Exploration and Practice of Collaborative Innovation Education Model for Industrial Robot Technology Major in Higher Vocational Education

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Abstract: As our country enters a new stage of development, the transformation of enterprises is aimed at high-quality development, and enterprises have put forward higher requirements for the quality of talents in higher vocational training. The application of industrial robot technology is an important part of intelligent manufacturing. As a world manufacturing country, my country needs a large number of industrial robot technical talents. How to train high-quality industrial robot technology professionals suitable for the development of enterprises in higher vocational colleges is a major topic in higher vocational colleges; this article analyzes the current problems in the education and teaching of industrial robot technology in higher vocational schools, and discusses the major in industrial robot technology The necessity of developing a collaborative innovation education model finally puts forward a school-enterprise collaborative innovation education model for higher vocational industrial robot technology.

1. Introduction

From the current point of view, the classroom teaching of industrial robot technology in higher vocational colleges is mainly based on theory. The teaching content is relatively boring, and students lack the enthusiasm for learning. In the classroom, students are not very involved, and teachers also lack innovative teaching methods. They still use traditional teaching methods when teaching theoretical knowledge and fail to mobilize students' enthusiasm. As a result, the classroom atmosphere is not active and affects the classroom. Teaching Quality.

2. Failure to Reasonably Balance Internal and External Practices

Students' internship arrangements are mainly divided into on-campus internships and off-campus internships. The internship link in the school is mainly to arrange the practice of theoretical knowledge in a stage through the training classroom provided by the school. The content of the practice is determined by the teacher according to the level of basic knowledge involved by the students, allowing students to combine theoretical knowledge and practice in a timely manner. It has a certain promotion effect for students to deepen their theoretical knowledge, which is difficult to achieve in off-campus practice. But at the same time, due to the limitations of practical content, students will lack practical training closely integrated with the industry. Because the actual handling situations that can be encountered in off-campus practice are diverse, and most situations encountered in the training classroom are within the scope of the textbook. Compared with on-campus practice, off-campus practice is more concentrated in graduation practice, which is to hone the comprehensive learning ability of students in a specific industry, and can better cultivate students' comprehensive ability, which is difficult to achieve in school practice.

At present, the theoretical system of knowledge and the arrangement of the teaching structure of industrial robot technology in my country are still in the process of updating slowly, and as industrial robot technology accelerates with the development of industry, the requirements for the depth of its content are constantly improving. However, according to the actual performance of most graduates in the company, there are still many students who are in a state of confusion in their jobs, and it is difficult to clearly grasp the industry they are good at and the time flow of the

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industry during the job search process. This is mainly because although the school attaches great importance to the cultivation of practice, but ignores the industry's continuous development of new technologies. In addition, the students themselves are not good at summing up their positions in the process of practice.

3. Necessity for the Development of Collaborative Innovation and Education Mode for Higher Vocational Industrial Robot Technology

3.1 Dual Education for Schools and Enterprises

In the process of joint training of talents, most of them take campus learning as the main body. Through the learning of school theoretical knowledge, students can extend the theoretical foundation and have a deeper understanding when participating in the practice of enterprises. At the same time, in the process of students' practice, it is helpful to sort out the logic and problems in the practice process, and clarify the development direction in the future learning process. Schools and enterprises have realized the whole process of training students from theory to practice through dual education, and jointly bear the responsibilities of the cost and teaching content design in the training process.

3.2 Dual Status of Student Apprentice

In schools and businesses, the identity of students has changed. Learn basic theoretical knowledge as a student in school, and learn practical and theoretical knowledge as an apprentice in a company. The surrounding environment and responsibilities faced by students in enterprises have undergone great changes. The learning process of students in enterprises requires self-summarization in practice, while the summary of basic knowledge in school learning is mostly done by teachers. Students enter the company to participate in practice, sign employment agreements, and become constrained and nurtured by the company, that is, they become intern employees of the company.

3.3 School-Enterprise Mutual Employment and Shared Teachers

The dual education of the school and the enterprise requires the teachers of the school and the engineer of the enterprise to have an understanding of each other's surrounding environment, and the two sides need to send relevant and excellent personnel to learn from each other. Specifically, companies need to have a certain degree of understanding of the school’s teaching environment and knowledge system structure to be able to arrange practical content according to the learning conditions of students in each grade, and then companies should regularly arrange first-line engineers to go into the campus learning environment and conduct Lectures help students narrow the distance between theoretical knowledge and practice. The school has a good understanding of the production environment of the enterprise in order to better carry out the practical teaching content in the future teaching, help students to apply theoretical knowledge in practice in the classroom, and have preliminary concepts and operational logic. The mutual sharing of human resources between schools and enterprises has jointly undertaken professional teaching work and better realized the cultivation of industry talents.

3.4 Work-Study Alternate Training Method

In the process of cultivating professional talents, especially the majors where learning theory and practical operation are closely integrated, it is necessary to arrange students to practice in the enterprise in time to realize the actual combination of theory and practice, and help students consolidate basic theoretical knowledge while being able to Accumulate work experience and improve students' practical ability. The arrangement of work-study alternation requires scientific curriculum design and close integration, so that students can gradually realize the natural transformation of classroom and production scenarios.

4. Third, the Specific Methods of Carrying out School-Enterprise Collaborative Innovation Education Mode for Higher Vocational Industrial Robot Technology Majors

4.1 Establish an Effective Operating Mechanism to Enhance the Strength of Teachers

Industrial robotics majors require mutual cooperation between schools and enterprises to establish a perfect talent cultivation model, which should include as much as possible all stages of the student's learning process. Schools and companies can sign an apprenticeship cooperation agreement. Through the agreement, companies can go deep into the process of cultivating talents in schools and help schools sort out imperfect content in the teaching process. In the course of practice, the school can truly grasp the learning situation of students. For the school, excellent talents must not only master theoretical knowledge, but also be good at learning and flexibly applying theoretical knowledge in the process of practice. Through the joint training model of schools and enterprises, each sub-duty finally cultivates outstanding talents. The enterprise establishes a complete team of masters and finally realizes the long-term development of apprenticeship. Through the practical teaching process of masters and apprentices, students can reduce the gap with practice, and finally form an understanding of industry development, which can be based on their own practice. The performance of the school makes up for the lack of knowledge in school learning. For the assessment of practice level, schools and enterprises can establish relevant assessment mechanisms and adopt a two-way scoring method to more objectively assess the results of practice. In addition to practice, for low-grade students who have not yet been exposed to the practical process, the school should also regularly arrange for master representatives to come to the school to give lectures, so that students have a certain understanding of the development of the industry and the direction of demand for talents before contacting industry practices , Establish the learning direction of the industry. Professional committees can be established to strengthen the closeness of joint communication between schools and enterprises, and actively explore the process of talent cultivation between each other to ensure the quality of talents.

The two-way exchanges between the school and the enterprise work together to cultivate and cultivate students. The enterprise selects excellent technical talents, and the school selects excellent scientific research teachers and teaching staff to conduct academic and practical exchanges and feedback. For the apprenticeship training content of students at each learning stage, different masters will be arranged for training according to different student bases, and help students develop suitable practical training courses. For the selection of masters, companies and schools should formulate relevant systems and supporting documents, and regularly assess and give feedback on the results of training, to truly achieve the company’s training and the school’s basic learning are closely combined, and schools and companies play a role in nurturing The different responsibilities among talents eventually cultivate outstanding industrial robot technical talents suitable for enterprise development and social needs. Companies can establish a regular selection team of masters, and update or change the direction of master training and team members through feedback from students and schools. The company's trainers must regularly go to the campus to tell students about the development prospects of the industry and the division of positions in specific jobs. At the same time, teachers must go deep into the practice of the enterprise and fully understand the changes in the actual needs of the industry. Only in the future teaching can the content of education be better adjusted, the core content is supplemented, the gap between students in the practice process is reduced, and the teachers are improved. Time ability and teaching planning ability. The joint of schools and enterprises ultimately practiced the sharing of resources, management, technology, talents and other aspects to cultivate more outstanding talents for my country's industrial robot technology industry, thereby promoting the overall development of the industry.

4.2 Establish a Complete Curriculum System

The main purpose of industrial robot technology is to serve enterprises, while cultivating outstanding industrial robot technology professionals, and to promote the in-depth development of my country's industrialization and intelligence. Therefore, in terms of talent cultivation, the school must build a curriculum system according to the society's demand for industrial robot technology

professionals. The construction of the curriculum system needs to meet the requirements for the cultivation of core competitiveness planned by the school and the branch. The formulation of new content helps teachers to better plan the teaching content, and also allows students to clarify that they need to focus on learning in their future careers. Constantly enhanced content. Specifically, a modern apprenticeship curriculum system can be constructed with four modules and one module. The four modules mainly include literacy modules, basic modules, core modules and elective modules. One module is mainly a professional application module, and the literacy module contains professional skills and other skills, among which other skills, including ideology and politics, laws and regulations, life values, etc., eventually cultivate compound talents with comprehensive knowledge and capabilities. In the process of cultivating outstanding talents, the cultivation of comprehensive knowledge is conducive to students' future development, regardless of environmental constraints, and with a positive and optimistic attitude to invest in the development of industrial robot technology in the motherland. The training needs Throughout all aspects of teaching, gradually and deeply cultivate students' comprehensive qualities. The basic modules mainly include related programming and design languages, industrial robotics technology, advanced artificial intelligence theory, etc. Industrial robotics is a discipline that combines theory and practice strongly, and requires a lot of time to consolidate and deepen the learning of basic knowledge content. In the process of practice, teachers can help students sort out various problems in practice, as well as the design process and logic through the way of teaching and apprentice. With the deepening of knowledge learning, the master can help apprentices plan their future career development, help students make targeted choices for future industries and positions, and then achieve targeted training of talents, and finally realize a sustainable cycle of talent training. The core modules mainly include important professional courses and practical steps in the industry. They are in-depth learning after basic knowledge reaches a certain level, accounting for 40% of the learning career. Elective modules mainly contain additional types of learning content, and are the main way for students to improve knowledge other than basic knowledge. Through the cultivation method of four modules and one module, it is helpful to cultivate compound talents with excellent professional knowledge, comprehensive knowledge and excellent moral character.

4.3 Strengthen Cooperation between Schools and Enterprises

The training of outstanding talents requires the joint efforts of schools and enterprises to finally establish an education model that combines work and learning. The main purpose of the training of school talents is to serve the enterprise, and enterprises want to develop more need excellent talents, the docking of schools and enterprises can help enterprises find excellent technical talents, and promptly integrate them with the business development of the enterprise. Invest in the construction of the industry as soon as possible to inject new vitality into the development of the industry. The mode of combining work and learning requires the division of labor and cooperation between enterprises and schools. Through the cultivation of theoretical knowledge, the school is used to support students' practice so that students can have evidence in practice. Moreover, the company helps students build a bridge between theory and practice through the form of mentoring and apprenticeship, and helps students deepen their theoretical knowledge in practice, and apply theoretical knowledge to life. Through the combination mode between the enterprise and the school, the gap between the development of students and the society is shortened, and it is even possible to start employment after graduation. In the first semester, students’ learning is mainly based on basic knowledge and quality courses. At the same time, the school can arrange relevant industry and enterprise experts to help students understand the development of the industry and the specific needs of the enterprise, so that students have a good understanding of the majors they are studying. A more detailed overall industry perception. In the second semester, after students have a certain basic professional knowledge, they can start basic practical operation training courses. The lecturers of the courses can give professional video lectures and practical observation courses by the practical masters of the enterprise to deepen the students’ professional knowledge. Application consciousness of knowledge. In the third semester, the school can adopt a learning method that alternates between

theory and foundation. The first half of the semester helps students to deepen and lay a solid foundation. In the second half of the semester, they enter the enterprise and start practical courses such as actual programming and simple simulation robot design, so as to realize the transition from student to apprentice. In the course of practice, students need to change the habit of learning theoretical knowledge in class in the past, learn to observe and summarize the experience in practice and combine with theoretical knowledge. In the fourth semester, the content focuses on practical courses such as programming and robot assembly and adjustment. In the fifth and sixth semesters, students mainly focus on the practice of the enterprise. Through practice, they gradually cultivate themselves into talents that meet the requirements of corporate talent recruitment standards. In practice, they gradually cultivate their ideas and logic for robot design, and start an apprenticeship To the transformation of quasi-professionals, and clarify the future development direction in the industry.

5. Conclusion

The design of industrial robots is mainly based on the development of the industry. Different industries require different levels of artificial intelligence and program design. Students need to find an industry suitable for their in-depth development in practice to be able to compete in many industries. Find its own future development direction in the industry. Therefore, it is necessary to strengthen school-enterprise cooperation, closely integrate learning content and practice, make it practical and diversified, and cultivate more outstanding talents.

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