Exploration of Innovative Talent Cultivation Community in Application-Oriented Universities under the Perspective of Industry-Education Integration

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Abstract: This paper focuses on the establishment of a community of mass entrepreneurship and innovation talents within application-oriented universities against the background of industry-education integration. Many current problems of talent cultivation in the application-oriented university are deeply analyzed. By drawing on the experiences of typical domestic and international cases, it elaborates in detail on the exploration path for establishing a talent - cultivation community in application-oriented universities. The aim is to offer both theoretical and practical references for enhancing the quality of talent cultivation and promoting the deep integration of industry and education.

Keywords: Integration of Industry and Education; Application-Oriented University; Talent Training Community

1. Introduction

In today's era of economic globalization and rapid development of science and technology, the social demand for innovative and applied talents is increasingly urgent. The integration of industry and education represents a crucial strategic move for application-oriented universities. In the face of the rapid evolution of new technologies and the new transformation of the economic landscape, this initiative is designed to pool diverse enterprise resources. By doing so, it aims to achieve the cultivation of innovative and entrepreneurial talents, enabling universities to better meet the ever-changing demands of the real-world economy.[1] Building a community dedicated to cultivating innovative talents holds great significance. By integrating resources from universities, enterprises, and the government, and forging a collaborative nurturing synergy, it not only propels the sustainable development of application-oriented universities, but also enables the cultivation of innovative talents well-equipped to adapt to the societal development in the digital-intelligence era.

2. Problems in Talent Cultivation in Application-oriented Universities

Since their inception, application-oriented universities have exhibited distinct traits of industry-education integration. They place a strong emphasis on the cultivation of application-oriented talents, with their teaching activities closely tied to local development needs. This localization of teaching and talent-training goals not only reflects their unique positioning, but also underscores their commitment to serving the regional economy and society.[2] However, as the construction of application-oriented universities in China has been in practice for less than 20 years, there are still several deficiencies in talent cultivation. For instance, the curriculum system is often irrational, with a low alignment with market demands. Course content can be outdated, failing to keep pace with the latest industry trends. Moreover, students often demonstrate weak professional qualities, which restricts their competitiveness in the job market.[3]

2.1 Disconnect between Talent Cultivation Objectives and Social Needs

Some application-oriented universities fail to conduct accurate research and in-depth market demand analysis when formulating talent cultivation programs. In addition, they do not regularly and comprehensively adjust the direction of talent cultivation. The curriculum often focuses on the teaching of theoretical knowledge, but the practical teaching part is

relatively weak. As a consequence, although students build a solid theoretical base, they struggle to meet the demands of enterprises and society in terms of practical application capabilities, innovation skills, and professional proficiency. For instance, students majoring in some engineering fields study a plethora of theoretical courses during their time at school. However, once they enter enterprises and are confronted with actual engineering projects, they find themselves at a loss. This situation compels enterprises to invest a significant amount of time in providing secondary training for these new employees.

2.2 Inadequate Practical Teaching System

The shortage of practical teaching resources is one of the common problems faced by colleges and universities. Although in recent years, universities have generally attached great importance to internship practices, increased the credits of practical courses, and established virtual simulation practical training systems, there is still a lack of practical operation training in real-world scenarios. Moreover, the off-campus practical training bases and campus teaching activities often show a "two-skins" phenomenon, lacking integrated design.[4] Enterprises show a low level of initiative in participating in practical teaching. The organization and management of practical teaching are not standardized, and there is a lack of an effective quality-control mechanism. This makes university students to participate in internship to some extent, showing the characteristics of "mere form", some students' internship content deviate from their expectations, and it is difficult for students to participate in specific business or R&D projects.[5]

2.3 Unreasonable Structure of the Teaching Staff

In the faculty of colleges and universities, theoretical teachers account for a large proportion, and there is a relative lack of "double–professionally-titled teachers" with rich practical experience in the industry. Even through the promotion of the integration project between industries and universities, a stable double–professionally-titled teachers faculty has not been formed.[6] The professional knowledge of teachers is updated at a sluggish pace, and they lack a deep understanding and proficient grasp of the cutting-edge technologies and development trends within the industry. Thus, it becomes extremely challenging to incorporate the latest industry-related knowledge and practical skills into the teaching process. This kind of faculty structure is not conducive to the cultivation of students' practical and innovative abilities, and also affects the in-depth promotion of industry and education integration to a certain extent.

2.4 Insufficient Depth of Industry and Education Integration

Although the integration of industry and education has emerged as a crucial direction for talent cultivation reform in universities, the cooperation between universities and enterprises remains largely superficial. The forms of cooperation are rather monotonous, mainly centered around student internships, equipment donations from enterprises, and the like. There is a notable absence of collaborative innovation in deeper-level areas such as curriculum development, the revision of talent cultivation programs, and scientific research cooperation. The interests of universities and enterprises have not been fully aligned, and a long-term and stable cooperation mechanism is lacking. The phenomenon of "enthusiastic schools but indifferent enterprises" has emerged. Evidently, enterprises' enthusiasm for participating in industry - education integration is not high. As a result, the continuous implementation of industry-education integration has faced significant obstacles.[4]

2.5 Poor Integration with Regional Economic Development

Responding to the needs of local economic and social development and resolving the predicament of the survival and development of specific universities is the reality and practical logic of the construction of application-oriented universities.[7] However, at present, some application-oriented universities' professional settings cannot reflect the economic development of their region's hot spots, nor can they use their professional knowledge to serve the society in depth, the talent cultivation is detached from the needs of the regional economic development. Moreover, they cannot establish good interactions with external enterprises and

the government, and the available resources from the external environment and internship bases are limited. All these factors impede the cultivation of applied talents.

3. Analysis of Typical Successful Cases of Industry and Education Integration in Foreign Countries

3.1 German "Dual System" Model

German "dual system" model of vocational education is a good example of the integration of industry and education. Under this model, students receive theoretical knowledge education in universities of applied technology on the one hand, and receive practical skills training in enterprises on the other, so that learning and work are closely integrated. Enterprises are deeply involved in the whole process of talent cultivation, playing an important role from enrollment, curriculum setting to teaching implementation, assessment and evaluation. The success of the "dual system" model is due to Germany's perfect legal and regulatory protection system, active coordination of industry associations, and the high importance that enterprises attach to vocational education. The students cultivated through the "dual system" model have strong practical ability and professionalism, can quickly adapt to the needs of the enterprise's workplace, and provide a solid support for the development of the German manufacturing industry.[8]

3.2 American "Cooperative Education" Model

American "cooperative education" model emphasizes cooperation between universities and enterprises. During their studies, students alternate between on-campus learning and off-campus work in enterprises. Through practical experiences, they deepen their understanding of theoretical knowledge and apply what they've learned in real-world work scenarios. In the United States, a vast cooperation network has been established between colleges and enterprises: enterprises offer students internship opportunities, practical projects, and financial support; in return, colleges and universities provide enterprises with services such as technology research and development and staff training. This model focuses on cultivating students' comprehensive ability and professional competitiveness, and also promotes resource sharing and complementary advantages between universities and enterprises. For example, the University of Cincinnati has a long history of "cooperative education" programs, which have trained a large number of high-quality talents to meet the market demand, and achieved remarkable results in the fields of engineering and business.[9]

3.3 Australian "TAFE" Model

Australia's "Technical and Further Education (TAFE)" system is renowned for its flexibility and practicality. It integrates the "learning by doing" traits of the traditional apprenticeship model into modern school-based education and is organically combined with the national trainee system, thus also being referred to as the "new apprenticeship system". TAFE colleges work closely with industrial enterprises to develop courses and training packages according to the needs of the industry, and the course contents are closely set around the skills requirements of actual jobs. Most TAFE teachers are experienced in the industry and their teaching methods emphasize practical operations and case studies. Upon completion of TAFE courses, students can obtain appropriate vocational qualifications and enter the labor market directly. In addition, the Australian government has guaranteed the effective operation of the TAFE system by formulating relevant policies and providing financial support. This model effectively integrates education resources and industry demand, cultivating a large number of technical and skilled talents for Australia, and playing an important role in promoting Australia's economic and social development.

3.4 The British "Sandwich" Model

The British "sandwich" model is an education model that combines work and study. The talent cultivation process is divided into two periods: "work" and "study". Through the alternation of these two stages, students are promoted to integrate professional knowledge with practical training in enterprises. University education mainly teaches basic professional and practical knowledge, while enterprise practice mainly guides students to carry out practical training. The "sandwich"

curriculum system incorporates the concept of competence cultivation into the formal curriculum framework. It carries out a teaching process centered around the cultivation of competencies and devises a specialized employability cultivation plan to achieve the cultivation objectives for applied talents.[10]

Through analyzing these typical cases in foreign countries, it can be found that they all have the following common features: first, the government has given strong support in terms of policies, regulations and funds, creating a good external mechanism and policy environment for the integration of industry and education; second, enterprises are deeply involved in the process of talent cultivation, and have formed a close cooperative relationship with colleges and universities; third, universities have paid attention to the practice of the teaching process, and have constructed a perfect practice teaching system; fourth, an effective quality assurance mechanism has been established to ensure that the quality of talent cultivation meets industry standards and social needs. These experiences offer valuable references for the construction of an innovative talent cultivation community within China's application - oriented universities.

4. Practical Exploration of Talent Cultivation Community Building in Application-Oriented Universities

4.1 Clarifying the Goal and Orientation of Talent Cultivation

Application-oriented universities should closely center around the needs of regional economic and social development, integrate their own disciplinary and professional advantages, and clearly define the goals and orientations of talent cultivation.[11] Centering on the cultivation of applied talents who possess a solid professional theoretical foundation, robust practical capabilities, and an innovative spirit, universities must prioritize enhancing students' comprehensive qualities. This enables students to swiftly meet the demands of enterprises and society upon graduation and equips them with certain potential for career development. For example, for application-oriented universities located in regions with flourishing information industries,

the cultivation of specialists in computer science, communication engineering, and the digital economy should be the top priority.

4.2 Optimizing the Curriculum and Teaching Content

Application-oriented universities are advised to establish a curriculum system focusing on the integration of industry and education. This involves seamlessly incorporating actual enterprise projects, industry-recognized standards, and state-of-the art technologies into the teaching content. By doing so, students can gain hands-on experience and in-depth knowledge that aligns with real-world industrial requirements, better preparing them for their future careers. Universities should also increase the proportion of practical teaching courses. They need to establish comprehensive and innovative practical teaching modules. During the graduation thesis stage, particular emphasis should be placed on deriving research topics from practical problems. This way, students can hone their practical problem-solving skills and innovative capabilities through hands-on experiences, better equipping themselves for the challenges of the professional world. At the same time, universities ought to institute a dynamic adjustment mechanism for the curriculum. Regularly, they should update the course content in line with the evolutions in industry development. This proactive approach ensures that the curriculum system remains timely and practical, enabling students to acquire knowledge and skills that are highly relevant to the current professional landscape. For instance, computer science teaching staff collaborating with software companies can integrate enterprises' software development projects into course instruction. This enables students to grasp the software development process, technologies, and specifications while working on these projects.

4.3 Building a "Dual-Teacher" Faculty

Application-oriented universities should strengthen the construction of teaching staff, improving teachers' practical teaching ability and awareness of industry and education integration. To achieve this, universities should dispatch teachers to enterprises for on-the-job training and encourage their participation in enterprise production practices, technology

research, and development. This enables teachers to gain a profound understanding of industry trends and enterprise demands, accumulate practical experience, and improve their practical skills. On the other hand, senior technical and managerial talents boasting rich practical experience should be recruited from enterprises to serve as part-time teachers, to bolster the teaching force. These part-time teachers can introduce real-world cases, work experiences, and the latest industry information into classroom teaching, significantly enriching the teaching content and bridging the gap between theory and practice. Furthermore, it is recommended that universities set up a teacher training and incentive mechanism. This mechanism aims to encourage teachers to take part in diverse practical teaching trainings, industry-education integration projects, academic exchange activities, and so on. Teachers who demonstrate outstanding performance in these activities should be acknowledged and rewarded.

4.4 Deepening the Mechanism of Collaborative Education Through Integration of Industry and Education

Universities need to adhere to the "trinity integration" model, namely the integration of science and education, the integration of industry and education, and the integration of science and practice, as a core strategy for talent cultivation.[12] Simultaneously, efforts should be made to establish and optimize a collaborative education mechanism that encompasses multiple entities, namely universities, enterprises, governments, and industry associations. Colleges and universities need to organize applications for university-industry collaborative education program and supply-demand docking employment education project. They should work with enterprises to formulate talent cultivation programs, develop curriculum materials, build practice teaching bases, etc., to achieve resource sharing and complement each other's strengths. In regions with the conditions, they can also combine the characteristics of regional economic development and cooperate with enterprises to build modern industrial colleges to further deepen the integration of industry and education.[13]

The government is expected to fully assume its role in policy guidance and macro-control. It should formulate relevant policies and regulations, actively encourage enterprises to engage in the integration of industry and education, and offer policy-based guarantees. These guarantees include financial support, tax incentives, and other preferential measures, all aimed at promoting the in-depth integration of industry and education. This will create a more favorable policy environment for enterprises to participate in the integration process, stimulate their enthusiasm and initiative, and ultimately boost the high-quality development of the industry-education integration cause.

Industry associations should actively play the role of a bridge, organize industry research, formulate industry standards, and coordinate the cooperative relationship between enterprises and universities. For instance, it is advisable to establish an industry-education integration community consisting of representatives from universities, enterprises, the government, and industry associations. This community will be responsible for coordinating and streamlining major affairs related to industry-education integration. It will formulate cooperation plans and implementation blueprints, and closely monitor the progress and quality of cooperation projects. By bringing together all relevant stakeholders, this community can ensure effective communication, resource sharing, and joint decision-making, thus promoting the smooth and high-quality development of industry-education integration initiatives.

4.5 Improving the Construction of Practical Teaching Platforms

Colleges and universities ought to augment their investment in the practice teaching platform. They should fortify the functions of on-campus internship training centers, promptly update experimental equipment, simulation software, and practice teaching tools. By doing so, a favorable practice teaching environment can be furnished for students, enabling them to gain more practical experience and skills during their study. Furthermore, they should proactively expand off-campus practice teaching bases. By establishing long-term and stable cooperative relationships with outstanding enterprises

within the industry, colleges and universities can offer students more off-campus practice opportunities. This can be achieved through the joint construction of internship training bases and industrial colleges, or by jointly sponsoring the establishment of an industry-education integration community. Such efforts will not only expose students to real-world work scenarios and industry-standard operations, but also facilitate the transfer of the latest industry knowledge and skills, better equipping students for the professional challenges they will face upon graduation. They also should strengthen the management and operation of the practice teaching platform, establish and improve the practice teaching management system and quality evaluation system to ensure the efficient operation of the practice teaching platform and the steady improvement of the quality of practice teaching.

4.6 Strengthening Innovation and Entrepreneurship Education

Innovation and entrepreneurship education should be integrated into the whole process of talent cultivation to build a perfect innovation and entrepreneurship education system. Colleges and universities are suggested to offer fundamental innovation and entrepreneurship courses. These courses aim to cultivate students' innovation and entrepreneurship awareness, as well as impart basic theoretical knowledge in these areas. Additionally, innovation and entrepreneurship practice courses should be established. Through these practical courses, students can be guided to formulate entrepreneurship plans, participate in innovation and entrepreneurship competitions, engage in entrepreneurship project practices, and more. By actively involved in these practical activities, students are provided with the opportunity to hone their innovation and entrepreneurship skills in real-world scenarios. This hands-on approach not only deepens students' understanding of theoretical concepts but also better equips them with the practical capabilities essential for future success in the dynamic fields of innovation and entrepreneurship. To strengthen the construction of innovation and entrepreneurship faculty, universities can invite successful entrepreneurs, industry elites and investment experts as innovation and entrepreneurship mentors to provide guidance to students. For example, Beijing Information Science and Technology University (BISTU) has set up the national innovation and entrepreneurship education practice base, which integrates on-campus resources and carries out innovation and entrepreneurship education, practical activities and project incubation; it also actively organizes students to participate in various types of innovation and entrepreneurship competitions, such as the China International College Students' Innovation Competition (CICSIC) , the "Challenge Cup" National Undergraduate Curricular Academic Science and Technology Works by Race, "Challenge Cup" Chinese Undergraduate Entrepreneurship plan competition etc. Outstanding achievements can readily kindle students' enthusiasm for innovation and entrepreneurship.

5. Conclusion

The construction of innovative talent cultivation community in application-oriented universities under the perspective of industry-education integration is a systematic and long-term project. Through a meticulous analysis of the talent cultivation issues in colleges and universities, while drawing on the successful experiences of exemplary cases overseas, it is proposed that application-oriented universities should explore the following practices: clearly define the objectives and positioning of talent cultivation, optimize the curriculum system and teaching content, foster a "dual-teacher" faculty, deepen the collaborative cultivation mechanism through industry-education integration, improve the construction of practical teaching platforms, and enhance innovation and entrepreneurship education. To effectively integrate the resources of all parties and generate the synergy of collaborative education, colleges and universities are obliged to enhance the quality of cultivating innovative talents. By doing so, they can offer robust talent support for the regional economic and social development. In addition, there remains an imperative need to gradually establish a sound legal and policy environment, intensify communication and coordination among all parties involved, and address a diverse array of issues cropping up during the process of industry-education integration. This

is to ensure the sustained promotion of the healthy development of the innovative talent cultivation ecosystem.

Acknowledgments

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