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Research on the Talent Cultivation Model of Modern Industry Colleges Oriented to Regional Industries

-- A case study of the Power Transmission and Distribution Industry College

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Abstract: The integration of industry and education is a key direction of higher education reform in the new era. As a new organizational form for deepening this integration, modern industry colleges play a crucial role in shaping talent cultivation models, which directly impact the quality of applied talent training. However, current development faces deep-seated challenges, including insufficient motivation for enterprise participation, superficial school-enterprise cooperation, and a disconnect between talent cultivation and industrial demands. Based on the Triple Helix theory and stakeholder theory, this paper constructs a diversified collaborative education platform centered on the "Industry Alliance + Modern Industry College + Doctoral Innovation Station," focusing on four core dimensions: alignment with industrial needs, cultivation pathways, collaboration mechanisms, and evaluation systems. It proposes a "2+1+1" segmented talent cultivation model and elaborates on implementation pathways across four stages: cognitive education, awareness internships, enhancement of core industrial competencies, and industrial engineering practice. This study aims to provide insights for addressing challenges in industry-education integration and improving the quality of applied talent cultivation.

Keywords: Modern Industry College, Industry-Education Integration, Talent Cultivation Model, Power Transmission and Distribution Industry.

1. The Practical Dilemmas in the Construction of Modern Industry Colleges

With the advancement of technological revolution and industrial transformation, new industries and technologies have imposed higher demands on talent cultivation. The Chinese government has issued policy documents such as the Several Opinions on Deepening the Integration of Industry and Education [1] and the Modern Industry College Construction Guidelines (Trial) [2], guiding universities to build modern industry colleges oriented to regional industrial development. However, the construction of modern industry colleges still faces deep-seated difficulties, manifested in three aspects:

First, insufficient motivation for enterprise participation. Many enterprises participate in education mainly through providing practice bases and internships, while their involvement in talent cultivation design and teaching content development remains low. Enterprise resources invested are often superficial, lacking support in funding, facilities, and deeper cooperation areas such as faculty development. The root cause lies in the difficulty of effectively balancing the interests of schools and enterprises [3].

Second, school-enterprise cooperation remains superficial. The roles and responsibilities of universities and enterprises are not clearly defined, preventing the maximization of industry-education integration. This is manifested in three aspects: (1) Curriculum revision cycles lag behind industrial technological iteration. (2) Most university teachers lack practical experience in enterprises. (3) University evaluations emphasize theory over practice, while enterprise evaluations prioritize skills over comprehensive qualities.

Third, talent cultivation is disconnected from industrial demands. Deepening collaboration often proves difficult due to conflicting interests, insufficient synergy, information barriers, and cultural differences. The conflict between market logic and social logic, the contradiction between rapid enterprise technological iteration and the cyclical regularity of university cultivation, and the tension between individualized enterprise needs and standardized university training constitute deep-seated contradictions in modern industry college construction [4]. Taking the Power Transmission and Distribution Industry College as a case study, this paper explores the core elements and practical pathways of talent cultivation models based on local industrial development needs.

2. Theoretical Basis and Analytical Framework

The Triple Helix theory[5] and stakeholder theory [6] provide appropriate theoretical perspectives for analyzing the talent cultivation model of modern industry colleges. The Triple Helix theory, proposed by Etzkowitz and Leydesdorff, emphasizes the interactive and symbiotic relationship among universities, industry, and government in knowledge production and transformation. It posits that these three parties should break down traditional boundaries and form a spiraling innovation community through mutual infiltration and role exchange. Applied to modern industry colleges, this theory suggests that universities should not merely act as "suppliers" of talent cultivation, nor enterprises as "demanders" of talent utilization, nor government as an "observer" in policy-making. Instead, the three parties should establish a collaborative education mechanism characterized by deep interaction, resource sharing, and shared responsibility.

Stakeholder theory, systematically articulated by Freeman,

posits that an organization's development depends on the input of various stakeholders, and the organization should pursue the overall interests of all stakeholders. Modern industry colleges involve multiple parties-government, universities, enterprises, students, and industry organizations-each with distinct demands: government pursues regional economic development, universities aim for high-quality talent cultivation, enterprises seek technical talent, and students aspire to career development. Stakeholder theory suggests that only by coordinating these diverse interests and establishing a fair distribution mechanism can a symbiotic pattern of mutual benefit be achieved.

Based on the above analysis, this paper constructs a four-dimensional analytical framework for the talent cultivation model of modern industry colleges: (1) alignment with industrial needs, addressing "what kind of talents to cultivate"; (2) construction of cultivation pathways, addressing "how to cultivate talents"; (3) collaboration mechanisms, addressing "who cultivates the talents"; and (4) evaluation systems, addressing "how well the talents are cultivated."

3. Construction of a Diversified Collaborative Education Platform: A Perspective based on the Triple Helix Theory

Based on the concept of interactive symbiosis among "university-industry-government" in the Triple Helix theory, the Power Transmission and Distribution Industry College has constructed a diversified collaborative education platform centered on the "Industry Alliance + Modern Industry College + Doctoral Innovation Station."

The industry alliance plays a role in integrating resources and aligning demands. It serves as a "collector" of industrial needs, gathering common talent demands of regional power transmission and distribution enterprises, and as a "connector" for collaborative education, building a communication bridge between universities and enterprises. This design reflects the role transformation of industrial entities from "passive recipients" to "active participants."

The modern industry college, as the main entity of education, is responsible for designing and implementing talent cultivation programs. It represents both an organizational innovation within universities and an institutional vehicle for industry-education integration. By integrating high-quality resources from both universities and enterprises, it achieves deep integration of educational logic and industrial logic.

The doctoral innovation station, as a platform for university faculty to serve enterprises, is composed of young university teachers leading students. It transforms enterprise technical challenges into teaching projects and research topics, achieving positive interaction between teaching and scientific research. This design reflects the role expansion of universities from "knowledge producers" to "knowledge transformers."

The three elements form a virtuous cycle of "industry proposing challenges, the college educating talents, and the platform tackling key problems." This platform construction provides organizational guarantees for addressing dilemmas such as insufficient enterprise participation and superficial school-enterprise cooperation.

4. Phased Design of the "2+1+1" Talent Cultivation Model

In response to the development needs of the local power transmission and distribution equipment manufacturing industry, the college has established the Power Transmission and Distribution Industry Class and implemented the "2+1+1" cultivation model: two years of foundational education on campus, one year of school-enterprise joint training, and one year of enterprise engineering practice. This model divides the cultivation process into four interconnected phases:

(1) Cognitive Education Phase: This phase primarily takes place during the first year. Its main task is to provide general education and professional initiation, helping students develop a basic understanding of the industry. Specific implementations include: offering general education courses; regularly organizing corporate culture lectures; arranging visits and technical experience activities; and using introductory professional courses to clarify professional direction. The focus is to stimulate professional interest and lay the groundwork for subsequent learning.

(2) Awareness Internship Phase: This phase primarily takes place during the second year. Its main task is to expose students to real enterprise projects, deepening professional understanding through practice. Specific implementations include: organizing students to participate in awareness internships based on engineering design projects; conducting industrial visits and market research; enterprises providing simple engineering design tasks to student teams with guidance from both enterprise and university mentors. The focus is to allow students to experience the engineering design process and cultivate preliminary engineering practice abilities.

(3) Phase of Enhancing Core Industrial Competencies: This phase primarily takes place during the third year. Its main task is to systematically enhance students' professional knowledge and engineering capabilities. Specific implementations include: conducting professional knowledge learning on campus; arranging specialized elective courses co-taught by enterprise and university mentors; organizing a two-month summer training program where students complete real project training in enterprises; and carrying out professional competence development activities. The focus is to achieve deep integration of theory and practice through co-teaching and concentrated training.

(4) Phase of Industrial Engineering Practice: This phase primarily takes place during the fourth year. Its main task is to enable students to complete the transformation from student to professional in a real work environment. Specific implementations include: conducting 4-6 months of intensive practical teaching within enterprises, where students deeply participate in actual enterprise projects; instruction is jointly delivered by university teachers and enterprise mentors; the eighth semester is dedicated to guiding internships and employment through two-way selection between students and enterprises. The focus is to enhance job suitability and achieve a smooth transition to the workplace.

5. Class Formation and Operational Mechanism of the Power Transmission and Distribution Industry Class: An Institutional Design based on Stakeholder Theory

Based on stakeholder theory, the formation and operation of the industry class focus on balancing the interests of all parties involved. The specific design is as follows:

Target Audience: The class targets undergraduate students from the first to third years majoring in Electrical Engineering, Automation, Mechanical Design and related disciplines, reflecting the cultivation concept of interdisciplinary integration.

Class Formation Method: Enterprises and the university jointly manage the student selection process. They conduct enrollment promotional activities, with the university organizing student registrations. Based on selection outcomes, an industry class is formed with approximately 40 students per class to ensure small-class teaching and personalized cultivation.

Application and Selection: A combination of student self-nomination and teacher recommendation is adopted. The selection mechanism includes a written examination (50%) and a comprehensive interview (50%), assessing both foundational knowledge and developmental potential.

Faculty Allocation: A "three-tutor system" is implemented, consisting of university class advisors responsible for class management, academic tutors, and enterprise technical backbones serving as industry mentors, forming a collaborative education team integrating campus and enterprise resources.

Incentive Mechanism: Special scholarships are established annually to reward students with outstanding academic performance and practical abilities, stimulating learning motivation and innovative enthusiasm.

Collaboration Mechanism: Mechanisms such as regular communication platforms within the industry alliance, joint university-enterprise teaching and research activities, and a project transformation mechanism for the doctoral innovation station provide institutional safeguards for multi-party collaboration.

6. Conclusion

Modern industry colleges serve as crucial vehicles for deepening the integration of industry and education. The construction of their talent cultivation models necessitates close alignment with industrial demands, adherence to competency-based logic, strengthened collaboration mechanisms, and continuous improvement of evaluation systems. The practice of the Power Transmission and Distribution Industry College demonstrates that the diversified collaborative education platform—centered on the "Industry Alliance + Modern Industry College + Doctoral Innovation Station" and constructed based on the Triple Helix theory and stakeholder theory—along with the "2+1+1" segmented talent cultivation model, can effectively address practical dilemmas. These include insufficient enterprise participation, superficial school-enterprise cooperation, and the disconnect between talent cultivation and industrial needs. This approach promotes the organic linkage of the education chain, talent chain, industrial chain, and innovation chain, thereby enhancing the quality of applied talent cultivation.

In the future, the construction of modern industry colleges requires continued exploration in areas such as mechanisms for co-building curricula, two-way flow of university and enterprise faculty, and reform of student evaluation systems. Only by achieving integration in mechanisms, synergy in resources, and vitality in motivation can a symbiotic pattern of multi-win outcomes be realized, providing solid talent support for the high-quality development of the regional economy.

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