Exploration on reform of college machinery major under intelligent manufacturing environment

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Abstract: Manufacturing industry is one of the important industries of national economic development, and with the support of advanced technology, intelligent manufacturing has become the direction of the development of world manufacturing industry in the new era. The future employment of machinery professionals is related to the development of manufacturing industry, so combining with the intelligent manufacturing environment, it is of vital significance to explore the reform of college machinery majors. Based on the intelligent manufacturing environment, this paper analyzes the teaching status quo of machinery majors in colleges and universities, and then puts forward specific countermeasures against the status quo for reference.

Key words:
Intelligent manufacturing; Universities; Mechanical major; Reform significance; Countermeasure

Introduction: Intelligent manufacturing integrates automation, intelligence and information technology into one, which can be said to be the inevitable result after the development of information technology to a certain extent, realizing the deep integration of advanced science and technology and manufacturing industry, and becoming the core of "Made in China 2025". The manufacturing industry occupies a basic position in the national economy, and in the process of turning to intelligent manufacturing, it also puts forward new requirements for higher education. Mechanical major is the cradle of cultivating talents in this field, and it is also one of the permanent majors in colleges and universities. In order to better cope with the "Made in China 2025" and train more intelligent manufacturing talents, the focus of this time is on the teaching reform of college machinery majors to meet the needs of the new environment.

I. The teaching status of machinery majors in colleges and universities under the intelligent manufacturing environment

1. Weak enterprise cognition and lack of talent resources

Manufacturing industry is one of the pillar industries in China, which involves a wide range of fields, which results in extremely fierce market competition, and enterprises are hoping to occupy a place in the market where there are many excellent enterprises. Some enterprises believe that as long as it is related to the Internet, it can be included in the category of intelligent manufacturing. In the lack of a clear mechanism for talent selection, it is impossible to select talents who truly meet the development of enterprises. In addition, for the development of enterprises, machinery related positions are best for high-quality talents, in order to promote the development of enterprises, but the college students just graduated because of the lack of practical experience, in the practical aspect of lack.

2. Personnel training lags behind, unable to respond to demand

Mechanical teachers in colleges and universities are mostly graduates of this major, and some of them are foreign teachers hired by schools. However, because the teachers have been teaching in the front line for a long time, there is not enough time to practice in the enterprise, so their practical skills are often in a state of lack. Based on the background of "Made in China", many colleges and universities are not perfect in terms of policies, talent training goals and teachers, so students will eventually have insufficient practical skills and be out of touch with the actual needs of enterprises. To be specific, it is reflected in the following aspects: First, most of the teachers' lectures are basic knowledge, such as concepts or formulas, which are not relevant enough to enterprise practice. At the same time, there is a lack of case content in new technology, and more teaching cases that can reflect intelligent manufacturing are added, resulting in less cognition of the current development of the mechanical field; Second, some colleges and universities in the expansion of enrollment and subject Settings there are shortcomings. As many teachers remain at the theoretical level in terms of professional skills, it leads to the lack of scientific and feasible implementation of enrollment expansion or personnel training, and the chain effect is the shortage of teachers in schools and the low quality of personnel training. Mechanical major is a typical engineering major, although the scale of engineering professionals in many colleges and universities has been expanded, but because of the above problems, it is difficult to solve the problem of disconnection between manufacturing talents and reality from the root; Third, at this stage, the intelligent manufacturing industry is developing very rapidly, if colleges and universities are still based on the original talent training program, do not make any adjustments, it will be difficult to meet the demand for talents. In fact, some colleges and universities because of the lack of market experience of teachers, or lack of professional demonstration, it is easy to make the talent gap of enterprises larger.

3. Single teaching model and insufficient student practice

As mentioned in the above content, due to the influence of many factors in school teaching, students cannot understand the needs of the market. At the same time, because students can not grasp the dynamics of market development, personal cognition and employment planning are also insufficient, and the sense of employment crisis is obviously insufficient. In this context, students will not actively participate in the school's practical training, focusing on cultivating their practical ability.

II. Under the intelligent manufacturing environment of college machinery professional reform countermeasures

1. Identify the goal of talent training

In order to develop clear, reasonable and in line with the needs of the job market for talent training objectives, the school must clarify the professional ability requirements of the enterprise for each professional talent, and then work out an evaluation index system suitable for the professional quality needs of college students. First of all, colleges and universities should have a deep understanding of the development trend of the manufacturing industry and the demand trend for talents, which requires the competent employment departments of colleges and universities to go deep into the grassroots level of enterprises for personal practice and field visits. Take Liaoning Province as an example, in recent years, vigorously promote the innovation and transformation of resource-based cities, the proportion of new industries continues to rise, located in Shenyang-Anshan - Fushun national old industrial zone, resource-based cities industrial transformation and upgrading demonstration zone, is gradually building a number of industrial chains, including: equipment manufacturing, a new generation of information technology, energy conservation and environmental protection industry chain. In the emerging trend of traditional industries, colleges and universities should strengthen the use of the Internet of Things, cloud computing, big data technology and industrial robots for mechanical talents, so as to firmly target the purpose of talent training, so that mechanical majors can better meet the needs of the work market for talent development and improve their professional quality and level. Secondly, colleges and universities should build targeted, clear and complete talent quality evaluation indicators from many aspects according to the differentiated needs of the industry for various disciplines. For the traditional mechanical majors, it is necessary to accurately recognize the needs of the new era and clarify their own position. Taking "material forming and control" as an example, as new materials have been more and more used in various industries, and the adjustment of the industrial structure of the domestic new material industry has a close relationship with the development of new equipment and new science and technology. And proficient in polymer material forming and control technology of high-level scientific and technical personnel, is the current job market hot candidates. Colleges and universities can start from the perspective of new materials, introduce the knowledge and technology of new materials into the comprehensive quality index of graduates, and enhance their competitive advantages in enterprises. Finally, according to the relevant index system, colleges and universities can improve their own majors, so that their educational purpose can match the needs of students' career development and work, and can keep up with the development trend of the industry, and constantly adjust and optimize their own talent training goals.

2. Deepen school-enterprise cooperation

Colleges and universities should strengthen cooperation with enterprises, effectively carry out the construction of internship bases, and carry out strategic cooperation with enterprises to ensure that students have more practical opportunities. At present, many colleges and universities have carried out exploration in this way, and achieved certain results. Taking Shandong University of Science and Technology as the research object, through the joint with a production enterprise in Shandong, the use of its own mechanical engineering technology, the enterprise's production equipment and advanced technology into the school's curriculum, the training of students' professional quality and the school's curriculum teaching and personnel training plan are closely linked, so as to effectively promote the cooperation between schools and enterprises. So that the recruitment of the school and the recruitment of the enterprise at the same time. However, for the current colleges and universities, most of the cooperation between schools and enterprises still stays at the level of recommending outstanding graduates to relevant enterprises for internship training.

The advantages brought by further deepening the cooperation mechanism between universities and enterprises are mainly reflected in the following two aspects: First, it can highlight the practical training link and give play to the role of practical training. Practical training can be divided into two parts, one is to take the enterprise as the home field, after the establishment of cooperative relationship between school and enterprise, the school can allow teachers or students to practice in the enterprise and observe the production on the spot. In addition, a campus training base can be set up. Colleges and universities are responsible for providing the site, while enterprises are responsible for the output of equipment, technology and professional personnel. Teachers and professional personnel can play a guiding role in this process, so that students can be associated with some jobs in the actual work of enterprises in school. Second, we can learn from Germany's dual-track engineering education model, and improve it according to the practice of schools and enterprises, requiring students to complete all the public basic courses in the first two years of college, and then carry out further specialization in the third year, on the basis of full understanding of the major, so that students can according to their actual situation, Choose the major suitable for them and interested in them. In addition, in the teaching of this major, we should take the initiative to arrange students to practice in enterprises, so that they can closely connect the theory they have learned with the practical work, so as to improve their practical skills and creative ability.

3. Improve the teaching objectives of mechanical majors

From the point of view of the current teaching goal setting of colleges and universities, although most colleges and universities are trying to combine reality as much as possible, there are still few goals related to intelligent manufacturing, which is extremely unfavorable to the reform of mechanical majors. As the situation of graduates is different every year, the market demand is constantly changing, so colleges and universities will be combined with the employment situation of graduates to estimate the market demand, in order to optimize the training program of new students. In order to meet the needs of the market, some top universities in China have opened intelligent manufacturing majors, such as Beihang University or North China Electric Power. These schools have intelligent manufacturing majors.

Machinery majors can refer to the target content of these schools when setting teaching goals, and integrate intelligent requirements into talent training, such as students need to have the ability of computer, automation technology, big data analysis, supply chain management, etc.; Be skilled in robot operation; Can analyze and process production data; Learn to apply big data technology to effectively extract information, etc. Based on this, the intelligent manufacturing major aims to cultivate high-quality applied talents with various abilities under the integration of machinery, information and other disciplines, who are competent for the research and development of a new generation of intelligent products and production lines in the manufacturing industry. Intelligent manufacturing is a new specialty in recent years, and the market effect achieved by talent training takes a certain period of time to appear. Although many colleges and universities have set up this major, but because of the different development of schools, there are also obvious differences in the goal of talent training. At present, the number of graduates majoring in intelligent manufacturing is scarce. Whether the knowledge reserve and skills of graduates can meet the development of intelligent manufacturing field and whether the talent training program needs to be optimized needs to be considered by the final feedback of the market.

4. Strengthen students' practical ability

Due to the lack of laws and regulations and the lack of active participation of most enterprises in the training of applied technical talents, a comprehensive examination, research and competition for students is to guide students to participate in practice, so that they can improve their professional ability through practice. At this stage, the mechanical vocational qualification examination and practical activities should be based on the development of the industry, observe the application of science and technology in the development of the mechanical field, but also understand the market demand for talents. Colleges and universities should not only train talents with solid theoretical knowledge, but also devote themselves to improving their practical ability, and can train them regularly. In addition, in order to deepen students' awareness and make them pay attention to the improvement of their practical ability, schools can also include whether students have passed the grade certificate into the teaching plan, and link it with credits, so as to encourage students to actively participate in the examination of vocational certificates. In addition, colleges and universities can also hold different types of practical activities, from the campus to outdoor, from indoor to outdoor, so not only for the school to get honors, but also to stimulate students' interest, so that their learning ability to improve.

Conclusion: In summary, intelligent manufacturing is the direction of China's future industrial development, and it is also the inevitable development of science and technology in the new era. The wide range of employment of mechanical professionals has played a vital role in the development of manufacturing industry. After explaining the significance and present situation, this paper puts forward some countermeasures for the teaching reform of machinery specialty in colleges and universities, hoping to improve the talent training system of colleges and universities. In general, through the teaching reform of mechanical majors, we hope to make up for the shortage caused by the imbalance of talent structure to a certain extent, and finally achieve the balance of industrial talent supply and demand.

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