Exploration and research on cultivating intelligent manufacturing professionals based on industry-academia-research platform

Siyang Zhang*, Jing Li, Yu Zhang, Yan Chen, Li Cai
Mechanical and Electrical Engineering Zhixing College of Hubei University Wuhan, China

*Corresponding author: zhangsiyangredsun@163.com

Abstract. Under the background of the construction of "New Engineering", intelligent manufacturing is an important direction of "Made in China 2025". The purpose of this paper is to study the optimization of training system by industry-university-research platform, optimize the way of school operation, update the construction plan of curriculum system, strengthen the construction of special courses, optimize the practical teaching system, expand the new way of training "dual-teacher" practical teachers, and build a platform for sharing the achievements of school-enterprise cooperation.

Keywords: Industry-academia research, intelligent manufacturing, transformation of results, dual-teacher.

1. Introduction

The "Thirteenth Five-Year Plan" clearly puts forward "reform institutions to innovate talent training mode, to guide the promotion of talent training chain and the organic connection of the industrial chain, innovation chain"[1]. Intelligent manufacturing is the main direction of "Made in China 2025" strategy, and it is the core technology to realize the transformation of China from a big manufacturing country to a strong manufacturing country[2-3]. With the implementation of "Internet+" and "Industry 4.0" plan, the demand for intelligent manufacturing professionals has increased, and gradually developed in the direction of composite, application-oriented and innovative, etc. Therefore, a new mode of integration of industry-university-research is urgently needed to provide a good foundation and conditions for the training of intelligent manufacturing professionals[4-6]. Through the mechanism of "innovation education, practical teaching and scientific research for teaching", we can improve the quality and effect of teaching and promote the development and transformation of scientific research projects[7].

2. Training Objectives

The author aims to study a new model of the mechanism of triple integration of industry[8], university and research, which provides a broad technical platform integrating teaching, application and scientific research for the cultivation of talents in colleges and universities, prompting teaching must conform to the trend of intelligent manufacturing development, closely focus on the actual production needs of enterprises, take the transformation of scientific research achievements of enterprises as the goal[9], accelerate the transformation of scientific research achievements to actual productivity, make scientific research achievements used by industry enterprises, transform them into At the same time, in the process of long-term cooperation between the university and the enterprises, the teaching methods and means are constantly improved, and students are trained in engineering practice and design of manufacturing process, so as to form a "community of achievements" for the benign development of the university and the enterprises[10].

3. Cultivation system optimization

Take the intelligent manufacturing major of Mechanical College as an example to explore the cultivation of engineering professionals based on the industry-university-research platform and optimize the cultivation system.

3.1 Update the curriculum building program

The professional teachers of the School of Mechanics discuss with industry experts the new developments and requirements in the field of intelligent manufacturing class technology, and through seminars and exchanges, set up special courses closely related to the production reality and development trend of the industry. The counselor teachers keep in touch with outstanding graduates, pay constant attention to the working status of graduates, and use the winter and summer vacation teachers' team to examine and select the relevant domestic enterprises suitable for cooperation, and in this process understand the knowledge requirements and ability requirements of employers and enterprises for mechanical technical talents, so as to grasp the needs of enterprises and implement the revision of teaching links into the curriculum system. The director of the teaching and research department determines the content of course teaching and competence development for each semester or time period through the study of teaching organization methods.

3.2 Strengthen the construction of special courses

Tracking the latest progress of research and industrial needs in the field of mechanical class technology, scientific research for teaching, updating course content, condensing special courses, improving course structure, and building key courses. Robotics is closely related to the latest frontier of intelligent manufacturing in China, and actively train young teachers to form an advantageous course cluster for the relevant course clusters that we have accumulated in the cross-discipline of mechanical classes and robotics, and start to pilot on the two cross-courses of 3D modeling and robot modeling.

3.3 Optimization of practical teaching system

Relying on off-campus (enterprise) engineering practice bases, students can participate in actual production in enterprises, implement dual-teacher teacher-enterprise engineer docking, conduct production internship, professional internship, and enterprise practical training and graduation design process-oriented practical teaching to improve students' practical hands-on ability.

Continuously expand the construction of practical teaching practice bases to ensure the implementation of the schooling purpose of combining professional construction with production reality, truly realize the combination of practical teaching and basic theory in enterprises, and provide students with a broad practice platform. Enrich the form of practical teaching, through competitions and related research projects, through teachers to guide students to explore the project, such as guiding students to consult data, search literature, determine the technical solutions and related knowledge, master the design and analysis methods, learn software, used to solve various problems, to achieve the purpose of inspiring students to learn independently, to ensure the personalized training of students, while cultivating students' teamwork spirit In addition to ensuring the personalized training of students, students will also develop teamwork, independent work, communication skills, as well as language skills and self-management skills.

3.4 Expansion of new ways to train "dual-teacher" practical teachers

Since 2016, the School of Mechanical Engineering has been sending teachers to enterprises every year during summer vacation in order to improve teachers' practical ability, and so far, six teachers have gone to enterprises for exercise, and their professional skills have been better improved. In the process of school-enterprise cooperation, our college invites enterprise instructors to lecture and guide the practical courses in school, meanwhile, through the process of mutual learning between teachers

in school and enterprise instructors, the focus of teaching in professional practice teaching is adjusted at any time according to market demand. In addition, our teachers will bring graduates into the internship enterprises every year, on the one hand, cooperate with enterprises to co-manage students, on the other hand, they also understand the new technology and new development related to the industry, and learn and master the advanced technology in the enterprises at the right time, fully introduce the latest development and knowledge of the enterprise industry into the classroom teaching, so that students can understand more comprehensively the relationship between theoretical expertise and practical application.

4. Build a platform for sharing the results of school-enterprise cooperation

The integration mechanism of industry-university-research can promote the transformation of scientific research and technological achievements, build a platform for sharing the results of university-enterprise cooperation, promote the sustainable development of education and teaching and manufacturing, effectively combine Internet learning with the practical application of engineering, and establish an operational mechanism for long-term sustainable development.

In the process of integration of industry-university-research, enterprises are the main body of practice and universities are the main body of production-university-research. Only when universities increase the proportion of budget in cultivating applied talents and enterprises increase the investment in cultivating talents in profit, can we guarantee the quality of cultivating applied talents in universities and ensure that enterprises have advantages in market competition. Colleges and universities fully integrate resources within the school, effectively use the national financial funds, set up fruit transfer and transformation cultivation bases in enterprises, give play to the talent advantage and scientific research advantage of colleges and universities, gather talent training and enterprise demand elements, which can realize fruit transformation and cultivate qualified applied talents, and provide guarantee for colleges and universities to better serve the society.

5. Summary

Applied undergraduate colleges and universities are one of the main bodies of general higher education in China. With the development of higher education, the competition for resources has become more and more complicated, and universities pay more attention to cross-industry and cross-regional educational resources in seeking to expand their own development, especially to partner enterprises with good practice environment to achieve a mutually beneficial and win-win situation. Enterprises can realize talent reserve by absorbing high quality talents; universities use cooperative education to save training cost and greatly expand the benefit of talent training. Combining with the national guidelines on the transformation of achievements and the cultivation of applied talents, as well as the actual situation of colleges and universities themselves, we scientifically formulate optimized strategies to increase the cultivation of applied talents, realize the rapid transfer of scientific and technological achievements to productivity, and manifest the effectiveness of colleges and universities in serving the society.

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