Research on Training Mechanism of Deep School-Enterprise Cooperative in New Energy Automobile Industry

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Abstract. School-enterprise cooperation is an important way to train the students’ ability of engineering practice. This paper, through the practice of new energy vehicle engineering specialty industry talent cultivation, analyzes the effectiveness and comprehensiveness of enhancing the deep cooperation of school enterprises from the aspects of curriculum system and content, research-oriented learning method, school enterprise joint training new mechanism, teacher engineering practice experience, comprehensive evaluation system. It provides reference for establishing and improving the training mechanism of innovative engineering talents in applied universities.

Introduction

The number of engineering students in our country is huge, but the problem of weak practice ability and lack of innovative consciousness is highlighted. The outline of the national medium - and long-term plan for reform and development of education (2010-2020) has clearly proposed to "vigorously improve the quality of talent cultivation". "Strategic emerging industry plan" aims at the development of strategic emerging industry planning, emphasis on training mechanism of innovation in colleges and enterprise joint, strengthens the depth of the cooperation between colleges and enterprise to cultivate excellent engineering talent [1].

College-enterprise depth cooperation need to enhance to realize the two cooperative enterprises "full participation", namely the enterprise fully participate in the development of training plan, full participation in frontier theory teaching and comprehensive practice teaching.

As shown in figure 1, in the process of personnel training plan formulation, both sides of cooperation form new theory teaching system by using "industry plan" as the carrier, through professional guiding committee, which make enterprise industry experts comprehensively involved
in developing the school personnel training objectives, curriculum setting, teaching content. We should give full play to the advantages of enterprise participation and make it play a role in teaching guidance, textbook compile, evaluation index and faculty building. In the combination of teaching and practice, we will add corporate mentors and practical projects, and set up a new teaching system of practice teaching.

New energy automotive industry, as one of strategic emerging industries, is still in its infancy on construction and development. The major of vehicle engineering in Wuhan University of science and technology is one of the engineering series major which is established earlier in our university. The professional has always attached great importance to the cultivation of students' practical ability. But cooperation in depth and breadth is not enough [2]. A new theoretical teaching and practical teaching system need to be rebuilt according to the actual project’s comprehensive operable process, relying on the support of local government policy and the new energy automotive industry enterprises.

The Reform of the Theoretical Teaching System of the Industry Plan

In theory teaching system reform, colleges and universities need to refactor course system and teaching content in according to strengthen the engineering practice ability, design ability and innovation ability. We will promote a variety of inquiry learning methods, such as the study based on the problem, the project, the case, etc., and strengthen the training of college students' innovation ability.

Refactor Curriculum System and Teaching Content

The curriculum system need to be reset, integrated and optimized by refining the professional training standard of the school "emerging strategic industry plan" into the knowledge ability syllabus or matrix. It mainly includes: first, curriculum system constructed through interdisciplinary integration, absorbing the latest achievements of technical progress of modern engineering science. Second, the content of humanities and social science courses need to strengthen considering cultivate students' sense of responsibility, environmental protection and social responsibility of sustainable development. Third, the practice teaching link should be implied and strengthened. We will strengthen the construction of practice base, build more teaching experiment platform, enable students to receive comprehensive and innovative experiment and practical training, and achieve close cooperation between theory and practice.

Efforts Should be Made to Promote Research-oriented Learning Methods and Strengthen Training in Innovation Capacity

New energy vehicles strategic emerging industry is facing the future development direction of automobile industry. Therefore, a wide range of practical teaching activities should be carried out to solve practical problems and to support multi-level and all-round projects. The research methods mainly include three basic forms: one is the inquiry learning based on the problem. Students work together to solve problems in the practice of simulated engineering. Second, discussion based on case study. Take the case study as object. The communication and evaluation carries based on the case study, analyzes, discusses and determines. Third, the participatory learning based on the project. Open exploration of long period around complex engineering projects from real situations is made up [3].

Deepen Cooperation of School Enterprises, Reform Practical Teaching System

Profound cooperation of school enterprises is an important aspect of higher education reform, training students' ability of innovative and practice. The reform of the practice teaching system is mainly embodied in the aspects of the selection of enterprises, the joint cultivation of the school enterprises and the establishment of the university-enterprise cooperation alliance.
Selection of Enterprises

Firstly, the selected enterprises should have good cooperation basis and positive cooperative attitude. Secondly, according to the development of the industry, we can choose enterprises related to industrial planning reform. Again, the relevant enterprises are best to have large and influential diversified enterprises in the industry. Fourthly, enterprises need better to have the experience of cooperating with universities, and have a strong sense of innovation and broad vision.

Some outstanding students are selected to practice in the local high quality enterprise, such as Dongfeng Electric Vehicle Co., LTD., Dongfeng Yangtze Automobile (Wuhan) Co., LTD., under the support of government and enterprises. They are arranged to work in departments related to the new energy industry. At the same time, some excellent private enterprises are also absorbed into the cooperative units, so as to strive for more social strength to support professional teaching.

Joint Cultivation of School Enterprises

The principle of taking the whole into zero, from less to more, divided by time is carried out on the joint cultivation of the school enterprises. According to the actual demand, the cultivation objectives and training standards of the enterprise learning stage are determined. Learning courses of study or engineering practice can be divided into different stages as one week to three months to different enterprise, and also can carry out professional practice and engineering practice for three months to one year in the enterprise according to the principle of two-way choice.

In the process of enterprise training, the double tutorial system has been implied. Corporate mentors are provided by enterprises. Tutors by the enterprise and school teachers guide students in the training phase of the study and practice of enterprise. For "industry plan" students, all the practice topics are adopted from practical engineering. The project task needs to be guided by outside experts and teachers, and completed at the enterprise site.

Establishment of School Enterprise Cooperation Alliance

Through the school enterprise alliance, there will be the signing of the alliance agreement or the establishment of the substantive organization. It is possible to establish a project to solve some problems that are urgently needed in the process of production or development of an industry or enterprise, so that students' practical content and the actual demand of industry enterprises are relatively connected [4].

In the process of cooperation with enterprises, it need to pay attention to absorb the enterprise and industry experts to join the professional teaching guide committee, design professional talent training scheme. The practical engineering problems of enterprises in concrete work practice, such as project design, research and development, etc. can be changed into comprehensive design or graduation design. The students who finished the specialized courses and the basic skills training can be absorbed by enterprise to participate in the internship.

Reform of the Assessment and Evaluation System of Industry Personnel Training

With the continuous reform and optimization of traditional teaching content, the curriculum that emphasizes theoretical and applied aspects is added, and the evaluation system should be reformed. The evaluation system must increase the teacher's engineering practice experience. The assessment of students needs to highlight the characteristics of case analysis and practical research.

Increase Experience in Teacher Engineering Practice

In the process of assessment and evaluation of professional teachers in “industry class”, the requirements for the experience of enterprise engineering practice are increased. The professional teachers of "industry plan" require at least half a year's experience in enterprise engineering in terms of title promotion. In the aspect of assessment, the achievements of teachers in engineering project design, patent, production-learning cooperation and technical services are treated equally with the results of theoretical research. In the assessment and all kinds of appraisal, the teachers of the
enterprise engineering practice experience are the priority. The experts in the enterprise and industry are working together as part-time teachers and working in engineering projects, engineering design and other activities with universities and colleges.

**Change the Examination of Pure Knowledge Achievements to the Comprehensive Evaluation System of Knowledge, Ability and Quality**

Because the new energy industry personnel training project emphasizes the cooperation of college and enterprise, it must change the past traditional appraisal way that score decides all. New evaluation should be put forward to strengthen the students' knowledge, ability and quality of the trinity comprehensive performance [5]. In the practice teaching link, we should give full play to the enterprise advantage, arrange excellent engineers as "industry plan" student tutor of enterprise, who do seminar regularly to all the students, and expand enterprise effect in teaching. The students should write the summary report of the practice, and sign the assessment opinion by the person in charge of the internship unit. The college should organize the students to report publicly and evaluate the credit of the qualified students.

**Summary**

Strategic emerging industry talent is an important source of high-level engineering science and technology talents and is an important support force for the development of national innovation-driven development. As an applied university, we have carried on the beneficial exploration based on the profound cooperation in new energy automobile industry personnel training aspects. The recruitment and employment situation is favorable. The cultivation effect was preliminarily revealed. The research results provide experience for other applied universities to train emerging industries.

However, we still have limited understanding of the rules of education. Relevant research and understanding are not deep enough. The key elements of the cultivation of practical talents for the construction of the mentor team and the construction of professional practice base should be improved. The deep cooperative training mode and training mechanism of the real all-round training talents need to be further tested. As applied universities, we must change education idea, further enhance confidence, make full use of the policy opportunities of education development of emerging industry talents, and create a high level, distinctive brand of new industry talents education based on profound cooperation of school enterprises.

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