Research on Industry-University Cooperative Education Mechanism in Applied Undergraduate Universities

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Abstract. Industry-University cooperative can promote communication and cooperation between schools and enterprises, realize the sharing of advantageous resources, achieve the common development of schools and enterprises, and promote the development of social economy. Industry university cooperation plays an important role in the reform of university education mode, but there are still many problems in the implementation. Therefore, in order to promote the sustainable and healthy development of industry-university cooperation, we should reform the personnel training program, the long-term mechanism of industry-university cooperation and the government's macro-control. Establish the perfect industry-university cooperation mechanism to promote the transformation and development of applied undergraduate colleges.

Introduction

With the development of higher education, China has built the largest higher education system in the world. The gross enrollment rate of higher education has reached 48.1%, and higher education has gradually entered the stage of popularization. In the new stage of higher education, improving the quality of teaching, establishing new educational models and methods have become the primary issues. It is necessary to bring together enterprise resources through industry-university cooperation to support education reform in higher education institutions.

Development of Industry-University Cooperation Mechanism

In industry-university cooperation, “production” refers to industry and enterprises, and “study” refers to academia, including universities and scientific research institutions. Through the cooperation of enterprises, universities and scientific research institutions, the university is guided by the market and social needs, and the students' training objectives are more clearly defined. The students' comprehensive quality and practical application ability are emphasized, so that the students can better meet the needs of the enterprises. Enterprises can cooperate with colleges and universities to promote technological innovation, reduce the cost of reform and innovation, and reserve high-quality employees [1].

The industry-university collaboration was first proposed by the UK in the 17th century. It aims to promote scholars to provide solutions to problems that arise in production, and to form a product catalog with details of how to generate products. In the late 19th century, American universities were transformed into large research institutions, and entrepreneurial universities stood out. The first universities to carry out industry university cooperation are Harvard University and MIT in the United States. Influenced by the United Kingdom and the United States, other universities in European countries also began industry-university cooperation. Although the concept of industry university cooperation was put forward late in China, the mode of industry university cooperation has a long history. In 1958, Tsinghua University built Miyun Reservoir in combination with teaching. In the same year, Beijing University of Aeronautics and Astronautics developed the first light passenger aircraft "Beijing No. 1". Subsequently, in the continuous development of higher education, domestic colleges and universities have further implemented the principle of combining teaching, scientific
research and production, then created many new forms and methods in industry-university cooperation.

**Current Situation Analysis of Industry-University Cooperation Mechanism in Applied Undergraduate Universities**

After years of exploration and realization, the mechanism of industry-university cooperation has achieved certain results in applied undergraduate universities. It effectively improves the professional skills and overall quality of students. However, with the adjustment of China’s economic structure, industrial upgrading, and continuous development of social culture, the industry-university cooperation mechanism has created new problems [2, 3].

**The Talent Training Program and Curriculum System in Universities Are not Perfect**

At present, the cooperation is still at a shallow stage of exploration, and has not really reached the deep integration between universities and enterprises in personnel training. In terms of teaching content and curriculum system construction, the main way of cooperation is that the university invites cooperative enterprises to jointly develop talent training programs, set the technical content of enterprises as curriculum in the training programs, and focuses on the training of professional skills [4]. This talent training program is more suitable for training institutions or higher vocational colleges, but it is not suitable for the applied undergraduate universities. Applied undergraduate universities should set up courses according to the theoretical system of disciplines. In addition to ensuring students’ application skills, they should also pay attention to the theoretical and technical foundations of students and realize the teaching model with both theoretical foundation and professional practice. If a perfect industry-university cooperative training program cannot be established, the students who are trained will not be able to meet the needs of the employer of the enterprise. It will affect the maintenance of the cooperative relationship and the development of universities.

**Lack of Continuity in Cooperation**

The mode of cooperation between schools and enterprises can be divided into technology transfer, commissioned research, joint research, joint construction of scientific research and training bases. Most of them are implemented in the way of project cooperation [5]. When the project is completed, the corresponding cooperation will be over. University researchers need to find new cooperative enterprises. It is difficult to have continuity and correlation between projects, which is not conducive to the ability improvement of university researchers and students, but also to the development of enterprises. Jointly building scientific research and training bases are conducive to the sustainable development of industry-university cooperation. At present, universities and enterprises lack reasonable ideological norms and management mechanisms on how to build and develop scientific research and training bases, which leads to the enthusiasm of both sides at the beginning of base construction. But various contradictions continue to emerge, which affects the cooperative relationship between the two parties [6].

**Lack of Macro-control and Imperfect Policy Environment**

The government plays a leading role in industry-university cooperation, but the current policies, implementation models, process management, supervision mechanisms, laws and regulations of the government on industry-university cooperation are still not perfect. There is no perfect legal system to guarantee the interests of all parties in industry-university cooperation. Industry-university cooperation is conducive to the transformation of innovative technology and achievements of universities and enterprises. However, there are no laws and regulations specifically for the distribution and management of technological achievements and intellectual property in industry-university cooperation. It makes the ownership of scientific and technological achievements
controversial, which lays a hidden danger for the cooperation between the two sides, and is not conducive to the long-term, stable and healthy development of industry-university cooperation.

**Development Strategy of Industry-University Cooperative Mechanism in Applied Undergraduate Universities**

The purpose of industry-university cooperation is to promote the reform of university education mode through cooperation between enterprises and universities, cultivate a large number of high-quality innovative talents and technical talents, enhance the technological innovation capability of enterprises, and promote the transformation and upgrading of enterprises. Therefore, applied undergraduate universities should summarize past experience and reform existing industrial cooperative education mechanisms to meet the new needs of economic and social development.

**Improve the Talent Training Program and Curriculum System in Universities**

The purpose of the industry-university cooperation personnel training program is to build a curriculum system that meets the needs of the industry. It is guided by the needs of industrial and technological development, combined with the characteristics of the school. In formulating the training program, applied undergraduate universities should pay attention to the students' comprehensive ability and quality in addition to the professional knowledge and skills training. Therefore, the curriculum system can be set up in a “layered” manner. According to the goal of talent training, the curriculum system can be divided into four modules: basic theory, professional skills curriculum, innovation and entrepreneurship training, comprehensive quality training. At present, the cooperation between universities and enterprises is outstanding in setting professional skills courses and cultivating students' innovation and entrepreneurship ability, while the basic theory and comprehensive quality training are seldom considered. The basic theory is the cornerstone of students' innovative ability and training future development. Only by mastering a comprehensive and solid basic theory, can we achieve advanced development in work. The basic theory should include the relevant mathematics, natural sciences, and professional basics knowledge required for the major. The comprehensive quality module mainly cultivates students' humanities and social science literacy, social responsibility and professional ethics. The comprehensive quality of students can be improved through in-class and extra-curricular scientific and technological activities, a series of lectures and "Two Courses" education.

**Constructing A Long-term Mechanism for Industry-University Cooperation**

To ensure long-term cooperation between industry and universities, it is necessary to clarify the interests of universities and enterprises in the cooperation, and to achieve overall optimization of the interests of both parties through cooperation.

In the industry-university cooperation, the main function of universities is to cultivate high-quality applied technology talents for enterprises and promote the technological innovation of industry. Through industry-university cooperation, universities and enterprises establish a cooperative relationship. Enterprises provide practical bases, and universities integrate practice training into the curriculum system, and cultivate students' practical ability. In the process of practice, students apply theory to solve practical problems. This process is a process of continuous application and innovation. Therefore, it has cultivated students' innovative ability and finally cultivated application-oriented talents with high quality and innovative ability. In terms of technological innovation, universities can increase their income and promote their development through the transformation of innovative achievements. As an economic entity, enterprises hope to obtain talent guarantee and innovative technical support through industry-university cooperation, and finally obtain long-term and good economic benefits. Therefore, in order to achieve long-term and stable development, universities and enterprises need to sign cooperation agreements, clarify the principles of responsibility and benefit distribution of both parties, and establish cooperative organizations to improve the various
management systems of cooperation. It can promote the healthy and long-term development of industry-university cooperation based on standardized, scientific and orderly management.

**Improve the Government’s Macro-control Mechanism**

The government is the bridge and link between the industry and universities. The industry-university cooperation cannot be separated from the guidance and promotion of government. At the same time, the smooth implementation of industry-university cooperation can promote the development of economic society. The government needs to issue relevant policies, laws and regulations, establish a sound legal system, protect the interests of all parties and reduce the risk of cooperation. In addition, in the initial stage of industry-university cooperation, the government can give some policies and financial support to promote the smooth implementation of industry-university cooperation. The government should establish a strict supervision mechanism and evaluation mechanism, ensure that funds are used according to the budget, and ensure that universities and enterprises have effectively implemented various cooperation tasks. When the cooperation model is established, the government can act as a supervisory body to ensure that industry-university cooperation can be carried out effectively and sustainably.

**Conclusion**

In the new stage of higher education development, applied undergraduate universities urgently need to explore and reform the operational mechanism of industry-university cooperation and promote the reform of education mode in universities. Through the establishment of a new education model of industry-university cooperation, we can cultivate high-level applied talents with systematic theoretical knowledge, solid innovation and entrepreneurship practice ability, comprehensive humanistic quality. Meanwhile, we can improve the scientific and technological innovation ability of universities, give full play to the advantages of universities to better serve the economic and social development.

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**References**


