

Research on the Cultivation Mode of Mechanical Applied Talents Based on the Integration of Industry, Education and the Collaborative Education Mechanism

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Abstract:

With the rapid development of China's economy and society, the transformation and upgrading of the manufacturing industry is accelerating, and the demand for mechanical applied talents is increasing. However, in the process of training, the traditional education mode often has problems such as disconnection between theory and practice and lack of innovation ability, which is difficult to meet the industrial demand for high-quality applied talents. As a new talent training mode, the mechanism of industry-education integration and collaborative education aims to realize the organic connection of education chain, talent chain, industrial chain and innovation chain through school-enterprise cooperation and school-local combination, so as to cultivate high-quality applied talents to meet the needs of industrial development. This paper discusses the importance of the mechanism of industry and education integration and collaborative education in the training of mechanical applied talents, analyzes the problems existing in the current training mode, and puts forward corresponding improvement measures, aiming to provide reference for cultivating high-quality mechanical applied talents to meet the needs of society.

Keywords:

Integration of Production and Education, Collaborative Education Mechanism, Mechanical Applied Talents, Training Mode

1. Introduction

In recent years, the Chinese government attaches great importance to the integration of industry and education and collaborative education, and has introduced a series of policies and measures to promote school-enterprise cooperation and the school-local integration. In this context, the research on the training model of mechanical applied talents has become the focus of academic and practical circles. This research takes the

training of mechanical applied talents as the research object, and discusses the training mode of mechanical applied talents based on the integration of industry and education and collaborative education mechanism, aiming to provide theoretical guidance and practical reference for the training of mechanical applied talents in China.

2. The Importance of the Mechanism of Production and Education Integration and Collaborative Education in the Training of Mechanical Applied Talents

The mechanism of industry-education integration and collaborative education combines the actual needs of enterprises with school education, so that talent training is more close to industrial development. Through enterprise participation in curriculum, teacher training, practice and other links, improve students' practical ability and comprehensive quality, and cultivate high-quality applied talents who meet the needs of enterprises. It is helpful to strengthen school-enterprise cooperation and realize resource sharing and complementary advantages. Enterprises can solve the problem of talent shortage; the school can improve the teaching quality and scientific research level. It helps to promote the technological innovation and industrial upgrading of the machinery industry. Through school-enterprise cooperation, the school can timely understand the development trend of the industry, adjust the professional Settings and curriculum system, cultivate talents with innovative spirit and practical ability, and provide intellectual support for the development of the industry [1]. It helps to improve students' competitiveness in employment. During the school period, students have participated in enterprise projects, internship and training and other activities, which have accumulated rich practical experience, improved their comprehensive quality, and laid a foundation for the smooth employment after graduation. It will help to promote education reform and improve the quality of education. In the process of talent training, the school constantly optimizes the curriculum and teaching methods, strengthens practical teaching, improves students' innovation ability and practical ability, so that the education is more in line with the social needs. It is helpful to cultivate interdisciplinary talents with interdisciplinary and cross-disciplinary knowledge. During the school period, students can participate in enterprise projects, internship and other activities, have access to the knowledge and technology in different fields, improve their comprehensive quality, and lay a foundation for future career development. As shown in Figure 1, the current mechanism of industry and education integration and collaborative education exist in the training of mechanical application-oriented talents, such as inaccurate orientation of training objectives, derailment curriculum system and industrial demand, single and backward teaching methods, insufficient professional quality of teachers, and insufficient construction of practical teaching platform.

2.1. The positioning of the training target is not accurate

Some colleges and universities fail to fully consider the industry development trend and market demand when setting the training objectives, which makes it difficult for the trained students to meet the actual needs of enterprises [2]. The training goal setting of some colleges and universities is too broad and lack of pertinence, which leads to the insufficient in-depth training of students in professional knowledge and skills.

2.2. The course system is derailed from the industrial demand

The curriculum of some colleges and universities fails to timely follow up the industrial development and technological progress, resulting in the disconnection between the teaching content and the practical application. Some courses are repeated and fail to be effectively integrated, leading to the increased burden of students and poor learning effect.

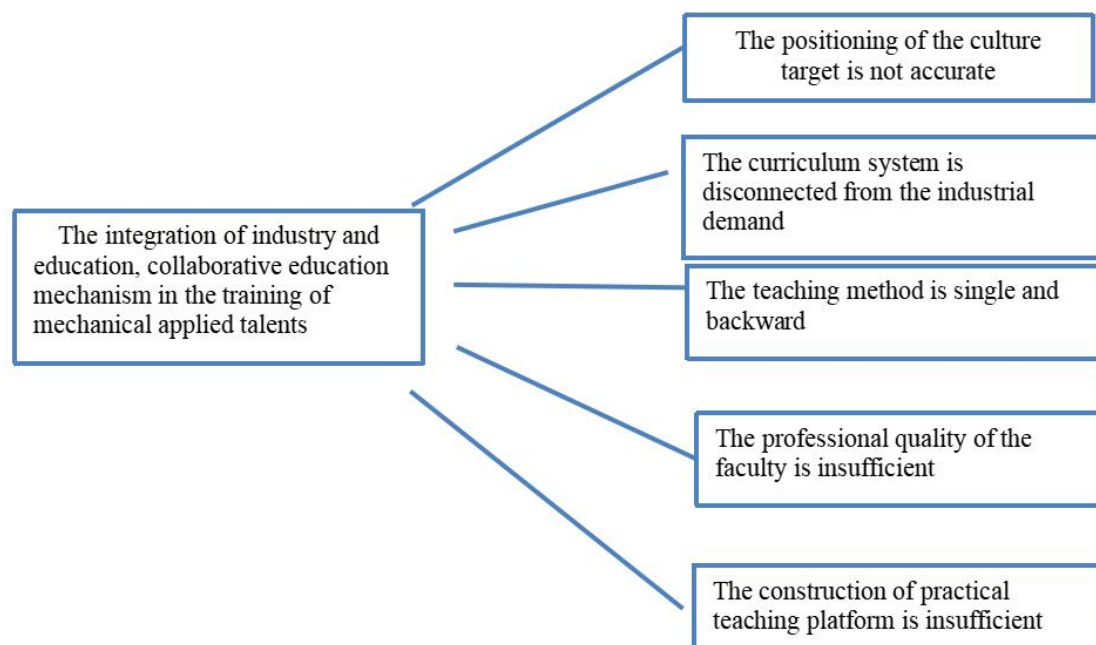


Figure 1. Problems existing in the mechanism of industry-education integration and collaborative education in the training of mechanical applied talents.

2.3. The teaching method is single and backward

Some colleges and universities still mainly teachers, students passively accept knowledge, lack of interaction and practice. Some colleges and universities fail to make full use of modern educational technology, innovate teaching methods and improve the teaching effect.

2.4. Insufficient professional quality of the teaching staff

In some colleges and universities, the proportion of teachers with practical work experience is relatively low, which is difficult to meet the needs of applied talents training. Some teachers fail to update their professional knowledge in time, resulting in backward teaching content and teaching methods.

2.4. Insufficient construction of practical teaching platform

Insufficient practical teaching resources in some colleges and universities are difficult to meet the practical needs of students. The practice teaching system in some colleges and universities is not perfect, lack of systematization and coherence, which leads to the poor training effect of students' practical ability.

3. Based on the Integration of Industry and Education and the Collaborative Education Mechanism

3.1. Repositioning of the culture objectives

3.1.1. Determine the training objectives according to the industrial needs

In-depth research on the development trend of the machinery industry, understand the characteristics of enterprises' demand for talents, and ensure that the training objectives are synchronized with the industrial development. Analyze the supply and demand situation of talents in the industry, clarify the skills and quality that the training target should have, and improve the pertinency and practicability of talent training [3]. Combined with the school's own advantages of the school, optimize the training objectives to form characteristic mechanical applied talents.

3.1.2. Emphasize on the cultivation of application and innovation ability

Pay attention to practical teaching, improve students' practical ability and the ability to solve practical problems. Strengthen school-enterprise cooperation, provide students with internship, practical training, employment and other opportunities, and enhance students' professional quality. Encourage students to participate in scientific research projects, and cultivate students' innovative consciousness and innovative ability. Innovation and entrepreneurship courses are offered to cultivate students' entrepreneurial spirit and entrepreneurial ability. We will strengthen the construction of teachers and improve their application-oriented teaching ability and innovation ability.

3.2. Optimization of the curriculum system

3.2.1. Docking of curriculum setting and industrial needs

Communicate with enterprises and industry experts, understand the knowledge, skills and quality required by mechanical applied talents, and ensure that the curriculum is closely connected with the industrial needs. According to the needs of the industry, adjust the curriculum, increase the courses closely related to the industry, such as intelligent manufacturing, robotics technology, numerical control technology, etc., to improve students' practical ability and innovation ability. Combined with the industrial development trend, timely update the course content, introduce new technology, new process, and new methods, to ensure that students learn knowledge to keep pace with The Times [4]. Assess the course regularly, constantly optimize the course setting and improve the course quality according to students' feedback and enterprise evaluation.

3.2.2. Increase the proportion of practical courses

In the curriculum system, the proportion of practical courses, such as experiment course, practice course, practical training course, is increased, so that students can master knowledge and skills in practice. Cooperate with enterprises to provide students with internship and practical training opportunities, so that students can exercise themselves in practical work and improve their competitiveness in employment. Combining with school characteristics and industry needs, we should develop targeted practical curriculum resources, such as case teaching, project teaching, etc., to improve students' practical ability. Assess the practical courses and pay attention to the students' performance in the practice process to ensure the effect of practical teaching.

3.3. Reform of teaching methods

3.3.1. Introduce project-based teaching, case teaching and other methods

Taking the practical engineering project as the background, the theoretical knowledge is combined with the practical operation, so that the students can master the necessary skills of the mechanical applied talents in the process of completing the project. Cooperate with enterprises to jointly develop the project courses to ensure that the project content is consistent with the actual needs. The course content is decomposed into several projects, and each project corresponds to certain knowledge points and skill requirements [5]. Guide students to cooperate in groups, complete the project together, and cultivate students' teamwork ability. The quality of project completion, teamwork, innovation consciousness and other aspects. Through the analysis of typical mechanical engineering cases, let students understand the actual engineering problems, solutions and implementation process, improve students' practical operation ability and problem solving ability. Collect and sort out typical mechanical engineering cases, covering different fields and different stages. Integrate case teaching into course teaching, guide students to analyze cases and sum up experience and lessons. Organize students to have case discussions to cultivate their critical thinking and innovative ability. Encourage students to combine their own majors and make case innovation to improve their practical ability.

3.2.2. Strengthen the management and assessment of practical teaching links

Make a practical teaching plan, and make clear the objectives, contents, methods and assessment standards of practical teaching. Establish a practice teaching base to provide students with a good practice environment. Strengthen the construction of practical teaching teachers, improve the level of practical teaching. Establish and improve the practice teaching management system to ensure the smooth progress of practice teaching links. The assessment methods are diversified, including experiment report, practice report, project achievement display, defense, etc. The assessment content is comprehensive, covering theoretical knowledge, practical skills, innovation consciousness, teamwork and other aspects. The assessment results are linked to the course performance to encourage students to actively participate in practical teaching. The statistical analysis of the assessment results can provide the basis for improving the practice teaching.

3.4. Construction of the teaching staff

3.4.1. Introduce teachers with practical experience in enterprises

In the recruitment process, attention should be paid to the practical experience of the applicants, and priority to the introduction of teachers with rich practical experience. For the introduced teachers, personalized training plans are formulated to make them grow rapidly in theoretical teaching, practical teaching and scientific research. Some policy preference should be given to the introduced teachers, such as increasing the salary and treatment, providing scientific research fund support, etc., to stimulate their work enthusiasm.

3.4.2. Encourage teachers to take temporary posts in enterprises for training

Teachers are encouraged to take temporary posts in enterprises for at least one month every year, so as to deeply understand the actual needs of enterprises and improve their practical teaching ability. Teachers can participate in enterprise project research and development, production management, technical transformation and

other work to accumulate practical experience. Teachers in temporary posts should be evaluated, and their performance in temporary posts will be included in the annual assessment as an important basis for professional title evaluation and evaluation of excellence and excellence.

3.4.3. Strengthen the cooperation between schools and enterprises, and jointly train teachers

Establish long-term cooperative relationship with well-known enterprises, jointly formulate talent training programs, and realize resource sharing and complementary advantages. Jointly carry out teacher training, academic discussion and other activities with enterprises to improve teachers' teaching level and scientific research ability. Teachers are encouraged to actively participate in enterprise projects, set up enterprise scholarships, and commend teachers who are outstanding in industry-university-research cooperation.

3.5. Construction of a practical teaching platform

3.5.1. Strengthen the construction of the campus laboratory and practical training base

According to the training needs of mechanical applied talents, update the laboratory equipment, improve the advancement and practicability of the experimental equipment, to ensure that students can have access to the latest technology and equipment. Combined with the actual needs of enterprises, the challenging experimental projects are added to improve the students' practical ability and innovation ability. Use virtual reality technology to provide students with an immersive experimental environment and improve the experimental effect. Establish and improve the laboratory management system to ensure the safe and orderly operation of the laboratory.

3.5.2. Expand off-campus practice bases

Establish a long-term cooperative relationship with enterprises, provide internship opportunities for students, let students understand the actual needs of enterprises, and improve the competitiveness of employment. Establish internship bases in key enterprises to provide stable internship positions for students. According to the teaching plan, students are regularly organized to practice in the practice base, so that students can improve their skills in practice.

3.5.3. Establish a platform for industry-university-research cooperation

Jointly carry out scientific research projects with enterprises to improve students' scientific research ability and innovation ability. Cooperate with enterprises to jointly develop new technologies, new products, and provide practical opportunities for students. Invite enterprise experts to teach students, so that students can understand the actual needs of enterprises and improve their competitiveness of employment. Regular industry-university-research cooperation and exchange activities will be held to promote university-enterprise cooperation and promote the integrated development of industry-university-research institutes.

4. Based on the Integration of Industry and Education, the Training Mode of Mechanical Application-oriented Talents is Guaranteed

4.1. The cooperation among the government, enterprises and schools

4.1.1. Policy support and guidance of the government

Formulate relevant policies, clarify the implementation objectives and principles of the mechanism of industry and education integration and collaborative education, and provide policy guarantee for the training of mechanical applied talents. We will increase investment in industry-education integration and collaborative education projects, and support schools and enterprises in cooperating in talent training and technology research and development activities. We will establish and improve the school-enterprise cooperation mechanism, and promote in-depth cooperation among the government, enterprises and schools in personnel training, technology research and development, and achievement transformation. Strengthen policy publicity and training, and improve the government, enterprises and schools' understanding and attention to the mechanism of industry-education integration and collaborative education.

4.1.2. Enterprise participation and cooperation

Enterprises should actively participate in the integration of industry and education, collaborative education projects, and provide schools with practice and training bases, technical support, project cooperation and other resources. Enterprises should work together with the schools to develop talent training programs to ensure that the trained students can have practical working ability. Enterprises should establish a long-term and stable cooperative relationship with the school, and jointly promote the training of mechanical applied talents. Enterprises should actively participate in the teaching reform of schools and provide them with cutting-edge technology and management experience.

4.1.3. Active docking and service of the school

Schools should take the initiative to meet the needs of enterprises, understand the characteristics of their demand for talents, and adjust the talent training program. Schools should strengthen communication and cooperation with enterprises, and jointly carry out activities such as personnel training, technology RESEARCH and development. Schools should establish and improve the school-enterprise cooperation mechanism to provide quality services for enterprises and students. Schools should strengthen the construction of teachers, improve the professional level and practical ability of teachers, and provide a strong guarantee for the integration of industry and education and collaborative education.

4.2. Operation and management of the collaborative education mechanism

Set up a leading group for collaborative education, responsible for coordinating the integration of industry and education and collaborative education. Set up a collaborative education office, responsible for the specific implementation, coordination, supervision and evaluation of industry-education integration and collaborative education projects. Formulate the work system of industry and education integration and coordinated education, clarify the responsibilities, rights and obligations of all parties, and ensure the orderly development of coordinated

education work. Establish and improve the assessment and evaluation mechanism, assess all parties involved in the collaborative education, and ensure that the collaborative education work achieves practical results. Establish a regular communication mechanism, hold regular meetings on industry and education integration and collaborative education, exchange work progress and solve existing problems. Build an information sharing platform (as shown in Table 1) to realize resource sharing and information exchange, and improve the efficiency of collaborative education. Strengthen school-enterprise cooperation, promote enterprises to participate in talent training, and realize the deep integration of industry and education.

Table 1. Functional module of the information sharing platform of industry-education integration and collaborative education.

Platform Function Module	Content	Detailed Overview
Industry and education resource pool	educational resources	Course resources, teaching cases, and experimental guidance
	Industrial resources	Enterprise information, industry dynamics, and technical standards
	human resources	Students' information, teachers' information, and enterprise talent needs
Information release and communication	School-enterprise cooperation information release	Cooperation projects, internship and training opportunities, employment information
	Teaching discussion	Teaching experience exchange between teachers, between teachers and enterprise experts
	Student interaction	Learning and communication between students and between students and teachers

5. Conclusions

The research on the training mode of mechanical application-oriented talents based on the integration of industry and education and collaborative education mechanism is of great significance for improving the training quality of Chinese mechanical application-oriented talents and promoting the transformation and upgrading of manufacturing industry. The mechanism of industry-education integration and collaborative education can effectively integrate educational resources, promote school-enterprise cooperation, and improve the quality of talent training. According to the needs of industrial development, we should build a diversified talent training system oriented by the cultivation of students' ability, and pay attention to the cultivation of students' practical ability, innovation ability and comprehensive quality. Through school-enterprise cooperation, we can realize resource sharing and complementary advantages, and jointly cultivate high-quality applied talents to meet the needs of industrial development. New teaching modes such as project-based teaching, case teaching and flipped classroom are adopted to improve students' practical ability and innovation ability. Strengthen the construction of "double-qualified" teachers, improve their professional practical ability and education and teaching level. Establish a scientific and reasonable evaluation system, a comprehensive evaluation of students' comprehensive quality and practical ability.

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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