Research on the Cultivation of Engineering Talents for Information Application Base on the Deep Integration of School and Enterprise that Take the Project as Carriers

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Abstract. At present, in the process of talents training in the application of information engineering, there are some phenomena in the school-enterprise cooperation, such as "universities are active, enterprises are not active", the cooperation level is shallow, and the matching degree between talent output and enterprise talent demand is low. In view of these phenomena, a new training mode of information application engineering talents is put forward that base on the deep integration of school and enterprise that take the project as carrier. The paper expounds its connotation, significance and concrete construction ideas and measures. Practice shows that the model can effectively promote school-enterprise integration and collaborative education, improve students' engineering application ability, innovation and entrepreneurship ability, improve students' employment competitiveness, and improve the matching degree of talent output and professional posts.

Keywords: Deep Integration of School and Enterprise · Project · Informational · Cultivation of Talents

1 Introduction

Deep integration of application-oriented university with enterprises is an important way to cultivate high-level information application engineering talents who service for the development of industries and enterprises [1]. However, in the process of promoting the deep integration of university and enterprises, university is the educational organizations for personnel training, because it takes moral education as the fundamental task. Enterprise, on the other hand, is the organization focusing on economic activities and pursuing maximization of interests. It is difficult for the enterprise to generate value returns in the short term in education cooperation with the university, which cannot meet its interest demands. Therefore, university-enterprise education cooperation of many application-oriented university is a kind of cooperation mode with the institution as the main body to actively promote the cooperation, and the enterprise passively participates without the

principal role. University-enterprise education cooperation appears the phenomenon of "Combined but not integrated" [2], which lies at a shallow level of cooperation.

Most of the university-enterprise cooperation mode of "Combined but not integrated" stays at the level of enterprises providing internship opportunities, practice bases and part-time enterprise tutors for the university, or dispatch employees or leaders of enterprises to the university to teach theoretical knowledge. At the same time, enterprises are not deeply involved in the specialty construction, talent training scheme formulation and curriculum setting of colleges and universities. So the talent training of the university cannot reach the development needs of industrial enterprises in a timely manner [3]. However, with the rapid development of new science and technology, artificial intelligence, big data and the Internet and other technologies have spawned a new generation of industries. All walks of life has come into the era of "Wisdom+". The industry is facing upgrading and transformation, presenting new requirements for talent training, and requiring information application engineering talents to have comprehensive knowledge application ability, cross-disciplinary integration ability and innovation ability. The university-enterprise joint training deeply has grown up to be a powerful tool for the cultivation of a new generation of information application engineering talents. However, the shallow University-enterprise cooperation teaching of "Combined but not integrated" makes the practical application training objectives of the talent system not effectively realized [4], which makes the training talent of university face with narrow employment, education mismatch between teaching and the needs of industrial enterprises, and the information application engineering talents cannot meet the development needs of local industrial enterprises, that causes the talent gap [5].

In order to accurately output high-level information application engineering talents serving local development and promoting the development of local economy, application-oriented undergraduate colleges need to explore new university-enterprise cooperation mode, so as to promote the deep integration of university and enterprise, strengthen the professional construction of university and improve the Quality of Talent Training.

2   Connotation of the Deep Integration of University and Enterprise Based on Project

The deep integration of school and enterprise with the project as the carrier is guided by the development of local industry, centered on the development of students, oriented by the employment needs of enterprises, and taking the real project of enterprises as the fusion agent and education carrier of school-enterprise interaction. It promotes the integration of school and enterprise, systematically cultivates high-level information application engineering talents adapting to the development of industries and enterprises, realizes the integration of production and education integrating morality education, scientific research and social service, and promotes the organic connection of education chain, talent chain and industrial chain.

The deep integration of school and enterprise based on the project contains the following advantages. First, the training mode of talents has been improved. In the past,

school-enterprise cooperation has mostly cultivated students' practical ability by building training bases, while the deep integration of schools and enterprises with projects as the carrier takes projects as the carrier, takes real project working environment as the classroom, takes projects as the melting agent of colleges and enterprises, and college teachers and enterprise technical backbones jointly cultivate students. Students really enter the first line of project production and development in the implementation of projects, and systematically master various skills and norms in skilled positions. Second, the training objectives has been optimized: on the one hand, the previous school-enterprise cooperation focuses on cultivating the students' practical ability; the deep integration of school and enterprise with the project as the carrier is based on the real project of local enterprises as the carrier to cultivate talents, so that students can master the whole cycle process, methods and norms of project development, cultivate their comprehensive knowledge application ability, the ability to solve complex engineering and technical problems, and the integration and innovation ability of edge majors, who will become high-level information application engineering talents serving for enterprise practical application. On the other hand, it pays attention to the individualized development of students; and students could choose to participate in the implementation of the relevant parts of the project according to their interests or expertise. At the same time, excellent student teams can be set up according to the students' performance, who research on key technologies. They will become excellent engineers in information technology. Third, a school-enterprise education community has been constructed: the university has abandoned the idea of taking themselves as the main body, the enterprise as participants, formed the idea of building a partnership with the enterprise. Under this idea, in order to pursuit the high-quality completion of project, enterprise actively participate in the process of cultivating talents t, so as to promote the link between education and work, make enterprise truly become the main body of education; at the same time, university will become the service party of enterprise in cultivating talents, which provide intellectual support for enterprise to improve the quality of project completion and form a good interaction between college and enterprise.

3   The Significance of Deep Integration of University and Enterprise Based on Project

3.1   The Deep Integration of School and Enterprise Based on the Project Makes the Output of Information Application Engineering Talents More Suitable for the Needs of Enterprises

The training goal of information application engineering talents is to cultivate high-quality talents with excellent system knowledge application skills, multi-disciplinary integration and innovation to meet local need. Most of the projects in the enterprise are the forefront of the integrated application and integration of modern technology innovation, and contain rich knowledge, skills, industry standards and value culture, which to some extent reflects the employment standards, job vocational skills and professional quality needs of enterprises. In the practice of projects, project participants can not only systematically improve application skills, cultivate the professional quality, learn new

technologies, new methods and new standards of enterprises, but also realize personalized development according to their own need. Excellent can learn the knowledge and vocational skills of the frontier disciplines, and master the knowledge of multiple frontier disciplines. They constantly integrate and innovated in multidisciplinary learning, thus becoming high-level information application engineering talents who meet the needs of enterprises.

3.2 The Deep Integration of University and Enterprise Based on Project Meet Multi-interest Demands

The function of local applied undergraduate colleges is to cultivate high-level talents for the local and serve the development of local industrial economy. In order to make the local industrial development rely on the professional advantage education resources of local colleges and universities, and accurately serve the local development, the cultivation of talents should meet the needs of local development, and the professional construction should be adapted to local conditions, built according to needs, and changed according to needs. Connecting with the internal development needs of local economy by projects, cultivating students' professional skills by real project practice, and edifying students' literacy by local and corporate culture are conducive to enterprises and universities to grasp the dynamic and trend of local economic development, and to enterprises to obtain a large number of professional counterparts, make up for the talent gap, improve the talent echelon structure of enterprises and enhance their competitiveness. It is beneficial for colleges and universities to meet the needs of local economic development professionals, meet the needs of enterprise development, improve the phenomenon of integration with enterprises, improve the connotation of professional construction and the quality of personnel training in colleges and universities, cultivate high-level information application engineering talents in line with local industrial economic development and industrial development, and boost local economic development.

3.3 School-Enterprise Integration is Promoted by School-Enterprise Cooperation Based on Projects, Thus Realizing the Integration of Production and Education

The deep integration of school and enterprise with the project as the carrier, from the perspective of colleges and universities, colleges will directly participate in the service production activities of enterprises through the implementation of the project, truly become the service party of cooperative enterprises, and provide intellectual services for the smooth development of the project and the development of enterprises; at the same time to provide all levels of staff training for enterprises, in order to enhance the overall skills and literacy of employees, improve the talent structure of enterprises and the retention rate. From the perspective of enterprises, in order to ensure the quality of the project, enterprises will join the technical backbones with rich practical experience in the project implementation. They will train and guide the project participants. Enterprises unconsciously take the initiative to join in the process of personnel training to promote the integration of production and education. It can integrate the intellectual advantages of colleges and the technological advantages of enterprises, and form a high-quality

resource integration model. It forms a virtuous circle of realizing accurate education by project development, radiating enterprise development by accurate education, innovating new technologies for enterprise development, and cultivating advanced talents by new technologies.

4 The Training Mode of Information Application Engineering Talents Base on the Deep Integration of School and Enterprise that Take the Project as Carriers

4.1 Taking the Project as the Carrier, the Cooperative Operation Mechanism of School-Enterprise Integration Has Been Constructed

A sound mechanism is the guarantee for the good operation of school-enterprise integration. First of all, cooperation rules should be agreed by institutions and enterprises; rules and regulations for cooperative projects should be formulated; the rights, obligations, dispute settlement mechanism and legal liability of both parties should be clarified. That ensures the cooperation is law-based and rules-based. At the same time, in order to constrain and drive enterprises to participate in talent training activities and clarify the service content and responsibilities of colleges and universities, the cooperation agreement should be signed, aiming at the support provided by the two sides for cultivating talents, the proportion of capital investment between the two sides, the specific content of students' participation in the project, and the standards and indicators for project completion. Secondly, in order to dynamically monitor and evaluate the project, including the degree and effect of enterprise participation in the project, the process and effect of enterprise education support, the technical ability of college students, the effect of students' participation in the project and so on, the supervision and evaluation feedback mechanism should be constructed. Mutual evaluation among enterprises, teachers and students. In the interactive evaluation, the problems are found in time, the scheme of cultivating talents is improved, the cooperative relationship of cultivating talents is strengthened, and the quality of talent training and the effect of project completion are improved. Finally, the project leader responsibility system should be implemented, and the project leader should coordinate, coordinate and manage the whole project.

4.2 Closely Connecting with Local Industries, Changing According to the Needs, and Optimizing Professional Construction

The information college of application-oriented university aim at cultivating high-level information application engineering talents and serving the development of local industries. It is the supply side of talents for local industrial enterprises. Information application is closely related to all walks of life, and the degree of information in all walks of life is different. The demand standard for information application talents in various industries has gradually changed. College should pay close attention to the dynamic development of industry and actively connect with local industries in a timely manner. According to the development changes and development trends of local industries, college should optimize the professional construction, and optimize the direction of talent training in the

direction of industrial development, so as to achieve a high degree of matching between talent supply and demand, and form a benign closed loop that optimizes professional construction by industrial development and promotes industrial development by professional construction, and ultimately continuously promotes the development of local industries.

4.3 Schools and Enterprises Jointly Optimize the Talent Training Program Based on Job Occupation Demand and Education Project

Revising the talent training program to meet the needs of industrial enterprises is the basic requirement of talent to promote economic development. With projects as the carrier for school-enterprise integration education, schools should go deep into local enterprises to grasp the industrial dynamics, understand the development of enterprises' projects in recent years and the trend of future projects, and jointly analyze and discuss the employment needs of professional posts with enterprises. Then, taking student development as the center and job occupation demand as the guidance, the knowledge, skill standards, professional quality and local culture of professional positions are extracted, and the resources of colleges and enterprises are integrated. Schools and enterprises jointly reversely revise the talent training scheme, improve the curriculum system and teaching content, so as to increase the matching degree between talent training and the development needs of enterprises, improve the quality of talent training, and achieve the coordinated development of students, colleges and enterprises.

4.4 Building a Team of Project Teachers to Meet the Needs of the Project

Teachers are the key factors to successfully complete the project, is the guide of students from the classroom to the industry [6]. Teachers' team, from the source, should have both industry experts, enterprise technical backbone and college teachers, which can give full play to the advantages of all parties. For example, industry experts are good at understanding market dynamics and the trend of technological development, enterprises are good at applying technology, and college teachers have solid theoretical knowledge. They learn from each other and complement each other to form a high-quality educational community. In terms of structure, the teacher team should be composed of various types of teachers, with various titles, various research fields required by the project, enterprise working background, and different ages. It should have an echelon structure. All kinds of teachers continue to develop into dual-qualification teachers with both theoretical and practical abilities in project implementation. At the same time, the young teachers are guided by experienced teachers to help them grow, so as to continuously build and strengthen the teacher team and ensure the sustainable development of the teacher team. Professionally, in view of the multidisciplinary and comprehensive nature of the project, according to the needs of the project, teachers from different disciplines, different professional backgrounds and different research directions are absorbed to form a cross-disciplinary tutor team, and finally realize the complementary advantages of disciplines and specialties.

4.5 Accurately Locate the Content of the Service According to the Evaluation of the Cooperation Ability of the Project

Enterprise projects are usually complex and long-term, and different projects involve different technical breadth and depth. When selecting joint education enterprises and education projects, the project teacher team should focus on the development needs of the project, evaluate the project including the academic ability and school conditions of the team, the educational role of the project, the project completion conditions, the resources and conditions provided by the enterprise. The team should grasp the core technology, difficulties and pain points of the project, and select the project that meets the ability level of the college as the education project. According to the selected education project, it is decomposed into different sub-projects, and the common education model of the school and enterprise is determined. On the other hand, the cultivation object should be clear. The basic part of the project is regarded as a general training project for students, and the core key technologies of the project are used to cultivate top students. Students can also choose different sub-projects according to their own interests or expertise to meet the personalized development of students. Through the pre-evaluation of the project, it can ensure the successful completion of the project, enhance the influence of colleges and universities in enterprises, and improve the sustainable development of school-enterprise integration. Through the pre-evaluation of the project, the project can be successfully completed, which is conducive to enhancing the influence of colleges and universities in enterprises and improving the sustainable development of school-enterprise integration.

5 The Implementation Effect of the Cultivation of Engineering Talents for Information Application Base on the Deep Integration of School and Enterprise that Take the Project as Carriers

After years of continuous reform and practice, the School of Information Engineering of Baise University has preliminarily established the training mode of information application engineering talents based on the deep integration of school and industry as the carrier of projects, and has achieved certain results in practice as follow:

1) School and several local enterprises have carried out collaborative education, and students' engineering practice ability and innovation ability have been improved.

At present, the School of Information Engineering of Baise University has built a discipline and professional group that closely connects the local industrial chain, innovation chain and talent chain. It has signed educational cooperation projects with 49 enterprises and institutions. The students' engineering practice ability has been improved, and the enthusiasm of students to participate in discipline competitions and the probability of winning awards have been improved. In the past six years, our college students to participate in all kinds of subject competition items increased year by year, from 1 to 12; the number of parameters and the number of winners are also increasing year by year, from only 12 people to now average annual participation of about 140 people; the number of national awards increased from 0 to 23 annually, and the number of provincial and ministerial awards increased from 12 to 78 annually.

2) Talent Output is More Suitable for the Needs of Enterprises and Institutions

Since the implementation of the project, personnel training has paid attention to job requirements, promoted the integration of curriculum and certificate under the cooperation of enterprises, built the pilot test of vocational qualification certificate, and jointly actively promoted "1 + X" certification. In 2020, 36 students participated in the "1 + X" vocational skills certification intermediate examination of big data application development (Java), 27 students passed the examination, and the passing rate was 75%. Not only students' professional knowledge and skills have been improved, but also students' employment competitiveness and employment quality have been improved. Some students work directly in school-enterprise cooperation enterprises when they graduate, and some students signed employment agreements during their graduation internships. From mid-July each year, the employment rate of graduates is above 90%.

3) Students' innovative and Entrepreneurial Abilities have Been Improved

Since the project was launched, 95 college students' innovation and entrepreneurship projects have been obtained, including 25 national projects and 58 district-level projects. In addition, some excellent students were trained. For example, Xue Hongren, a student independently developed the enrollment interview system for only one week, so that the enrollment interview work can be carried out smoothly without the end of the current coronavirus disease.

6   Conclusions

In the in-depth collaborative education between schools and enterprises with the real project of enterprises as the carrier, enterprises are fully involved in professional construction, personnel training plan formulation and teaching material content optimization, which make up for the shortcomings in the practical training of school talents, making school education and teaching change according to needs; this has improved students' engineering practice application ability and innovation ability. Practice training is more in line with the needs of enterprises' posts, and talent output can better match the development of local industries.

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