in the integration of industry and education to improve their enthusiasm for participation. Universities should improve the internal practical teaching management system, establish and improve the practical teaching quality monitoring and evaluation system, strengthen the management and supervision of the practical teaching process, and ensure the quality of practical teaching.

3.5 Construct a Diversified Evaluation System to Improve the Evaluation Effect of Students' Comprehensive Abilities

Establish a diversified practical teaching evaluation system, change the traditional evaluation method mainly based on examination results, and comprehensively consider students' practical operation abilities, innovative abilities, teamwork abilities, professional qualities, etc. The evaluation subjects should include teachers, enterprise mentors, students themselves, and classmates, achieving multi-dimensional and all-round evaluation. The evaluation methods can combine process evaluation and final evaluation, and combine qualitative evaluation and quantitative evaluation to comprehensively and objectively evaluate students' practical learning achievements. For example, in the evaluation of professional internships, enterprise mentors can evaluate students based on their work performance and task completion during the internship; in the evaluation of graduation design (thesis), invite enterprise experts to participate in the evaluation and evaluate students' research results from the perspective of actual enterprise needs.

4 Conclusion

The integration of industry and education is an important way to promote the reform of practical teaching in universities and improve the quality of talent cultivation. Currently, there are problems in the practical teaching system of Chinese universities, such as uneven resource allocation, shallow school-enterprise cooperation, and disconnection between practical teaching content and industrial needs, which seriously affect the quality of practical teaching and the effect of talent cultivation. From the perspective of the integration of industry and education, through optimization paths such as optimizing the curriculum system design, deepening the school-enterprise cooperation mechanism, improving the quality of the construction of a "double-qualified" faculty, strengthening policy support and institutional guarantee, and constructing a

diversified evaluation system, the existing problems in practical teaching in universities can be effectively solved, the quality of practical teaching can be improved, and more high-quality applied talents that meet the development needs of industries can be cultivated. In the future, with the continuous advancement of industrial upgrading and technological innovation, the integration of industry and education will be continuously deepened, and the practical teaching system in universities also needs continuous optimization and improvement to better serve economic and social development.

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