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Key Course Group Construction of Intelligent Manufacturing for Applied

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Abstract: This article mainly expounds the intelligent manufacturing theory basis and technology foundation course group construction in the important role of applied undergraduate professional curriculum system, combining the reform of the new round of intelligent industry, on theoretical knowledge taught content at the same time, the core courses and practical application of the teaching content to construct, and explore the construction conform to the concept of the new era of smart manufacturing key lessons Cheng Qun, the introduction of cognition and reconstruction of the teaching theory, make full use of various platforms to help students better meet the requirements of intelligent manufacturing industry talent.

Keywords: Application-oriented university; Intelligent manufacturing; Curriculum group construction

1. Introduction

Intelligent manufacturing has gradually become the biggest advantage and main direction for countries all over the world to seize market opportunities. Taking the development of intelligent manufacturing technology in China as the background, strengthening applied undergraduate education is an important way for China's economic and social development, and plays a key role in the needs of professional degree postgraduates and promoting the quality of higher education and the popularization of higher education. After the 1980s, the development of higher education in China has gradually become international and become the main trend of the new era. The teaching goal is to cultivate innovative and high-quality technicians, integrate theory with practice, pay attention to students' mastery of scientific methods and improve practical ability, and create talents who can fully apply their professional knowledge to their professional social practice. In essence, it is different from academic talents and research talents. The construction [1-2] of intelligent manufacturing key course group needs theory and practice as the foundation, strengthen the construction of intelligent manufacturing key course group, strive to realize the scientization and diversification of key course group construction, and then strengthen the improvement of teaching quality.

2. The goal of intelligent manufacturing key course group construction
2.1. Strengthen the cultivation of practical application ability

The teaching purpose of higher education is to cultivate specialized talents with practical ability. Intelligent manufacturing majors not only need to cultivate professional planning and implementation talents, but also enable them to accurately operate intelligent equipment and intelligent systems. In the actual teaching

process, the basic quality and teaching level requirements of education and teaching are completed through practice. For example, through intelligent manufacturing standard system and system planning, digital workshop system design, automatic production line design, installation and commissioning, industrial robot system application, industrial and agricultural cloud platform planning and design, the comprehensive application ability, preliminary planning and design ability and expansion ability of intelligent manufacturing system can be improved; Industrial software application training, electromechanical integration equipment and system design and application based on Cyber Physical Systems, industrial control configuration, intelligent logistics system and equipment, electrical system automatic control technology training, so as to improve the design, commissioning and application ability of intelligent manufacturing system and electromechanical integration system automatic control.

2.2. Strengthen research on scientific research projects

Scientific research projects can effectively improve students' practical work ability and correct and reasonable thinking ability, and use scientific logical methods to observe, compare, analyze and summarize things. When solving the problem of serious disconnection between talent training and social enterprises, application-oriented [3-4] undergraduate universities can choose the teaching mode of integration of industry and education, school enterprise cooperation and integration of industry, university and research, strengthen the construction of application-oriented undergraduate intelligent manufacturing training environment and platform, establish a scientific research environment, and promote teachers and students to jointly carry out academic research, cooperation and exchange, subject experiment and publication of scientific research results, The innovative design of new mechanical products further shows the scientific research advantages of application-oriented undergraduate intelligent manufacturing specialty, applies the learned knowledge to production practice, and has achieved remarkable economic and social benefits.

3. Current situation of intelligent manufacturing course teaching

At present, the demand for intelligent manufacturing professionals at home and abroad is increasing year by year. The cultivation of talents in China lags behind. Both colleges and vocational and technical schools [5] ignore the output of intelligent manufacturing talents. When colleges and universities with undergraduate education train talents of intelligent manufacturing related majors, most of the teaching objectives focus on the research of principles, and there is little training of practical application skills, which leads to that the training speed of talents of intelligent manufacturing cannot keep up with the social demand for talents.

Enterprises have a situation that talents are in short supply, and managers often say that there is no one available. The problems existing in the teaching of intelligent manufacturing courses are mainly reflected in the following points:

(1) The training of intelligent manufacturing professionals lacks accurate positioning. Some colleges and universities set intelligent manufacturing related courses as auxiliary courses, and have not set up intelligent manufacturing related majors for the time being. Most students are not proficient in applied knowledge.

(2) The practical course structure of intelligent manufacturing specialty is unreasonable. Many colleges and universities have a kind of standard concept in varying degrees. Education and teaching are self-centered, does not pay attention to cultivating students' social applicability, and cannot meet social needs. In terms of curriculum structure, it still focuses on basic knowledge and lacks practical application. The curriculum does not highlight professional characteristics. Some courses change slightly in electromechanical technology teaching courses such as mechanical design, manufacturing and electricity, and some courses lack innovative materials in content.

(3) Teachers need to be improved" "double qualified" teachers are the characteristics and focus of teachers'

team construction in professional colleges and universities. Vigorously cultivating "double qualified" teachers has become a common voice in the social and vocational education circles. However, at present, most colleges and universities have not formed the training concept of establishing "double qualified" teachers, are still continuing the traditional teacher training system, and have not joined the practice system and content and knowledge system, teachers in colleges and universities cannot realize the transformation from knowledge-based to practice-based, and lack industry experience. In addition, the teacher training system and mechanism are relatively imperfect, unable to give full play to the role of the training system and mechanism, which seriously reduces the quality and efficiency of teacher training in professional colleges and universities. In addition, due to the lack of assessment, evaluation, training and training system for teachers, many teachers only learn some theoretical knowledge in the training process, Unable to really invest in enterprises, teachers' enthusiasm to participate in training is low, and many teachers have no time and energy to further study and training due to their heavy workload.

(4) The construction of practical teaching system is not perfect. Compared with other majors, due to the late start and less investment in intelligent manufacturing in China, there are still a series of problems in the training of intelligent manufacturing specialty in colleges and universities at all levels. The form and content of training activities of intelligent manufacturing specialty are relatively thin, the training in schools is not valued, the content is monotonous, and the objectives of professional training are often vague, lack of systematicness, hierarchy, specific operability and specific guidance. The training content and form of intelligent manufacturing specialty should be determined according to the phased specific objectives of the training work. Only when each training work completes a specific training objective, can the effectiveness of the training work be improved and the students' practical ability and comprehensive quality be improved in an all-round way.

4. Implementation strategy of key course group construction of application-oriented undergraduate intelligent manufacturing

Zhou Ji, former president and academician of the Chinese Academy of engineering and director of the national manufacturing Power Construction Strategy Advisory Committee, clearly pointed out that we should unswervingly develop the real economy, unswervingly adhere to the manufacturing power, and unswervingly take intelligent manufacturing as the main direction to promote the manufacturing power strategy. Developing intelligent manufacturing is an important technical way for China to build a manufacturing power strategy. It is particularly important for colleges and universities to carry out the construction of key courses of application-oriented undergraduate intelligent manufacturing.

4.1. Refine the teaching content

After investigating the basis of students, the college optimizes the existing courses such as NC machining, mechanical equipment maintenance, industrial robot application and maintenance and intelligent manufacturing technology according to the actual needs, builds a key course group with application as the link, and fully combines the teaching contents of several courses, so as to better highlight the practicability of intelligent manufacturing courses. Case teaching method can be used to give students space for independent thinking, improve students' innovation ability and the ability to analyze objective problems and put forward solutions. In addition, teachers can also combine with practice, through the application of intelligent manufacturing in life and the appreciation of intelligent manufacturing practice cases, stimulate students' interest in the discipline of intelligent manufacturing, deeply understand the positive role of intelligent manufacturing industry in production, and improve students' learning motivation. For example, a group aims at intelligent manufacturing. Use automation and informatization to realize lean smart factory,

vigorously promote equipment automation, flexibility and intelligent upgrading, realize process transformation, interconnection and sharing of production and management data, and provide customers with customized, interactive and flexible products and services; In the home visiting enterprises, through intelligent industry, agriculture and information construction, we are committed to transforming the traditional production and marketing mode of home textile, building an integrated and interactive platform of automation and information, reducing operating costs, shortening product development cycle, reducing product defective rate, improving the company's output efficiency, and leading home textile enterprises to move forward to intelligent manufacturing.

4.2. Layered teaching and individualized teaching

In the process of building the key course group of intelligent manufacturing for application-oriented undergraduates, professional colleges and universities should take the actual situation of students as the basis, respect the individual differences of students, and carry out differentiated teaching with a targeted aim, so as to ensure that each student can develop his strengths and avoid his weaknesses and make progress for his students. In theory, layered teaching is an effective measure to speed up students' progress, and it is also an effective way to teach students according to their aptitude. In the process of implementing layered teaching, teachers should pay attention to the principle of layered teaching, not only based on students' academic achievements, but also comprehensively consider students' autonomous learning ability and other factors to carry out layered teaching for students, such as: students with solid foundation, strong acceptance ability, correct learning methods and excellent achievements can be divided into a group; Students with general foundation, acceptable ability, self-conscious learning and certain ambition are divided into a group. In view of the differences in thinking development level and cognitive structure of students at different levels, establish different educational objectives and adopt different teaching methods, so that each student can get good opportunities for development.

4.3. Strengthening the construction of teaching staff in colleges and universities

First of all, formulate a comprehensive training plan and make corresponding system settings, including training contents, training courses and training objectives, so that teachers should not only receive professional theoretical knowledge training, but also master certain professional skills related to intelligent manufacturing, implement classified training for each teacher, and make overall management and planning in combination with the real situation of teachers. Clarify the key points of teachers' skill training, and carry out skill training and practical ability training. Secondly, we should strengthen the integration of information technology and teacher training, improve the quality and efficiency of training, keep pace with the Internet plus era, develop mod and micro courses by using information technology, implement training in many forms such as off-line production, on-the-job, online and offline training, and meet the needs of teachers' diversification and individuation in the process of information technology and teacher training. Then improve the enthusiasm of teachers to participate in training.

4.4. Effective training and teaching

Professional colleges and universities should highlight the practicality of intelligent manufacturing curriculum system, enrich training forms, strengthen the construction of on campus training and off campus base, and improve the teaching ability of training teachers. under the guidance of "full practice" education system, they should give students more training time and opportunities, and actively organize students to carry out internships, training, social practice and other activities. Prevent training from becoming a mere formality. In addition, we should also pay attention to the diversification of training forms and let students accumulate valuable experience in practice according to its future development direction. For example,

organize activities, on-site research, social research, project activities, etc., so that students can really learn knowledge and gain happiness from practical training, so as to lay a solid foundation for formally entering the society and engaging in intelligent manufacturing related majors in the future. Intelligent manufacturing has strong applicability and practicality, so the training work is very important for students. It can help students form an independent character, improve their practical ability, significantly enhance their comprehensive quality and skill level, and the knowledge and skills learned in the training work.

4.5. Implement diversified assessment mode
Changing the previous single assessment mode, combined with diversified forms, it can comprehensively assess the whole process performance of students and give comprehensive evaluation. For example, the theoretical module is mainly closed book, sometimes in the form of open book examination, thesis and defense, investigation report, etc. The skill module is mainly process assessment, sometimes in the form of experimental design, practical creation, hands-on operation and more.

5. Conclusion
Through the construction of the application-oriented undergraduate intelligent manufacturing key course group, students can better carry out the learning of professional knowledge related to intelligent manufacturing, mobilize students' learning initiative, and lay a good foundation for future course learning. While teachers constantly innovate teaching methods and improve their teaching level, the society should strengthen the cultivation of students' autonomous learning ability, effectively stimulate students' interest in learning, and improve students' innovative spirit and practical application ability.

Disclosure statement

The author declares no conflict of interest.

Author contributions

Zhu-qiao Ma constructed the paper independently.

References

[1]   Yu H, 2021, Research on Curriculum Construction and Application in Colleges under Blended Learning. International Journal of Continuing Engineering Education and Life-Long Learning, 31(1): 1.

[2]   Cao J, 2019, Research on Talents Training of Productive Service Outsourcing under Intelligent Manufacturing.

[3]   Hu R, 2021, Course Setting and Optimization of Public Mathematics in Local Application-Oriented Universities—Taking Sichuan University of Arts and Science as an Example. Open

Access Library Journal, 08(2): 1-9.

[4]   Wei S, Branch Z, 2020, University B N. Exploration and Practice of Application-oriented Talent Training Mode of Real Estate Industry. Education Teaching Forum.

[5]   Chen C, Wang C, Hou J, et al., 2021, Research on Training-mode of Intelligent Technical Talents in the Local Application-oriented University. CIPAE 2021: 2021 2nd International Conference on Computers, Information Processing and Advanced Education.