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Exploration on the Training Mode of Applied Talents in Mechanical Major in Local Colleges under the Background of Industry-Education Integration

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Abstract: Under the background of educational transformation, colleges and universities should take cultivating students' abilities as the educational goal, take the actual needs of enterprise positions as the orientation, and actively connect with industries and enterprises to take the road of industry-education integration. At this stage, some colleges and universities have actively explored the path of industry-education integration for applied mechanical professionals, but there are also problems such as talent training lagging behind the needs of industrial development, ineffective connection between practical teaching and theoretical teaching, lack of practical teaching content and resources, and the teaching team needing to be optimized. Based on this, the article briefly outlines the strategic needs of industry-education integration in application-oriented colleges and universities, analyzes the difficulties faced in the training of applied talents in mechanical majors, and on this basis, explores specific reform strategies for talent training modes, hoping to provide useful references for relevant educators.

Keywords: Industry-education integration; Colleges and universities; Mechanical major; Talent training

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1. Introduction

The "Several Opinions on Deepening Industry-Education Integration" issued by the State Council clearly points out that industry-education integration is of great significance for improving the quality of talent training in colleges and universities and promoting employment and entrepreneurship. The training of applied talents under industry-education integration has a clear goal orientation. Applied talents in mechanical majors should not only master solid theoretical knowledge such as mechanical principles and drawing, but also have proficient operational skills, the ability to solve practical production problems and innovative thinking. In this context, industry-education integration and school-enterprise cooperation in colleges and universities are not only effective means to solve the problem of enterprise talent shortage and the disconnection between college talent training and actual enterprise needs, but also the only way to promote the reform and innovation of college education and cultivate high-quality talents adapting to the changes of the times[1].

2. Strategic needs for industry-education integration in application-oriented universities

2.1. Industry-education integration is the historical mission of application-oriented universities to serve local areas

The professional positioning of local universities should be based on local conditions, serve the local economic development, and promote the development of regional industries.

From the perspective of industry-education integration, universities and enterprises have different attributes and focus on different interests. Enterprises are profit-oriented, and some enterprises lack enthusiasm to participate in talent cultivation with universities because they cannot obtain benefits in a short time. Meanwhile, some universities themselves lack practical resources and need to carry out in-depth cooperation with excellent enterprises to improve the quality of talent cultivation. In addition, although some schools have carried out cooperation with enterprises, the rights, responsibilities and interests of both parties are not clearly defined, and there are still many problems in the integration of industry and schools. Therefore, by clarifying the professional boundaries for both universities and enterprises at key points and solving the interest issues in industry-education integration, enterprises will be more willing to integrate their practical resources into professional talent cultivation, and schools will be able to connect with industries to meet the talent needs of enterprises, thus better serving the development of local economy[2].

2.2. Industry-education integration is the inevitable path for application-oriented universities to improve professional quality and efficiency

Industry-education integration is an important measure to promote the integrated development of education, science and technology, and talents, providing goals and directions for the cultivation of application-oriented talents in universities. It breaks through the superficial limitations of traditional university-enterprise cooperation and promotes the effective connection of the education chain, industrial chain and innovation chain. For local universities, deepening industry-education integration is a key way to optimize the teaching structure, promote in-depth alignment between disciplines/majors and industrial needs, realize two-way circulation of university-enterprise resources, and strengthen the faculty for talent cultivation. It is also the only way for universities to build distinctive talent cultivation models, establish collaborative education mechanisms, cultivate high-quality innovative talents and technical skills talents, and achieve high-quality development[3].

2.3. Industry-education integration is an effective means for application-oriented universities to solve the shortage of professional practical resources

The key to industry-education integration lies in resource sharing and pragmatic cooperation between universities and enterprises to ultimately achieve mutual benefit and win-win results. Universities can provide talent resources for enterprises and improve their talent guarantee, while enterprises can provide universities with funds, knowledge, training equipment, and faculty resources to enhance the quality of talent cultivation. Therefore, from the perspective of industry-education integration, universities can promote all-round integration between enterprises and schools and form a joint force in education by making overall plans and tapping resource advantages. Specifically, university teachers can take temporary positions in enterprises to closely connect teaching with production practice. At the same time, universities can employ technical backbones from enterprises to teach on campus and build a resource pool of enterprise mentors. In addition, universities can establish collaborative innovation platforms by leveraging the advantages of both parties' resources, jointly develop curriculum resource libraries and case libraries to serve teaching and enterprise training.

3. Difficulties in cultivating applied talents in mechanical majors

3.1. Talent cultivation lags behind industrial development needs

At this stage, the talent cultivation goals of colleges and universities do not align with the talent needs of enterprises. It is difficult for students finally cultivated by colleges and universities to quickly adapt to the job requirements of enterprises, and they can hardly meet the talent cultivation goals of enterprises. This situation leads to many college graduates needing to spend a lot of time and energy on training after entering enterprises, making some enterprises unwilling to recruit graduates[4]. In addition, science and technology are advancing by leaps and bounds, and new technologies and processes are updating and iterating at an accelerated pace. However, the formulation of talent cultivation plans and teaching syllabuses in some colleges and universities cannot keep up with the pace of industrial development.

3.2. Failure to effectively integrate practical teaching and theoretical teaching

Restricted by traditional teaching concepts, the teaching of mechanical majors in colleges and universities focuses more on theoretical teaching. Practical teaching has insufficient hours for hands-on training, and lacks real training scenarios, training equipment, etc. These difficulties directly result in low effectiveness in cultivating students' engineering practice ability. However, problems such as short hours of mechanical practical courses in colleges and universities and long intervals between practical courses and theoretical courses lead to the disconnection between theory and practice, making it difficult for students to receive systematic hands-on training.

3.3. Lack of practical teaching content and resources

To cultivate applied mechanical talents that meet the development of the industry, some colleges and universities have begun to improve teaching quality by revising talent cultivation plans and increasing practical hours. However, the existing talent cultivation model is still influenced by traditional educational concepts and models. In addition, problems such as low utilization rate, slow update speed, and high update cost of experimental equipment for mechanical majors in colleges and universities make it difficult for experimental teaching in colleges and universities to keep up with industrial development. The disconnection between practical teaching content and enterprise production also affects the application of new technologies in practical teaching, resulting in a significant reduction in teaching effectiveness.

3.4. The teaching team has not been optimized

At this stage, some teachers of mechanical majors in colleges and universities are often confined to the framework of existing teaching experience and professional knowledge, and they themselves lack practical ability, which restricts the development of students' experimental ability and affects the overall teaching effect. In addition, under the background of school-enterprise cooperation, some colleges and universities have introduced enterprises into the campus and hired technical personnel from enterprises as teachers. However, their lack of teaching experience and inability to control the classroom have greatly restricted the improvement of teaching effect.

4. Reform strategies for the training model of applied talents in mechanical majors in colleges and universities

4.1. Clarify talent training goals and ideas, and optimize discipline and major construction

Against the backdrop of educational reform, colleges and universities should adjust their talent training plans and specifications in combination with local economic characteristics and the characteristics of mechanical majors. First of all, colleges and universities should clarify teaching goals and integrate the cultivation of students' innovation and entrepreneurship capabilities into the teaching system. To this end, colleges and universities should establish a collaborative education system integrating industry and education with large enterprises, and participate in professional construction together with enterprises. The construction of the talent training model for mechanical majors in colleges

and universities should be carried out in accordance with such teaching goals and ideas as the principles for subsequent work.

It should be noted that in the process of innovating the new talent training model integrating industry and education, colleges and universities do not need to completely abandon the traditional teaching model, but to bring forth new ideas on the original basis and seek new development paths in the process of inheritance and innovation. On the whole, the construction of the talent training model for mechanical majors in colleges and universities should be based on the existing talent training foundation, optimize and innovate the original teaching model to adapt to the new trends of educational reform and the development of the times. Colleges and universities should take a broad view, proceed from an overall and systematic perspective, take professional courses as the cornerstone, strengthen practical teaching links, and deepen school-enterprise collaborative education. At the same time, introduce professional skills competitions, innovation and entrepreneurship competitions, etc., to enrich the levels and dimensions of education.

4.2. Reconstruct the curriculum system based on job requirements

The reconstruction of the curriculum system for mechanical majors in colleges and universities should formulate corresponding planning schemes according to the talent training goals. Based on the professional processes of posts, starting from career analysis and post capabilities, it should promote the connection between curriculum settings and work content, the integration of teaching processes and work processes, and the combination of professional skill training and professional quality. Therefore, colleges and universities should conduct in-depth enterprise research, combined with the local industrial status quo, clarify the needs of technical talent posts such as manufacturing processes and structural design, and determine the direction of talent training for mechanical majors. They should take design, manufacturing, etc., as the skills that mechanical professionals should possess, cultivate their innovation and entrepreneurship capabilities, build an industry-education integration system for mechanical majors based on vocational skills, industry standards, and enterprise norms, increase the proportion of practical teaching, and solve the problem of disconnection between on-campus teaching content and enterprise production needs. The ultimate goal is to make the setup of mechanical majors in colleges and universities adapt to the development of local industries, and to integrate the teaching content and practical training of professional courses with the production process of enterprises.

4.3. Optimize the teacher structure and build a school-enterprise teaching team

Teachers are the main force in talent training. Under the traditional teaching model, the training of mechanical professionals in colleges and universities mainly relies on teachers' teaching. However, at present, there are two problems in the college teacher team. First, teachers often feel inadequate in the practical teaching link and find it difficult to provide effective guidance to students. Second, insufficient teaching experience of teachers leads to difficulty in effectively improving teaching quality. To solve these problems, colleges and universities can optimize the teacher structure from two dimensions. On the one hand, colleges and universities should set up teaching management teams with key teachers as the core to carry out "mentoring" for young teachers, helping them accumulate teaching experience and improve teaching ability to better perform teaching tasks. At the same time, colleges and universities should improve the talent introduction mechanism, actively introduce key technical talents from enterprises to serve as part-time teachers, and set up famous teacher and craftsman studios, so that these teachers with superb skills and rich experience can undertake practical teaching courses. This can solve the problem of insufficient practical teaching ability of college teachers and effectively reduce the burden of on-campus teachers in practical teaching work. On the other hand, colleges and universities should improve the teacher training mechanism to enhance the professional ability of on-campus teachers. They should carry out regular special training to completely and systematically update teachers' knowledge systems and keep up with the pace of industry development. At the same time, they should encourage teachers to actively participate in academic conferences, teaching ability competitions and other activities, so that professional teachers can absorb advanced teaching concepts, learn from successful teaching experience, broaden their knowledge horizons, and

comprehensively improve their overall quality through mutual communication and cooperation. In addition, colleges and universities should encourage teachers to take part in training in enterprises and participate in actual work projects of enterprises to enrich their work experience, thereby improving the effectiveness and pertinence of classroom teaching.

4.4. Deepening school-enterprise exchange and cooperation, and building a collaborative education mechanism

At this stage, the machinery manufacturing industry is transforming towards intelligence and high-endization, and the cooperation between colleges and universities and enterprises has become a key path to promote the collaborative development of both parties. The essence of school-enterprise cooperation lies in colleges and universities innovating the talent training system by integrating various resources of enterprises. Enterprises, on the other hand, promote technological research and development as well as innovation through the scientific research platforms of colleges and universities, so as to enhance their own market competitiveness. Therefore, colleges and universities and enterprises should establish a close cooperative relationship and build a collaborative education mechanism. Specifically, it can be advanced in three aspects: First, colleges and universities should adopt the "work-study alternation" talent training model to improve students' practical ability and social adaptability. Second, both schools and enterprises should jointly build a teaching staff. On the one hand, schools should regularly arrange teachers to study in enterprises to enrich their own practical experience. On the other hand, colleges and universities can hire managers or experienced technical personnel from enterprises to enter the school and carry out collaborative education with in-school teachers. Third, colleges and universities should jointly build training bases. Relying on enterprises' advanced equipment and financial support, colleges and universities should establish an industry-education integration training center integrating practical teaching and technical services, so as to shorten the distance between students' learning and employment, jointly cultivate high-quality technical and skilled talents who meet market demand, and provide talent guarantee for the development of the machinery manufacturing industry.

4.5. Improving the education evaluation system to promote long-term and effective education

Educational evaluation is related to the development direction of education and serves as the guiding basis for the operation of colleges and universities. However, the educational evaluation system involves various educational subjects such as the government, schools, society, and enterprises, as well as the interests of all parties. Therefore, if colleges and universities want to promote industry-education integration through evaluation, they need to take measures from the following aspects:

First, establish a diversified evaluation index system. Traditional evaluation methods are often single, only taking test scores and classroom performance as the basis for evaluating students. However, this kind of evaluation method is generally lack of comprehensiveness and objectivity, making it difficult to accurately evaluate students. Therefore, colleges and universities should abandon the evaluation method mainly based on theoretical examinations, take students' professional literacy and practical ability as evaluation indexes, and implement a diversified evaluation index system. Such an evaluation system can assess students from multiple dimensions, fully consider their comprehensive qualities and abilities such as professional literacy, innovation ability, and learning attitude, more accurately evaluate their learning effects, and also prompt teachers to provide targeted guidance and help to students.

Second, develop an industry-education integration evaluation index system for local colleges and universities and issue special evaluation plans for industry-education integration in colleges and universities. Although under the background of in-depth promotion of industry-education integration, school-enterprise cooperation and industry-education integration have been included in the qualification assessment and audit assessment plans of local colleges and universities, these are often overshadowed by the academic evaluation standard system, making it difficult to attract the attention of the government, society, etc. As the main body of industry-education integration, colleges and universities should formulate specific and detailed standards and measures in terms of curriculum system, training model, teacher

construction, and teaching process around the goal of industry-education integration, so as to run schools for the society, improve the efficiency of school management, and serve the local area through industry-education integration[5].

5. Conclusion

To sum up, industry-education integration provides a new development path for the cultivation of applied talents in mechanical majors of local colleges and universities. Colleges and universities should take industry-education integration as the core, explore new development paths and opportunities, build a high-quality education system, and continuously improve the quality of cultivating applied innovative talents, so that the finally cultivated talents can adapt to the development of the industry. Therefore, colleges and universities should take the initiative to take measures in aspects such as clarifying talent training goals and ideas to optimize discipline and professional construction, reconstructing curriculum systems based on job demands, optimizing teacher structure to build a school-enterprise teaching staff, deepening school-enterprise exchange and cooperation to build a collaborative education mechanism, and improving the evaluation system, so as to cultivate high-quality mechanical professionals and better serve the development of local economy.

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Disclosure statement

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