

Exploring Innovative Practices in Talent Cultivation Models at Local Application-Oriented Universities from the Perspective of Industry-Education Integration

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Abstract: Based on the *Guiding Opinions on Guiding Some Local General Undergraduate Universities to Transform Into Application-Oriented Ones* issued by the Ministry of Education in 2015 and the development philosophy of “deepening the integration of industry and education, integrating vocational and general education, and integrating science and education” proposed in the Report to the 20th National Congress of the Communist Party of China, this paper takes the school-running orientation of local application-oriented universities as the foothold, and systematically analyzes the practical dilemmas existing in the current talent training mode of industry-education integration. Innovative strategies are put forward from three dimensions: deepening multi-party coordination to build a benefit symbiosis governance mechanism, establishing a dynamically adjusted curriculum system in response to industrial demands, and building a dual-qualified faculty through two-way communication channels. The research results can provide theoretical reference and practical guidance for local universities to promote connotative development and enhance their capacity to serve regional economic and social development.

Keywords: Industry-education integration; Local application-oriented universities; Talent training mode; Innovation-driven; Collaborative education

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1. Introduction

In October 2015, the Ministry of Education issued the *Guiding Opinions on Guiding Some Local General Undergraduate Universities to Transform Into Application-Oriented Ones*, emphasizing that local universities should shift their school-running ideas to serving local economic and social development, to industry-education integration and school-enterprise cooperation, and to cultivating application-oriented technical and skilled talents. The General Office of the State Council issued the *Several Opinions on Deepening Industry-*

Education Integration in 2017, pointing out that it is necessary to deepen reforms in higher education, give play to the important main role of enterprises, and promote all-round integration of structural factors on the supply side of talent training and the demand side of industries. The Report to the 20th National Congress of the Communist Party of China clearly put forward the development concept of “deepening the integration of industry and education, integrating vocational and general education, and integrating science and education,” pointing out the direction for the development of higher education in the new era. Against the background of the accelerated advancement of a new round of scientific and technological revolution and industrial transformation, local application-oriented universities are faced with important tasks of transformation and upgrading, and industry-education integration has become the key path for them to realize connotative development^[1]. Exploring the innovation of talent training mode from the perspective of industry-education integration is of great significance for improving the ability of local universities to serve regional economic and social development.

2. Practical challenges in talent cultivation at local application-oriented universities from the perspective of industry-education integration

2.1. Superficial university-enterprise cooperation and ineffective co-governance

At present, the cooperation between many local application-oriented universities and enterprises remains at a shallow level, lacking long-term and stable cooperation mechanisms. Some universities have not formed an effective mechanism for collaborative education through industry-education integration and school-enterprise cooperation, making it difficult for the quality of talent training to meet the demands of industries and enterprises^[2]. Relevant studies point out that the industry-education integration of application-oriented universities is confronted with three institutional logical contradictions. First, the mandatory institutional logic suppresses the manifestation of marketability and utility of industry-education integration. Some universities only pursue the formalization of industry-education integration and school-enterprise cooperation, sign a large number of cooperation projects, yet ignore the project progress, cooperation effect evaluation, and fund arrival after signing. Second, there is an internal contradiction between imitation logic and the essential attributes of industry-education integration. Application-oriented universities fall into a vague state of governance objectives for industry-education integration, lacking standardized effect evaluation indicators with consensus and high identification. Third, there exists an internal conflict between struggle logic and the inherent attributes of industry-education integration. Some industry-education integration organizations suffer from single target positioning, weakened structural functions, and rigid organizational operation^[3]. Scholars such as Liu emphasized the dual-subject education mode of universities and enterprises—universities send teachers to work as enterprise consultants or temporary staff, college students study and intern in enterprise classrooms, and enterprise staff teach or receive training in universities, so as to jointly participate in the whole process of talent training and truly realize industry-education integration. However, many universities fail to implement this concept in reality^[4]. In addition, the boundaries of powers and responsibilities among the government, industries, enterprises, and universities are ambiguous, information cannot be fully shared, and there is no daily coordination and communication platform. As a result, industry-education integration falls into a fragmented state of “universities are active while enterprises and governments remain indifferent,” and the multi-party co-governance education mechanism is basically idle^[5].

2.2. Supply-demand information gaps and curriculum misalignment

The revision cycle of talent training programs in local application-oriented universities is too long to timely capture changing signals of industrial technology iteration and job competency demands. Scholars such as Hu pointed out that the discipline setting and teaching concepts of traditional university education systems were mostly formulated based on industrial demands in the 1970s. The education mode with continuous subdivision of disciplines over the past 40 years can hardly cultivate talents capable of handling increasingly complex integrated manufacturing systems ^[6]. Relevant studies stress that local application-oriented universities shall base themselves on the demands of local economic and social development, break traditional thinking modes, and cultivate innovative application-oriented talents with sound professional quality, strong practical ability, and high adaptability who can transform knowledge into actual production ^[7]. In reality, however, local application-oriented universities fail to fully align with actual post demands, and their training objectives are overly theoretical. The curriculum system cannot keep pace with industrial technology updates, the proportion of practical teaching content is insufficient, and links including experiments, internships, and practical training lack systematic planning. The latest industrial standards and real projects cannot be effectively integrated into teaching, resulting in poor job adaptability of graduates ^[8]. Thus, a serious “information disconnection” emerges between the supply side of talent training and the demand side of industries: graduates “learn things irrelevant to their jobs and apply knowledge they never learned,” showing poor adaptability and high re-learning costs after employment, and the talent training objectives lack clear targeting.

2.3. Limited faculty diversity and insufficient practical teaching capacity

The vast majority of full-time teachers in local application-oriented universities hold academic master’s and doctoral degrees. Their career path from campus to campus leaves them without practical work experience in industries and enterprises, resulting in innate deficiencies in engineering practice and technology transformation capacity. The teacher evaluation system has long been oriented to papers and research projects, attaching excessive importance to scientific research ability while neglecting the improvement of teaching skills, without matching teaching incentive measures. This leads to insufficient motivation for teaching innovation among teachers, which cannot meet the actual teaching demands of industry-education integration ^[9]. Due to the lack of enterprise work experience for most teachers, their mastery of the latest industrial developments and professional skills is inferior to that of enterprise personnel, and their professional sensitivity is low. The long-term shortage of dual-qualified teachers hinders the smooth connection of the education chain, talent chain, industrial chain, and innovation chain, making the supply of talents unable to keep up with industrial demands. Studies show that application-oriented universities are in a marginal position in China’s higher education system, and their industry-education integration is subject to many restrictions and dependencies, which directly affects the quality of talent cultivation ^[10]. Scholars such as Sheng proposed to build a teaching staff of industry-education integration through multiple approaches including training full dual-qualified teachers and hiring industrial enterprise experts as part-time teachers ^[11]. Nevertheless, multiple obstacles exist in practical operation, such as rigid personnel systems, uncompetitive salaries, and schedule conflicts of enterprise experts. The dual dilemma that teachers cannot guide students to practice and enterprise experts cannot enter classrooms renders practical teaching in an awkward position for a long time.

3. Innovative strategies for talent cultivation models from the perspective of industry-education integration

3.1. Deepening multi-stakeholder collaboration: Establishing a governance mechanism based on shared interests

Aiming at the superficial school-enterprise cooperation and idle multi-party co-governance mechanism, we can construct an in-depth collaborative education governance mechanism from three aspects: benefit bond, organizational structure, and evaluation system. First, integrate multi-party resources to realize in-depth industry-education integration. Industry-education integration cannot rely on the conscious responsibility of a single subject. The government, enterprises, universities, and industries shall cooperate jointly to establish a system with complementary advantageous resources. The government provides policy and fund support, enterprises actively participate in platform co-construction, universities set up courses according to demands, and industries provide continuous information and technical support within their capacity. Second, build a four-in-one industry-education integration community consisting of government, universities, enterprises, and industry associations. Taking the practice of Shanghai University of Engineering Science as an example, the university continuously innovates the “three-coordination” education mode based on the inheritance of cooperative education, and constructs a three-level management mechanism at university, college and major levels. Led by the construction of modern industrial colleges and taking major construction as the starting point, the university carries out reform practices in eight aspects including training programs, curriculum system, textbook development, practical bases, internships and training, teaching staff, operation management and quality evaluation, integrating internal and external teaching resources and forming a general pattern of integrated development of education and industries. It innovatively constructs an application-oriented talent training system of “three coordination and eight integrations.” This mode provides a reference for solving bottlenecks such as superficial school-enterprise cooperation, disconnection between education and industries, and imperfect institutional mechanisms in universities’ industry-education integration ^[12]. Third, establish a matching talent evaluation mechanism adapted to industry-education integration. A quantifiable talent evaluation system shall be built with personalized evaluation methods. Scholars such as Li have put forward exploratory research on the industry-education integrated talent evaluation mode of “measuring talents by comparison like Cao Chong weighing the elephant.” Drawing on the allusion of Cao Chong weighing the elephant, the mode takes enterprise employee test data as the scale and compares students’ test results with it, evaluating students’ abilities according to the relative degree of their professional competence reaching the standard of enterprise employees ^[13]. This new idea breaks the limitations of traditional evaluation systems and realizes scientific measurement of talent quality under a multi-subject framework.

3.2. Aligning with industrial needs: Establishing a dynamically adjustable curriculum system

To address the information disconnection between supply and demand sides and untargeted curriculum content, targeted efforts shall be made from three dimensions: demand research, curriculum reconstruction, and practical platforms. First, conduct in-depth market research. Through enterprise visits, questionnaires, and industry forums, thoroughly understand job competency demands, and adopt big data technology for intelligent analysis to form scientific and dynamic demand analysis reports. Taking industrial demands as the logical starting point, build a new ecosystem for cultivating application-oriented talents through industry-education integration. Second, formulate joint training objectives for industry and education. Both

universities and enterprises shall focus on cultivating multi-interface, diversified, and multi-specification application-oriented talents. Close communication and joint decision-making shall be maintained throughout the whole process of talent training program formulation, curriculum system design and teaching content updating to ensure high matching between educational supply and industrial demands. Build a three-in-one comprehensive training curriculum system of general education, professional education, and second class, systematically plan practical links including experiments, internships, and real training, and adopt real industrial projects as practical cases in teaching. Universities may refer to the five-stage full-chain industry-education integration mode proposed by Wu *et al.* (routine communication → knowledge base foundation → systematic improvement → competition practice → innovation and entrepreneurship incubation), and build a ladder-type curriculum system ranging from cognition to competence and from basic to innovation^[14]. Third, innovate featured courses integrating courses and competitions. Respond to industrial demands and build maker spaces and entrepreneurship incubation bases to provide sufficient practical training space for students. The three-level school-enterprise and school-government joint training practical base system (provincial, university and college levels) proposed by Zhou *et al.* offers valuable references for hierarchical construction of practical platforms for college students^[15].

3.3. Facilitating two-way mobility: Developing an empowered dual-qualified teaching workforce

To tackle the single source of teachers and weak practical teaching capacity, systematic promotion shall be carried out from three dimensions: source expansion, platform empowerment and evaluation guidance. First, jointly build teaching and research platforms. Universities shall cooperate deeply with enterprises to jointly construct laboratories, engineering technology centers and technology R&D centers, enabling teachers to deeply participate in enterprise horizontal projects and technical breakthroughs, so as to improve scientific research and practical teaching abilities in real industrial practice. Scholar Li emphasized that local application-oriented undergraduate teachers should not be satisfied with knowledge teaching in classrooms, but cooperate deeply with enterprises to jointly participate in the whole process of technology R&D and talent training^[16]. Universities shall arrange full-time teachers to take temporary posts in industries and enterprises every semester, and take enterprise practical experience as an important part of teachers' career development. Second, unblock the two-way talent flow channel between universities and enterprises. Set flexible posts such as industrial professors and enterprise tutors to attract industrial technical backbones and senior engineers to undertake practical teaching tasks in universities. Meanwhile, support full-time teachers to take part-time or short-term positions in enterprises, realizing regular two-way talent flow and mutual empowerment between universities and enterprises. Third, establish teacher evaluation and incentive mechanisms matching industry-education integration. Teaching evaluation shall not be limited to academic indicators such as papers and research projects, but also include indicators such as teachers' time and achievements in enterprise practice, transformation results of horizontal projects, and effects of guiding students to solve real enterprise problems. Take evaluation reform as leverage to guide teachers to shift their focus from papers to practice, and from closed classroom teaching to open collaborative education.

4. Conclusion

Industry-education integration is a key pathway for local application-oriented universities to achieve high-

quality and sustainable development. To advance this process, it is necessary to overcome such challenges as superficial university-enterprise cooperation, information gaps between talent supply and industrial demand, and insufficient practical competence among faculty members. Future efforts should further strengthen policy support mechanisms, improve diversified investment systems, and develop a new model of application-oriented talent cultivation with distinctive Chinese characteristics, thereby promoting the deep integration of the education chain, talent chain, industrial chain, and innovation chain.

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