Research on University-enterprise Cooperation Practical Education of New Engineering Majors under the Background of Integration of Industry and Education

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Abstract: With the implementation of the national strategy of "transportation power", the transportation major is facing the transformation of new engineering majors. Practical education is an important link in the training of new engineering majors in application-oriented universities and plays a vital role in the quality of talent training. The transformation and upgrading of traditional majors has promoted the transformation of traditional school-enterprise cooperation to the integration of industry and education. Under the background of the integration of industry and education, the author puts forward some viewpoints, such as the precise orientation of talent training, the improvement of the system construction of practical education base, and the broadening of the practical education forms of the integration of industry and education. Taking Anhui Sanlian University as an example, This paper analyzes the practice and achievement of university-enterprise cooperative practical education construction for new engineering majors under the background of the integration of industry and education.

1 The background

On October 18, 2017, in his report to the 19th National Congress of the Communist Party of China (CPC), Xi Jinping put forward the important judgment of "deepening the integration of industry and education and cooperation between schools and enterprises". On December 5, 2017, "Several Opinions of the General Office of the State Council on Deepening the Integration of Industry and Education" pointed out that "to deepen the integration of industry and education, promote the organic linkage of the education chain, the talent chain, the industrial chain and the innovation chain". [1] The structure, quality and level of the supply side and the industrial demand side of talent training cannot fully adapt, and the problem of "two skins" still exists. Deepening the integration of industry and education, and promoting the organic linkage of education chain, talent chain, industrial chain and innovation chain are the urgent requirements for promoting the supply-side structural reform of human resources at present.

Since 2012, "Several Opinions of the Ministry of Education and other departments on Further Strengthening Practical Education in Colleges and Universities" pointed out that "Practical education base is an important carrier for carrying out practical education work. We should strengthen the construction of laboratories, bases for practice and training, and sharing platforms for practical teaching, and rely on existing

resources to focus on the construction of a number of state-level experimental teaching demonstration centers, national off-campus practical education bases for college students, and vocational training bases." [2] Over the years, colleges and universities have achieved certain practical education effects by jointly establishing off-campus practice education bases and university-enterprise cooperation practice platforms, etc., but the cooperation enthusiasm of enterprises has been declining year by year, and the cooperation effect is not obvious, etc., which is worth our deep thinking.

2 the main problems in the construction of new practical education base for applied undergraduate engineering majors

As an important part of modern higher education, application-oriented colleges and universities pay more and more attention to the talent cultivation quality after upgrading traditional engineering majors into new engineering majors. In recent years, with the continuous advancement of national transportation construction, especially the new infrastructure construction, there is a large gap of engineering and technical personnel in the new field of transportation, and application-oriented colleges and universities have set up undergraduate majors in transportation, which, to a certain extent, makes up the bottleneck of application-oriented talents in the current transportation construction in China. [3]

Practical education is an important link in the training quality of application-oriented undergraduates majoring in transportation, and there are many problems in the construction at present.

2.1 It covers a wide range of subjects

Transportation is a very comprehensive discipline, involving a wide range of traditional theoretical courses and practical courses are more inclined to management, training for railway, highway, logistics, rail transportation, public transportation and other employment direction of professional comprehensive talents.[4] This requires colleges and universities offering transportation majors to have their own characteristics and precise positioning, and should not involve a wide range of subjects, otherwise it will bring great difficulty to practice education.

2.2 Seek complete counterpart cooperation enterprise difficulty is great

Because the subject of transportation involves a wide range of subjects, the specialty orientation of each school is not the same, and the orientation of talent training is also different. Under the background of cultivating various transportation talents, colleges and universities need to accurately connect with school-enterprise cooperative enterprises that are completely corresponding to professional talents. The business scope of enterprises is relatively broad relative to the direction of talent training, and the demand for talents on positions cannot be limited to a certain direction. What they expect is more complex and cross-application talents. The asymmetrical talent output and input requirements of universities and enterprises make it difficult for both sides to seek completely corresponding partners.

2.3 Cooperation intensity is not significant, the effect is not obvious

The purpose of school-enterprise cooperation is to cultivate more practical and entrepreneurial talents to meet the needs of enterprises and society.[5] In most school-enterprise cooperation, the number of cooperative units is emphasized, rather than the quality of the cooperative units. On the one hand, the transportation has its characteristics of subjects, a single enterprise of university-enterprise cooperation can't meet the direction of the talent training, blindness and increase the quantity of university-enterprise cooperation unit, false identity the cooperation concept of "the more the better", form a many-to-one multi-directional cooperation, university-enterprise cooperation become a mere formality, education base to become "base". On the other hand, the school-enterprise cooperation is only in the form of students' comprehensive practice, which lacks the momentum of broadening and deepening the cooperation, and the cooperation effect is not satisfactory.

2.4 The number of teachers is not enough, especially practice teachers

Teachers are the main force of teaching in the practice base, and their academic level and engineering quality are the fundamental guarantee of the quality of practice teaching.[5] The intersecting characteristics of transportation disciplines require the intersecting knowledge and ability of teachers in this discipline, and the shortage of teachers has always been a prominent problem. Cooperative enterprises have higher and higher requirements on talent ability, and students are more and more flexible in the application of practical learning. Therefore, it is necessary to require practical teachers to have more solid knowledge and ability. Under the unfavorable conditions of lack of talents and personnel, the effect of training personnel in practice base is self-evident.

3 Approach to the Construction of School-Enterprise Cooperative Practical Education Base of New Engineering under the Background of Integration of Industry and Education

3.1 The precise orientation of talent training is the premise of seeking school-enterprise cooperation

It is very difficult to train talents for such a wide range of disciplines, so the precise positioning of the direction of talent training is particularly important. In 1998, the Ministry of Education of the People's Republic of China adjusted the catalogue of undergraduate majors and merged some majors into transportation. Therefore, the directions of transportation majors in China are relatively mixed. Due to the differences in the history, disciplinary advantages, humanistic environment and other factors of each university, the directions of transportation majors in different universities are different.[6] Colleges and universities should combine their own development and the hot trend of the industry to determine the precise positioning of the training direction of transportation professionals, so as to resonate with the cooperation of enterprises' talent needs.

Figure 1 Corresponding relationship between the demands of transportation disciplines and enterprise talents (part)

3.2 Perfecting the rules and regulations of off-campus practical education bases is a favorable guarantee for school-enterprise cooperation

On the basis of mutual win, establish and perfect the rules and regulations of the off-campus practical education base, including the most basic organization system, fund reward system and management system.[7] Relevant rules and regulations should be supplemented and improved according to the needs of the cooperation between the two parties and the particularity of the positions involved. For example, establish a monitoring and evaluation system for both parties. As an important stage of talent training, practical teaching should not become a mere formality due to the lack of supervision and evaluation. A perfect practical teaching evaluation system includes practical teaching conditions, practical teaching process, practical teaching effect evaluation and so on.[8] A detailed monitoring and evaluation system can be formulated according to the evaluation contents of practical teaching of various schools, so as to better guarantee the effect of practical education.

3.3 Broadening the practice and education form of integration of industry and education is the breakthrough point of in-depth cooperation

The construction content of off-campus practical education base should be bidirectional and multi-form. The traditional single type of practice education is limited to the post practice mode, and then expanded to the multi-post rotation mode, which is basically the form of post, and the education effect is not improved greatly. Exploring multi-form cooperation modes such as research platforms, workshops and industrial colleges jointly built by the university and enterprises is the continuous driving force for the continuous and in-depth cooperation between the university and enterprises. With multi-dimensional demands of enterprises, colleges and universities should make full use of the advantages of human resources and explore the width of bilateral cooperation so as to effectively improve the effect of cooperative education.

4 Characteristics and practical effect of construction of new engineering specialty practice education base in Anhui Sanlian University

Since 2017, the transportation major of Anhui Sanlian University has been approved two new engineering renovation and construction projects. Through promoting the construction, we have explored new ideas for the construction of a new engineering practice education base.

4.1 Misplaced talent training positioning, accurate docking of new engineering professional talent needs

According to the official website of the Ministry of Transport, PRC, the transport sector added 15 million jobs between 2003 and 2011, and 22 million jobs between 2010 and 2019, of which about 30 percent were in the field of traffic safety. As far as Anhui Province is concerned, there are more than 200 traffic-related enterprises in the whole province, with an annual talent gap of 30,000 people, including about 10,000 people for traffic safety talents.

Many colleges and universities in China have opened traffic engineering, traffic management and control, transportation and other related majors, which have provided a large number of academic research-oriented talents for the society. As application-oriented colleges and universities, they cannot compare with the disciplines of traditional and established colleges and universities, and it is even more difficult to compete for the limited practical education base resources. In the early days of its establishment, the transportation major of Anhui Sanlian University was once faced with the situation of inaccurate positioning and imitating the direction, and could not make a breakthrough in seeking the off-campus practical education base. In the cooperation with leading traffic safety enterprises in Anhui Province, the professional direction of road traffic accident prevention and control, road traffic accident identification and handling for small, medium and micro enterprises has been established by means of docking industry, integrating into enterprises and matching post capabilities. The dislocation orientation of talent training related majors with traditional universities and the precise docking of talent needs in the industry create favorable conditions for the cooperation with enterprises in the practical education base.

4.2 Deepen the integration of industry and education to meet the practical requirements of new engineering majors

"School-enterprise cooperation, industry-university-research cooperation" is the gene of Anhui Sanlian University. Relying on the industrial plate of Sanlian Group, it actively connects with the integration construction of industry and education of smart transportation. The integration of industry and education is not the traditional school-enterprise cooperation. By building the practical teaching platform of the integration of industry and education, building the entrepreneurship incubation platform, building the industrial college and other forms of cooperation, the interests and responsibilities of both sides can be shared. The school has built Anhui Provincial Key Laboratory of Traffic Information and Security, the Research and Development Center of Traffic Safety and the Entrepreneurship Incubation Platform with Anhui Transportation Construction Co., Ltd., together with Anhui Sanlian Transportation Application Co., Ltd. The practical education base is no longer limited to employment

partners, but starting from the business needs of both sides, it not only serves the scientific and technological innovation of enterprises, but also serves the practical ability application of teachers and students, and conforms to the first line of production practice.

Fig. 2 Schematic diagram of integration of industry and education to promote practical education

4.3 Break through discipline and specialty restrictions, expand the practice education base in multiple fields

The pain point of the construction of new engineering specialty of transportation is the cross-discipline, which needs to integrate the resources of the whole university to support the construction. Anhui Sanlian University has the advantages of flexible running and efficient resource integration. At present, it has completed the sharing and co-construction of 6 major disciplines, such as transportation, machinery, electronic information, electrical, computer, safety science and engineering, so as to better serve the construction of new engineering majors of intelligent transportation. Multidisciplinary cross is both pain points and advantages of transverse broaden the new engineering professional practice education base provides rich resources, intelligent traffic, with the advantages in the multidisciplinary subject, break through the traditional thinking transportation professional practice base, strengthening and traffic information, traffic data, new traffic signal control, traffic infrastructure and other related enterprises cooperation, Expand the construction of new engineering specialty practice education base.

5 conclusion

The new engineering construction of application-oriented universities in China is faced with many new problems, and the practical education is the pain point of the new engineering construction. Under the background of the in-depth promotion of the integration of industry and education, it is imperative to explore the university-enterprise cooperative practical education for the new engineering specialty of application-oriented universities. In this paper, the precise orientation of the training direction of new engineering talents in application-oriented universities, the perfection of the system construction of the practical education base, and the expansion of the practice education form of the

integration of industry and education are studied in depth. Through the analysis of the school-enterprise cooperation practice education of the new engineering major of transportation in Anhui Sanlian University, the following conclusions are drawn:

(1) Dislocate the orientation of talent training and accurately connect with the demand of talents of new engineering majors. It has created favorable conditions for the practical education base of school-enterprise cooperation.

(2) Deepen the integration of industry and education to meet the practical requirements of new engineering majors. To better serve the needs of teachers and students for practical education, we should build a scientific research platform, a studio, an industrial college and other deep cooperation forms.

(3) Break through the limitations of disciplines and majors, and expand the practice education bases in multiple fields. The multidisciplinary intersecting of new engineering can broaden the cooperative fields of practical education bases and better serve the training of new engineering professionals.

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