

Exploration and Practice of Innovative Mechanical Talent Cultivation Mode by Industry-Education Integration under the Background of New Engineering Science

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Abstract: With the deep development of the global economy and the continuous improvement of the industrial structure, colleges and universities have carried out research on the integration of industry and education in the field of new engineering disciplines. At present, China is in an important period of industrial system reform and modernization, and is in urgent need of high-quality mechanical technical talents. However, at present, the cultivation mode of China's mechanical professionals can not fully meet the needs of modern industrial development, and there are problems such as the disconnection between theory and practice, and the lack of innovation ability. Under the background of the new engineering discipline, the research and practice of the innovative talent cultivation mode of industry-teaching integration has both great theoretical value and great social significance.

Keywords: New engineering; Integration of industry and education; Mechanical talents; Cultivation mode; Exploration and practice

1. Introduction

The core purpose and task of this paper's research is to systematically explore the role and practical significance of the integration of industry and education on the innovation mode of talent cultivation in China's mechanical industry in the context of new engineering education. This paper aims to explore the differences between new engineering education and traditional engineering education. On this basis, through the combing of related literature, the theoretical basis of the integration of new technology and industry-education is systematically sorted out, and the empirical research is adopted to analyze the current situation and existing problems of talent cultivation in China's mechanical manufacturing industry and, on this basis, to design a targeted innovative cultivation mode.

2. Integration of industry and education in the context of new engineering disciplines

2.1 Concepts and characteristics of the new engineering disciplines

The new era of engineering education, represented by the new engineering discipline, emphasizes the integration of industry and education, innovation-driven and practical. It breaks through the boundaries of traditional engineering fields and provides interdisciplinary research to solve increasingly complex engineering problems. New engineering is characterized by an emphasis on students' innovation and hands-on ability, so that students have both solid theoretical knowledge and strong ability to solve practical problems.

In terms of the education model, it emphasizes the integration of industry and education and the in-depth cooperation among enterprises, colleges and universities, and research institutes. Such a cooperative learning model not only provides students with abundant internship opportunities, but also facilitates the transformation and application of scientific research results. For example, Stanford University has a close partnership with many technology companies in Silicon Valley, which provides students with many internship and work opportunities while promoting technological innovation and industrial development. In addition, New Engineering emphasizes the cultivation of students' innovative thinking and interdisciplinary integration ability. Students are encouraged to take the initiative to explore and work in teams to solve practical problems by means of thematic research and problem-oriented learning. This not only enhances students' interest in learning, but also cultivates their team spirit and communication skills.

2.2 Connotation and mode of integration of industry and education

The integration of industry and education is an important element of the deep collaboration between industry, academia and research. It breaks through the traditional teaching mode and imports the needs, technologies and resources of the industry into the teaching process, making it possible to seamlessly integrate teaching with the industry. The implementation of the new engineering discipline can cultivate students'

practical skills as well as their working ability, and promote the innovation and development of enterprises. There are various forms of integration of industry and education, such as school-enterprise cooperation in running schools, integration of production and learning, and order-based education. These three modes are all centered on the combination of industry-academia-research, with industry-education as the core to provide high-quality talents for the society.

The integration of industry and education is an effective way to solve the contradiction between the supply and demand of talents. With the rapid development of science and technology and the increasing optimization of industry structure, the requirements of enterprises for talents are also changing. In addition, the integration of industry and education can grasp this change in time and adjust the direction and content of talent development in a timely manner, so as to better meet the needs of the market. Through the introduction of industrial resources and scientific and technological means, the hands-on ability and innovation ability of students can be cultivated to better meet the future employment needs.

3. Innovative Mechanical Talent Cultivation Mode by Industry-Education Integration under the Background of New Engineering Science

3.1 The current situation of mechanical personnel training

At present, the training of China's mechanical professionals and technicians is facing many problems. In the context of scientific and technological progress, industrial structure optimization, the requirements of the mechanical industry for talents have undergone a great transformation. However, the traditional way of mechanical professional training focuses more on the teaching of theoretical knowledge and ignores the cultivation of students' hands-on ability and creativity. Therefore, many mechanical students, it is difficult to adapt to market demand. According to relevant data, in recent years, the shortage of talents in the field of mechanical engineering in China has been on the rise. On the one hand, the demand of enterprises for mechanical and electrical professionals is increasing, on the other hand, the employment situation of mechanical graduates is not optimistic. This phenomenon reflects that at present there is a large gap between China's mechanical professional training and market needs.

3.2 The implementation path and measures of innovative mechanical personnel training mode

First of all, it is necessary to clarify the current situation and existing problems of the training of mechanical professionals in China. Statistics show that the traditional mechanical professional training mode has the problem of focusing on theoretical teaching and light on practical operation ability. This makes it difficult for many graduates to quickly adapt to the new environment, and even more difficult to achieve excellent results in practical work. Therefore, the innovative mechanical professional training mode should focus on cultivating students' hands-on ability and innovative thinking. Secondly, in terms of the realization of the way, we can learn from the German "dual system" education model, so that the combination of school and enterprise, production, learning and research. Students can not only carry out theoretical learning in school, but also through the introduction of project learning and problem-oriented learning and other advanced teaching methods to stimulate students' interest in learning and innovative thinking. Establish school-enterprise cooperation practice bases to increase students' opportunities for internship. On this basis, students are encouraged to actively participate in innovative practical activities by carrying out various kinds of innovative competitions and scientific research projects and other activities. At the same time, it is necessary to strengthen the construction of the teaching team, introduce the teaching team with rich practical experience and strong innovation ability, and strengthen the guidance for students.

4. Exploration and practice

4.1 Specific application of industry-education integration in the cultivation of mechanical talents

Under the background of new engineering, the specific application of industry-teaching integration in the cultivation of mechanical professional talents is reflected at the following levels. First, the integration of industry and education should be reflected in the design of the curriculum, which requires universities and enterprises to jointly design the training program and combine the actual needs of enterprises with teaching. For example, a well-known engineering company and a university offer an advanced manufacturing technology course, which is closely related to the actual production process of the enterprise, so that students can have direct contact with the latest production technology. In this way, it can not only improve students' practical operation ability, but also provide enterprises with talents who have practical working experience. Secondly, the concept of "integration of industry and education" runs through the whole process of internship and practice. Schools and enterprises jointly create internship and training facilities so that students can experience a real working environment. According to statistics, a university and a number of mechanical enterprises have joined hands to provide internship opportunities for hundreds of students. In the process of internship, students not only participate in production practice, but also get professional training from enterprises. This mode of internship training can effectively shorten the adaptation period of college students from campus to society and enhance their

competitiveness in employment.

At the same time, the "integration of industry and education" also enables the combination of research and teaching. Researchers from universities and enterprises can cooperate in research programs and transfer the latest research results to teaching. For example, a university has cooperated with an enterprise to develop a new type of mechanical material with excellent mechanical properties and environmental performance. This research will provide students with direct participation in experiments and research opportunities, which will deepen students' understanding of specialized knowledge and cultivate their innovative thinking and hands-on ability.

4.2 Practical cases of innovative mechanical personnel training model

Under the background of new engineering, the emergence of China's mechanical professional talent training mode has brought new vitality to the development of China's mechanical industry. Through the integration of industry and education, resource sharing and complementary benefits have been realized, and an advanced training base for mechanical professional and technical talents has been formed. The base has advanced mechanical equipment and experimental facilities and employs engineers and technicians with many years of practical working experience as teaching guides. Students have the opportunity to learn about the latest mechanical engineering technology and participate in the latest research and development, thus improving their hands-on ability. The results of the study show that the students trained in the way of industry-teaching integration are able to adapt to the work of the enterprises faster after their graduation and have stronger innovation and problem-solving abilities. At the same time, through such a cooperative approach, for the scientific and technological progress of enterprises, enterprises to deliver all kinds of high-quality mechanical talents. At the same time, in this course, the educational concept of integration of industry and education is put forward, which focuses on the connection of theory to practice and the cultivation of students' hands-on ability. Such teaching concept not only meets the demand for talents in the new engineering era, but also lays a good foundation for students' future career development.

4.3 Analysis and evaluation of practice effects

In the analysis and assessment of the actual effect, a variety of methods and means were used to comprehensively and deeply analyze the effect of the implementation of the innovative mechanical talent cultivation mode. First of all, a large number of surveys and researches have been carried out on the students' academic performance, employment situation, enterprise feedback and so on. After statistical analysis, students not only have a better grasp of the basic knowledge, but also in the practical ability, innovative consciousness and other aspects have been significantly improved. Secondly, industry experts and scholars were invited to evaluate this model, which is considered to focus on theory and practice, and is conducive to the improvement of students' comprehensive quality and the cultivation of innovation ability. Finally, the significance and feelings of the model for students were understood through questionnaires and interviews. In order to further verify the effectiveness of the training mode in practical application, this paper selects some representative practical application cases for in-depth analysis. For example, taking a machinery manufacturing enterprise as an example, using the method of integration of industry and education, the actual needs and problems of the enterprise are brought to the classroom, so that the students can improve their practical ability while solving the actual problems, and also bring real economic benefits to the enterprise.

5. Conclusion

In summary, under the background of the new engineering discipline, strengthening the integration of industry and education and carrying out the innovation of the training mode of mechanical professional talents is the key to improving the quality of talent training and promoting the development of the industry. On this basis, by researching the training mode of mechanical specialty, it can provide more high-quality professional technicians suitable for the market needs for enterprises, and also promote the integration of industry and education to achieve a win-win situation. For this reason, the integration of industry and education should be strengthened, and the reform of professional education should be carried out, so as to provide more high-quality professional and technical personnel for China's machinery industry. Future research should further deepen the research and practice of industrial education integration model, with a view to contributing to the cultivation of high-quality mechanical professionals.

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