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Practical exploration of talent training mode of integration of production and education in digital design and manufacturing specialty

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Abstract: *Nowadays, with the in-depth development of digital design and manufacturing and the widespread application of the industrial Internet, although this has brought unprecedented development opportunities, it also poses new challenges to the cultivation of digital design and manufacturing talents. Faced with this situation, it is of great significance to practice and explore the integration mode of production and education. This study plans the talent training mode of integration of production and education in four parts. Firstly, it analyzes the problems existing in the existing teaching mode, and defines the goal of cultivating talents with integration of production and education. Secondly, relying on the new trend of educational informatization and integration of production and education, a curriculum system and practice base with the characteristics of integration of production and education are designed; Thirdly, the evaluation system of talent cultivation of integration of production and education is established, and the teaching effect is fed back through multi-dimensional and dynamic evaluation methods; Finally, it puts forward the strategies and measures to further improve the talent training mode of integration of production and education. It is found that the talent training mode of integrating production and education can effectively improve students innovative ability and practical skills, and has positive significance for the high-quality cultivation of digital design and manufacturing talents. The results of this study have been implemented in some colleges and universities, achieving remarkable teaching effects and receiving positive social feedback. This has provided valuable practical experience and references for the new engineering education reform in digital design and manufacturing majors, as well as related fields.*

Keywords: *digital design and manufacturing; Integration of industry and education; Talent training mode; Educational informatization; Innovation ability and practical skills*

1. Introduction

Under the background of rapid development in the field of digital design and manufacturing, the cultivation of professional talents is increasingly important, and the traditional teaching mode can no longer meet the actual needs of industry. At the same time, with the widespread application of the industrial Internet, new demands in the field of digital design and manufacturing continue to emerge, which indicates that the requirements for professional talents are also constantly changing. This is a new challenge for professional education, especially digital design and manufacturing majors. How to effectively cultivate professional talents under the new situation? The practical exploration of the integration mode of production and education is of great significance. The talent training mode of integration of production and education is an important concept in the process of educational reform, aiming at improving the quality of education and teaching, better adapting to industrial development and improving students core literacy. This study focuses on four parts to make an in-depth discussion on the integration mode of production and education: studying the existing problems and defining the goals; The curriculum system and practice base with the characteristics of integration of production and education are designed; The evaluation system is established to give feedback to the teaching effect from many angles and dynamically; Finally, the perfect strategies and measures are put forward. Practice has proved that the talent training mode of integrating production and education has positive significance for improving students innovative ability and practical skills, and for cultivating high-quality digital design and manufacturing talents.

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2. Analysis of problems in the existing talent training mode of digital design and manufacturing major

2.1 The development of digital design and manufacturing industry has new demands for talent training

With the rapid digital transformation of global industries, the digital design and manufacturing industry has ushered in unprecedented development opportunities and challenges[1]. The continuously developing advanced technologies, such as big data, cloud computing, artificial intelligence and the Internet of Things, have profoundly changed the production mode and service form of the manufacturing industry. The introduction of these technologies not only improves production efficiency and product quality, but also greatly promotes the development of customized production and intelligent manufacturing. The field of digital design and manufacturing has expanded rapidly in this context, requiring practitioners not only to have deep professional knowledge, but also to master interdisciplinary comprehensive skills and innovative thinking[2].

These changes have put forward new demands for talent training. First, digital design and manufacturing talents must have a solid engineering foundation and advanced computer application ability. These changes have presented new demands for talent development. Firstly, talents in digital design and manufacturing must possess a solid engineering foundation and advanced computer application skills. Second, compound talents become the key, which requires students to have interdisciplinary abilities such as information technology, data analysis and system integration to master professional knowledge. Third, the cultivation of innovation and practical ability has been raised to an unprecedented height. Solving practical problems and technological innovation have become important indicators to evaluate talents, which requires integrating more practical teaching and project-driven learning in the process of education.

Under the context of globalization, the needs of international cooperation have been expanded, and language ability and cross-cultural communication ability have become important aspects to measure the comprehensive quality of talents. The education model of integrating industry and education emerged as The Times require. Through school-enterprise cooperation, industry-education cooperation and other forms, students can get to contact with the actual production environment earlier and improve their adaptability and practical level.

These new demands not only put forward higher requirements for higher education institutions, but also promote the change of their education and teaching methods. Only through continuous exploration and innovation of talent training mode can we effectively meet the urgent demand for high-quality talents in the digital design and manufacturing industry.

2.2 Problems existing in the existing teaching mode

At present, the talent training mode of digital design and manufacturing specialty has obvious shortcomings in several aspects. The teaching content is out of touch with the needs of the industry, the curriculum is relatively outdated, and it cant keep up with the pace of technological updates in time, resulting in a big gap between students knowledge and practical application. Theoretical teaching is separated from practical training, students knowledge mastered in class lacks the opportunity of practical verification, and the cultivation of practical skills is seriously insufficient. School-enterprise cooperation channels are not smooth, and enterprise resources cant be effectively integrated into teaching, which affects the improvement of students practical ability and innovative quality. Teachers have a single professional background and lack of practical industrial experience, so it is difficult to update teaching contents and reform teaching methods from the latest industry trends. The subject evaluation and teaching quality monitoring system is imperfect, the teaching effect is difficult to comprehensively evaluate and give effective feedback, and the training effect cannot be dynamically adjusted. These problems jointly restrict the cultivation of high-quality talents in digital design and manufacturing, and need to be solved urgently through new educational models and means.

2.3 Clarify the goal of cultivating talents with integration of production and education

It is clear that the goal of cultivating talents integrating production and education is to cultivate high-quality professionals with solid theoretical foundation, rich practical experience and innovative ability in response to the talent needs of digital design and manufacturing majors. Specific objectives

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include developing students sense of innovation and practical skills that enable them to independently solve practical problems in a dynamic and complex industrial environment; Enhance students comprehensive quality in the application of digital design and manufacturing technology, including the ability to integrate interdisciplinary knowledge and teamwork; Improve students ability to adapt to the development of modern industries, and keep the advanced and cutting-edge professional knowledge through continuous learning and application of new technologies and methods. Finally, a sustainable talent training system combined with industrial development will be formed to provide a steady stream of high-quality talents for the industry.

3. Design and implementation of the talent training model of integration of industry and education

3.1 Curriculum system design based on educational informatization and integration of production and education

The rapid development of digital design and manufacturing specialty emphasizes the teaching mode of combining practice with theory, and the traditional curriculum system has been difficult to meet the diversified needs of emerging industries for talents[3]. In the new teaching framework, the design of curriculum system should fully integrate the development trend of educational informatization and the actual needs of the industry.

The curriculum system should be based on the field of digital design and manufacturing, covering three levels: basic theory, technical application and innovative practice. Basic theoretical courses include advanced manufacturing technology, intelligent manufacturing system, industrial big data, etc. to consolidate students basic knowledge reserve. Technology application courses focus on improving students professional skills, such as computer-aided design (CAD), computer-aided manufacturing (CAM) and industrial robot programming, etc. Through project-driven and case analysis teaching methods, students hands-on ability and practical operation ability are enhanced.

In curriculum design, the full utilization of information resources is the key[4]. The introduction of digital teaching platform, virtual simulation software and online educational resources can greatly enrich the teaching content and improve the interaction and operability of teaching. For example, using virtual simulation technology to carry out virtual factory training enables students to control and manage complex equipment and production lines in a virtual environment, which not only saves actual operating costs, but also improves students technical literacy and ability to deal with complex practical problems.

The characteristics of the integration of industry and education are reflected through school-enterprise cooperation projects, the participation of enterprise mentors and the construction of practice bases. On the one hand, we will jointly formulate curriculum standards with industry leading enterprises to ensure that the course content is close to the actual application needs. On the other hand, the introduction of enterprise mentors can provide students with first-hand cutting-edge technology and practical experience, so that theoretical teaching seamlessly connects with the actual needs of enterprises. The construction of the industry-education integration practice base provides students with a real production environment, and cultivates their adaptability and working ability in the actual working environment.

This kind of curriculum system design not only solves the problem of disconnection between theory and practice in traditional teaching, but also provides students with the opportunity to comprehensively improve their skills and innovation ability, and constructs a new teaching model that combines theory with practice, complementing informatization and materialization.

3.2 Construction of a practice base with the integration of industry and education

The construction of a practice base with the integration of industry and education is crucial to the realization of high-quality training of digital design and manufacturing talents. In the process of construction, we should pay attention to the in-depth cooperation with industry enterprises, jointly set up practice bases through the school-enterprise alliance, provide students with real production environment and project tasks, improve their practical operation ability and problem-solving thinking. In the functional design of the practice base, it is necessary to be equipped with advanced digital design and manufacturing equipment to closely follow the cutting-edge industrial technology to ensure that the

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knowledge and skills learned by students during the school period are highly timeliness and practical. In order to ensure the sustainable development and good operation of the practice base, a perfect management mechanism and evaluation system should be established to check and improve the teaching effect and facility maintenance of the base regularly. Through multi-party cooperation, resource integration and continuous optimization, the practice base can effectively promote the realization of the goal of integrating industry and education into talents training, and improve the students comprehensive quality and employment competitiveness.

3.3 Design and implementation of the evaluation system of talent training mode integrating industry and education

The design of evaluation system needs to cover multi-dimensional and dynamic evaluation methods to comprehensively measure the teaching effect. By introducing online and offline evaluation methods, students learning progress and practical performance can be fed back in real time. Evaluation methods include project development, actual case analysis, enterprise tutor evaluation and student self-evaluation, etc. Multi-dimensional feedback helps to adjust teaching contents and methods in time and ensure the continuous optimization and improvement of training mode. Communicate regularly with corporate partners and collect feedback from employers to verify the effectiveness of training programs and make corresponding improvements.

3.3.1 Design of multi-dimensional dynamic evaluation method

Multi-dimensional dynamic evaluation method comprehensively evaluates students training effect through the aspects of knowledge mastery, skill application effect, development of innovative ability and practical problem solving ability. Using quantitative and qualitative data analysis means, we can dynamically monitor students growth trajectory and progress, optimize and adjust teaching contents and strategies in time, so as to ensure the efficiency and pertinence of the training mode.

3.3.2 Optimizing the training model through evaluation feedback

Through evaluation and feedback, this paper analyzes students performance in the practice base and the practical application effect of the curriculum system, adjusts teaching contents and methods in time, and improves students comprehensive quality and ability.

4. The effect of industry-education integration talent training model and further improvement strategies

4.1 Analysis of Teaching Effect and Social Feedback of Industry-Education Integration Talent Training Model

The talent training mode of integrating production and education has gradually been popularized and applied in digital design and manufacturing majors, and its teaching effect is remarkable. Through a series of teaching reforms based on the concept of integration of production and education, students innovative ability and practical skills have been significantly improved. Practical enterprise projects are introduced into the course, so that students can directly come into contact with real work scenarios during the learning process and cultivate the ability to solve practical problems. Students reports show that this teaching method not only improves their interest in learning, but also greatly improves their practical ability.

Feedback from enterprises is an important aspect to verify the teaching effect. Students trained by the integration mode of production and education quickly adapt to the working environment and are competent for various technical tasks after entering enterprises for internship or employment. A number of cooperative enterprises said that the graduates trained under the integration mode of production and education performed well in adaptability, innovative thinking and teamwork, which made up for the lack of students hands-on ability and practical application ability under the traditional education mode.

The evaluation of the industry-education integration model from all walks of life is also very positive[5]. Employers generally reflect that the students trained by this mode can integrate more quickly into the work of enterprises, reducing the training cost of enterprises. The actual projects and technologies that students are exposed to during the school period have brought new perspectives and innovative ideas to enterprises, and formed a benign interaction. Some school-enterprise cooperation

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projects have also contributed to the deep cooperation between universities and enterprises, and promoted the common progress of industrial technology.

Although the integration model of industry and education has achieved remarkable results, there is still room for further improvement. Through social feedback analysis, it is found that the diversity and complexity of projects need to be further improved and students ability to adapt in different situations. Strengthening the cooperation between teachers and enterprise technical experts to develop more advanced and close to the needs of the industry is also an important measure to improve the quality of teaching. In general, the application effect of the industry-education integration mode in the digital design and manufacturing talent training is remarkable, which is widely recognized, and also provides valuable experience for the subsequent optimization.

4.2 Assessment of the impact of students innovation ability and practical skills

The talent training mode of integration of production and education plays a significant role in improving students innovative ability and practical skills. By introducing enterprise projects into the curriculum system, students can exercise their hands-on ability and innovative thinking in the real project environment, and can better understand and apply what they have learned. The establishment of the practice base provides rich experimental and internship opportunities. Students practical experience in enterprises enables them to quickly master the latest skills in the industry, and cultivate the ability of teamwork and solving practical problems.

The multi-dimensional dynamic evaluation system further consolidates this improvement effect. Through the comprehensive evaluation of students innovative projects, actual operation achievements and enterprise feedback, we can accurately analyze students performance and growth in different dimensions. The data shows that the students who participate in the teaching mode of integration of production and education have obvious advantages in innovative projects compared with the traditional teaching mode, which reflects their higher innovative ability and practical skills. Students enterprise practice experience in school not only enhances their employment competitiveness, but also lays a solid foundation for their subsequent career development.

4.3 Strategies and measures to improve the talent training mode of integration of industry and education in the follow-up

The subsequent strategies and measures to improve the talent training mode of integrating industry and education include: optimizing the curriculum system, enhancing the practicality and cutting-edge nature of the curriculum content, and ensuring that the educational content is close to the development needs of the industry. Strengthen the cooperation between schools and enterprises, deepen the construction of industrial education integration practice bases, and improve students ' practical operation abilities. We should also improve the multi-dimensional dynamic evaluation system, and constantly improve teaching methods through data analysis and feedback mechanisms. Furthermore, we should promote interdisciplinary cooperation and innovation, and cultivate students ' abilities to fully develop and solve complex engineering problems. Additionally, we should strengthen the construction of the teacher workforce, improve teachers ' practical experience and teaching levels, and ensure the continuous improvement of teaching quality.

5. Conclusions

This study plans the talent training mode of integration of production and education in detail, analyzes the problems of the existing education mode, defines the goal of talent training, and designs the curriculum system and practice base with the characteristics of integration of production and education. At the same time, we have also established a comprehensive evaluation system to monitor and evaluate students learning effects. Then, based on these achievements, we put forward some strategies and measures to improve the talent training mode, and the implementation of these measures has achieved remarkable results in the teaching of digital design and manufacturing. Practice has proved that the talent training mode of integrating production and education can improve students innovative ability and practical skills, and has a positive effect on promoting the high-quality cultivation of digital design and manufacturing talents. Although the current research has achieved some results, we are also aware that there are still some limitations and challenges in the current research. For example, how to balance knowledge updating, skills training and practical application

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under the talent training mode of integrating production and education; How to further enhance the depth of enterprise cooperation in the integration mode of production and education needs to be further solved. Based on the above research and practice, in order to further improve the effectiveness and quality of industry-education integration talent training in digital design and manufacturing majors, we will continue to deepen research and further improve industry-education integration. The model and strategy of talent training aims to provide stronger support for the reform and innovation of my countrys digital design and manufacturing professional talent training methods through continuous exploration and practice

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