

# *Analysis of the Current Situation of School-enterprise Cooperation for Electrical Engineering and Automation Professionals*

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**Keywords:** OBE concept, Electrical engineering, School-enterprise cooperation, Talent training.

**Abstract:** In recent years, colleges and universities in Heilongjiang Province have carried out the reform of the talent training model by means of school-enterprise cooperation and have achieved certain results, but at the same time they have also shown some problems. This paper studies the school-enterprise cooperation based on the OBE concept of electrical engineering and automation majors in Heilongjiang Province, analyzes the problems of school-enterprise cooperation in the training of electrical engineering and automation professionals, and puts forward some suggestions.

## **1. Introduction**

With the introduction and advancement of my country's "Made in China 2025" and "Internet +" strategies, the new economy represented by new technologies, new formats, new models and new industries in various fields has flourished, and the requirements for scientific and technological talents have been further improved. The transformation of applied talents training in colleges and universities also poses challenges [1]. At present, it seems that the theoretical teaching and practice of electrical engineering and its automation are still not closely connected, and the practical aspects have not been paid enough attention, resulting in insufficient practical ability of students, and even many obstacles when students enter the workplace after graduation. This paper draws on and summarizes the previous experience of combining the theory and practice teaching of electrical engineering and automation, and draws on the ongoing practice of school-enterprise cooperation, trying to explore a set of school-enterprise cooperation talents training methods suitable for this major.

## **2. The Current Situation of School-enterprise Cooperation and Personnel Training in Electrical Engineering and Automation**

### **2.1. Research Status of School-enterprise Cooperation at Home and Abroad**

In recent years, the demand for economic and technological development in Heilongjiang Province has become higher and higher, so the emphasis on applied talents in related majors has gradually increased. High-tech and high-skilled applied talents have become an important standard for talent selection in today's society. Exploration and research on school-enterprise cooperative education models include the dual system model in Germany, the sandwich model in the United Kingdom, the TAFE model in Australia, and the CBE model in Canada and North America [2]. Domestic scholars' research on school-enterprise cooperation mostly focuses on the extraction of the connotation of school-enterprise cooperation and the analysis of the dynamic mechanism and mode of school-enterprise cooperation. Gao Mengli pointed out that the talent training mode of school-enterprise cooperation has problems such as lack of benefit distribution mechanism, inconsistent enthusiasm, and insufficient depth of cooperation, and discussed the new model of "virtual class" of school-enterprise cooperation, and detailed the operation mechanism of "virtual class". Explanation [3]. Yang Kuilan pointed out the advantages of school-enterprise cooperation talent training in applied undergraduate colleges in promoting the transformation of schools and adapting talents to the needs of the social market, and expounded on the adjustment of professional courses in the process of school-enterprise cooperation, the promotion of deep school-enterprise cooperation and the construction of school-enterprise cooperation. The importance of collaborative research platforms [4]. Zang Liangyun et al. analyzed the necessity of talent training for school-enterprise cooperation in application-oriented undergraduate colleges, and pointed out that the current process of school-enterprise cooperation mainly focuses on forms and practical results, cooperation cannot be mutually beneficial, and cooperation norms are problems [5].

### **2.2. Current Situation of Talent Training for Electrical Engineering Majors in Applied Undergraduate Universities**

The electrical engineering major has a strong practicality, and the traditional teaching mode has been unable to meet the needs of the society for applied talents in the cultivation of professional talents. It is a feasible way to carry out school-enterprise cooperation by enhancing the practical application of practical education to meet the needs of the market and enterprises to introduce the concept of Outcome-Oriented Education (OBE). Therefore, the reform of electrical engineering and its automation major in agricultural colleges and universities must be guided by the training objectives of cultivating students' abilities, professional certification, and the needs of society and industry, strengthen practical curriculum settings, improve students' engineering practice ability, and explore a set of adaptations. A new model of talent training for social development needs.

### **2.3. Current Situation and Problems of School-Enterprise Cooperation in Heilongjiang Province**

At present, most domestic application-oriented undergraduate colleges have carried out certain school-enterprise cooperation, but in general, there are still some defects in terms of effectiveness and universal applicability, and most of the research on school-enterprise cooperation remains at the theoretical level. The research results of school-enterprise cooperation that cannot be fully integrated with practice and can be combined with the development of Heilongjiang Province are relatively lagging behind [6]. Therefore, the issue of school-enterprise cooperation for the

cultivation of talents in Heilongjiang Province needs to be further studied in depth. In recent years, major colleges and universities have vigorously carried out education and teaching reforms in various disciplines. On this basis, school-enterprise cooperation projects, as an important part of teaching reform, have been given full attention. The teaching reform training mode of school-enterprise cooperation can make full use of internal and external resources, provide a real practical teaching environment for electrical engineering and automation professional training, and improve the quality of personnel training. Objectively, it is necessary to introduce the advanced educational concept of OBE, and adjust the traditional training plan for electrical engineering and automation professionals.

### **3. School-enterprise Cooperation Concept Based on OBE Concept**

OBE is the abbreviation of Outcome based education, which has been widely used in education and teaching reform. After years of theoretical and practical exploration, a relatively complete theoretical system and implementation model have been formed. The OBE teaching concept has been regarded as the mainstream concept of education reform by many foreign countries [7-8]. OBE emphasizes formulating specific talent training plans based on learning outcomes, establishing professional talent training goals, formulating talent training processes, and rationally designing graduation requirements based on the needs of social and economic development for talent. The learning outcomes of OBE not only focus on what students have learned in the classroom, but also on how well students can apply them to the society. The teaching results of OBE not only require students to master, understand, and remember the knowledge points taught by teachers in the classroom, but also require students to strengthen the knowledge they have learned into their hearts, which is what we usually ignore in the teaching process [9]. From a teaching strategy perspective, OBE focuses more on what students have learned rather than what teachers have taught students. This requires students not only to master the content taught by the teacher, but also to strengthen their learning on this basis, transform the content taught by the teacher into the knowledge they have learned, and at the same time be able to complete some challenging tasks to exercise and demonstrate own ability [10]. In general, the OBE teaching philosophy is more about the ability of students to develop in the teaching process, especially creativity, thinking ability, ability to analyze problems, and ability to organize and plan, rather than simply based on what students have learned. And what kind of performance students have achieved to evaluate [11]. This aspect is exactly what we are lacking in our educational process now. Therefore, my country's higher education needs to pay attention to and apply the OBE concept to the teaching process, and it is necessary to gradually change the traditional educational concept, so as to continuously educate the teaching ability.

Under the background of today's OBE training concept and meeting the actual needs of the market, electrical engineering graduates are required not only to have a solid grasp of professional basic knowledge, but also to have corresponding practical and innovative capabilities. Application talents are in short supply [12]. Under the background of the new market demand-oriented talent training model, through the establishment of a school-enterprise collaborative education and innovation training system, the teaching resources of colleges and universities and the practical resources of enterprises are fully combined to jointly cultivate talents with professional ability and practical ability. At the same time, a long-term mutual employment promotion model can be established between colleges and enterprises, which can meet the society's professional needs for talents on the one hand, and solve the problem of lack of practical ability of graduates in the learning process on the other hand.

## **4. Problems Existing in School-enterprise Cooperation in the Training of Electrical Engineering and Automation Professionals**

### **4.1. Institutional Issues**

First, the school-business cooperation mechanism in Heilongjiang Province is still in the phase of research and innovation compared to the mature model of school-to-business cooperation in developed countries. Currently, there is still a lack of a mature and perfect system of cooperation between schools and companies that cannot effectively prevent schools, colleges, universities and companies from fulfilling their respective tasks and obligations. If one of the three parties changes the educational philosophy or investment policy, the cooperation between the school and the current company will be affected.

Secondly, colleges and universities belong to two different institutions: colleges and universities belonging to the education system, which mainly provide general higher education, and funding for the operation of schools mainly comes from State subsidies; A business refers to the use of different factors of production to provide goods or services to the market for the purpose of making a profit. Legal entities or other social and economic institutions operate independently, are responsible for their own profits and losses and have an independent auditor [13]. There are often differences between schools and businesses in terms of effective school goals, training goals and financial investment, which hinders the seamless development of co-operation between school leaders.

### **4.2. School-enterprise Teacher Training Issues**

A recent document from the Ministry of Education states that vocational education in colleges and universities should expand students' high-quality teaching and practical skills, as well as basic knowledge while training graduates in high-tech fields. This is the primary task of teaching the course. This has increased the demand for practical and practical skills of teachers. In the interaction between the school and the company, the basis of cooperation is the joint use of teachers. Industrial engineers come to colleges and universities to participate in education, bring applied knowledge into the classroom, and implement the integration of professional and classroom knowledge. [14]; Companies provide continuing education to their employees to improve their knowledge and skills. In a corporate environment, teachers gain a better understanding of creativity and entrepreneurship. In the actual teaching process, university teachers have a strong theoretical knowledge base, but most teachers lack practical skills and require training related to specialized skills. The dual responsibility of teaching and researching university faculty often makes it difficult to engage in systematic learning. Most industries are electrical trainers with excellent professional and technical skills, but lack academic skills, lack a unified education system for corporate teachers, and have high staff turnover rates. It has become [15]. Therefore, developing a binary training system for school teachers and organizational teachers is an important issue in school-company collaboration projects.

### **4.3. Achievement of Talent Training Goals**

One of the benefits of partnering with school associations is that companies are able to provide a learning platform to develop high-quality students with expertise so that students can compete in the job market or on tests. In the early stages of collaborative planning and after the 2020 disaster, students and parents boycotted the training camp. As a result, the impact of the expected training is further reduced and the learning objective is not achieved. Some students do not want to go to school trained by the company.

## **5. Countermeasures and Suggestions**

### **5.1. Improve the System of School-enterprise Cooperation**

The success of the school-enterprise cooperation project depends on an orderly organization and management system. In the process of cooperation between the two sides, both the school and the enterprise should establish a scientific and effective management system, and establish a management agency to promote the connection between the two parties. Only in this way can the school-enterprise cooperation be guaranteed. The smooth development of the project [16]. First, the establishment of a special organizer in charge of the project in the state department, and the implementation of the school-business partnership project under joint management. Alternatively, industry leaders or industry associations may be involved in managing relationships between schools and business organizations. These organizations and institutions are involved in setting reliability standards in the sector, and because they are aware of the dynamics in the sector, they can provide guidance on vocational education objectives and levels of skill needs [17]. In addition, institutions must actively participate in school-business partnerships, take full advantage of scientific and technological research, and benefit from the economic and social benefits of education as well as policy changes.

### **5.2. Strengthen the Construction of the Teaching Staff of Both Schools and Enterprises**

In the face of problems of cooperation between schools in the local information industries, both schools and institutions should do a good job of educating teachers. Encourage school teachers to get involved in business education. Ensure that assigned teachers participate in quarterly company-sponsored study trips. And a national training course in industrial technology every summer. On the other hand, institutional teachers can participate in university teacher training and be guided and supervised by training schools. Schools are required to undertake some training before introducing business education classes so that business educators understand the school's management philosophy and professional learning goals. Knowledge of school management systems and teaching processes to help vocational teachers better fulfill their teaching responsibilities. Institutional teachers are also responsible for teaching and educating people, such as ideological and political issues, student leadership, etc.

### **5.3. Continue to do a Good Job in Talent Training**

Both sides of the school-enterprise cooperation should participate in the revision of the professional talent training plan to ensure that the talent training plan conforms to the positioning of big data technology to cultivate applied talents. Do a good job in the professional education of students entering the school, actively carry out various professional quality development activities, strengthen engineering teaching in the teaching link, and practice the OBE teaching model [18]. School-enterprise co-construction of an internship and employment resource database Enterprises should actively set up a student employment arrangement team and a big data industry-related project department, maintain extensive contacts with big data companies, build a student internship and employment resource database, and provide students with high-quality internships and employment in the future. Chance.

## 6. Conclusions

In the future, under the guidance of policies, electrical engineering and its automation majors and enterprises can build practice and training bases inside and outside the school by sharing resource advantages, and jointly formulate application-oriented talent training plans that meet market needs in combination with the OBE concept, and through regular teacher exchanges To achieve the purpose of mutual benefit and win-win. At the beginning of cooperation, problems are inevitable, but schools and enterprises should pay enough attention. According to the actual situation of colleges and universities in Heilongjiang Province, combined with the characteristics and development trends of electrical engineering and its automation major, school-enterprise cooperation should be strengthened. Only in-depth cooperation, platform sharing, and teamwork can deepen the integration of industry and education and promote the healthy development of school-enterprise cooperation.

## Acknowledgements

Funding for this research comes from the 2021 key topic of the "14th Five-Year Plan" of Education Science of Heilongjiang Province, "Exploration and Practice of School-Enterprise Cooperation Training Mode Reform of Electrical Engineering and Automation Talents Based on OBE Concept" (Project No.: GJB1421198); Heilongjiang Province The key entrusted project of higher education teaching reform "Research and Exploration of High-level Productive Training Base Construction Based on School-Enterprise Integration" (Project No.: SJGZ20200149); Heilongjiang Province Education Science "Thirteenth Five-Year Plan" 2020 Key Project "Based on Virtual "Research on the Training Mode of Innovative Talents in Agricultural Machinery Specialty in Simulation Experiment Teaching" (Project No.: GLB1320227); Heilongjiang Bayi Agricultural University Graduate Teaching Research Project "Research on the Training Mode of Postgraduate Group Meetings" (Project No.: YJG201908); Heilongjiang Bayi Agricultural and Reclamation University School Level Teaching research project "Exploration of the core curriculum system of electrical engineering and automation in applied undergraduate colleges and universities" (Project No.: NDJY2020); Heilongjiang Provincial Education Planning Project "Engineering Practice Education System and Platform Construction Based on New Engineering in General Agricultural Colleges" (Project No.: NDJY2020); No.: GJB1421190); Heilongjiang Provincial Educational Planning Project "Construction and Practice of Agricultural Engineering Professional Talent Training Mode Adapting to the Integrated Development of Industry and Education" (Project No.: GJB1421191).

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