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Research on the Construction of Intelligent Manufacturing Collaborative Innovation Center

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Abstract: On the basis of summarizing the problems existing in the construction of collaborative innovation center in China, this paper focuses on the construction objectives, construction planning and construction measures of intelligent manufacturing collaborative innovation center, which has a certain reference value for colleges and universities to build a collaborative innovation center with deep integration of industry and education.

1. Introduction

Under the guidance of our school running strategy of "integration of industry and education, service area and coordinated development", the college of mechanical and electrical engineering focuses on the school running orientation of "local and applied", makes full use of Dongguan's geographical and manufacturing advantages, and meets the talent demand for transformation and upgrading of manufacturing industry. The college has formed distinctive talent training ideas in various majors: guided by the talent demand for the transformation and upgrading of manufacturing industry in Dawan District, especially in Dongguan, aimed at cultivating engineers in intelligent manufacturing industry, focused on the construction of double qualified teachers, and focused on helping the transformation and upgrading of manufacturing industry in Dongguan, so as to improve students' engineering practice ability and innovation ability.

At present, the college has set up Robot Engineering, Automation, Mechanical Design and Automation, Electrical Engineering and Automation and other related intelligent manufacturing majors, has accumulated some practical teaching experience, formed a more reasonable teaching team, and has complete experimental and training equipment. The college takes "high starting point, high standard and characteristics" as the standard, takes advantageous and characteristic disciplines and research bases as the basis, aims at the major needs of regional development strategy, strategic emerging industries and cultural inheritance, takes the construction of intelligent manufacturing collaborative innovation center as the carrier, takes deepening the reform of mechanism system as the guarantee, and effectively supports regional social and economic development as the purpose, and integrates talents, disciplines and scientific research resources, actively promotes the in-depth cooperation between schools and enterprises, establishes collaborative innovation bodies, cultivates a number of collaborative innovation plan projects by batch cultivation and preferential support, and strives to make effective progress in the construction of collaborative innovation centers.

2. Existing Problems

Through the investigation, it is found that there are generally closed, decentralized and inefficient characteristics in the construction of collaborative innovation centers in China, and there are still many problems in improving the collaborative innovation ability and talent training quality of colleges and universities[1][2]. At present, the construction of collaborative innovation center mainly has the following problems.

The operating mechanism lacks policy guidance. The lack of special laws and regulations on collaborative innovation construction leads to the lack of support and guidance for the cooperation among various collaborators, and it is difficult for each other to form a real community of interests[3][4]. The cooperation between our university and industry enterprises mostly stays at the levels of student practice and employment and teacher practice. A more perfect long-term mechanism of industry education integration has not been formed in the aspects of deeper professional collaborative construction, talent collaborative training and technological collaborative innovation.

Lack of motivation for industry enterprises to participate. The cooperation between universities and industry enterprises lacks the mechanism of benefit distribution and risk sharing, and has not formed a collaborative innovation alliance[5][6]. In the process of talent training, the school enterprise cooperation has not realized the deep integration and seamless connection of industry and education[7]. Therefore, the enthusiasm of industry enterprises to participate in collaborative innovation is not high.

3. Construction Objectives

Aiming at serving the transformation of traditional enterprises to high-end manufacturing industry, the intelligent manufacturing collaborative innovation center promotes technological innovation, talent training, promotion and application in a coordinated manner, and provides transformation enterprises with systematic solutions such as industrial robot and intelligent manufacturing production line integration, rapid equipment maintenance and high skilled talent training, so as to solve the technical problems existing in relevant enterprises, To achieve the goal of reducing cost and improving quality. Cultivate a group of innovative and entrepreneurial talents in technical services, system integration and virtual manufacturing, and build a comprehensive center to provide public services such as visits, training and technical skill appraisal for schools, production enterprises and the public.

4. Overall Construction Planning

The intelligent manufacturing collaborative innovation center will play a role in talent training, technological innovation and application services[8]. The overall construction plan is as follows.

(1) Talent training planning

Cooperate with relevant enterprises, schools and enterprises in Dongguan to build an industry education integration base on integrating technology research and development, high skilled talent training, staff training and talent exchange, so as to provide hardware guarantee for talent training[9][10]. Innovate the talent training mode, change the traditional closed and semi closed talent training path of colleges and universities and the decentralized and independent equipment use training system of equipment manufacturers, integrate multiple resources, teachers undertake teaching modules in blocks according to the characteristics and strengths of all parties, and adopt modular and open teaching in teaching methods, Vigorously improve the students' comprehensive practical ability.

(2) Technological innovation planning

Focus on the two core directions of industrial machine system integration and new intelligent manufacturing technology, and promote the construction of four major technological innovations, including precision and stability optimization of industrial robots, and Research on on-line and off-line programming control[11][12]. Ergonomics research, optimize robot human-computer interaction system; Research on universal and modular machine vision system; Research on modularization of intelligent manufacturing production line.

(3) Application service planning

Take the market as the guidance and the project as the carrier to carry out application services, transformation of technical achievements and export of skilled talents. Provide industrial robot application and maintenance services to enterprises.Cooperate with transformation enterprises to develop industrial robot workstation, automatic production line and intelligent manufacturing integration system, provide lean production solutions, and realize "efficiency improvement, personnel reduction and quality improvement". Export high-quality application- oriented talents for industrial robot application and maintenance and intelligent production line integration to employers.

5. Construction Measures

(1) We will deepen the reform of the system and operating mechanism

Strengthen the construction of the internal operation system of the collaborative innovation center, improve the collaborative innovation mechanism and policy guarantee system, give full play to the advantages of various collaborators, and rely on the management of the leading unit to form an independent and relatively independent industry university research institution, so as to promote the collaborative innovation center to become a relative entity. Formulate relevant policies to allow the collaborative innovation center as an entity to apply for scientific research projects and scientific research awards, ensure that the center has autonomy in post setting, resource allocation and financial management, strengthen the supervision of the use of the center's funds and improve the efficiency of fund use. Actively establish a reporting and communication mechanism with government departments, make full use of the overall coordination and guidance function of government departments, and promote the continuous improvement of the long-term operation mechanism of multi-party linkage of "government, school, bank and enterprise".

(2) Strengthen the construction of collaborative innovation team

Continuously improve the comprehensive quality of teachers and the quality of talent training, build a high-quality "double qualified" teacher team integrating theory and practice, establish a training mechanism for teachers to practice in enterprises, encourage teachers of collaborative innovation center to regularly go deep into enterprises to learn advanced technology, and make the school curriculum system closely meet the needs of enterprise production and development. Technical experts in the industry are employed as professional leaders, and the technical backbone of the enterprise is employed as part-time teachers, so that the full-time and part-time teachers of the center can exchange and learn from each other in the process of collaborative work. Enterprises can also hire professional teachers who master the latest technology to participate in the enterprise's technology research and development of new products. Each collaborative innovation center should actively encourage and support personnel mobility and academic exchanges to realize the sharing of high-quality human resources among collaborative innovation subjects.

(3) Establish a scientific and reasonable performance appraisal system

Strengthen the center construction process and target assessment management, and optimize the evaluation mechanism on the basis of establishing scientific talent training, introduction mechanism

and responsibility system. A reasonable evaluation and feedback mechanism is the combustion promoter developed by the center and encourages the collaborative units to make continuous progress. Considering the task as the traction, the innovation and contribution should be put in the first place. The internal mutual evaluation of the center, combined with the evaluation of domestic and foreign peer experts, should break through the single evaluation mechanism based on the number of articles, awards and other achievements, play a guiding and incentive role through the evaluation, effectively create innovative and applied achievements, and promote the sustainable development of the collaborative innovation center.

6. Conclusion

This paper comprehensively analyzes the construction objectives, construction planning and construction measures of intelligent manufacturing collaborative innovation center, which plays a guiding role in building a collaborative innovation center with deep integration of industry and education. Guided by the market demand, the intelligent manufacturing collaborative innovation center integrates schools and enterprises deeply, focuses on the application of automation equipment such as industrial robots, gathers intelligent manufacturing technical talents, constructs a high-quality carrier of industry, University and research, develops and improves the collaborative innovation system and management and operation mechanism, and plays an exemplary role in guiding the application and promotion of regional technology. It will become a model for talent gathering, information exchange The innovation highland of technology integration and the training base of enterprise technical skills talents.

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