

The New Construction of the "Production, Education, Research, Competition and Training" Education System for Mechanical Majors in Vocational Colleges

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Abstract: The talent cultivation model of integrated teaching of "production, education, research, competition and training" requires the guidance of competition standards and enterprise standards, driven by competition content, and the organic combination of skills competition projects, teaching content, scientific research projects, production projects and practical skills training content, to achieve corresponding teaching objectives within the specified time. Enable the teaching activities of schools to closely connect with the real production of enterprises, achieve high-quality employment for students, and solve the supply-demand balance of talents in schools and enterprises. This study provides a reference basis for the further implementation of high-quality technical and skilled talent training models.

Keywords: Integration of Production; Competition and Training; Deep Integration of Schools and Enterprises; Education Mode

1. Introduction

High skilled talents are the direct producers of enterprises and the core backbone members of the worker technical team. They are the direct executors of promoting technological innovation and achieving the transformation of scientific and technological achievements in enterprises, and are necessary for economic development and industrial structure upgrading and transformation. In the constantly optimized social environment, the social identity of vocational education is

constantly recognized. This is an important channel for young people to open the door to success. We must attach great importance to and accelerate development. China bears the important responsibility of cultivating diverse talents, inheriting skills, and promoting employment and entrepreneurship. China's vocational education has experienced unprecedented development. However, vocational education itself also appears unsatisfactory, especially during the critical period of economic restructuring and industrial upgrading. The coexistence of labor shortages in enterprises and employment difficulties in colleges and universities, as well as the inability of vocational colleges to effectively provide the high skilled talents needed for industrial development, are issues related to vocational education, and the situation is awkward.

In the rapid development and practice of higher vocational education, people's understanding of the talent training goals in higher vocational education is becoming clearer, and the talent training goals in higher vocational education are gradually evolving: from high to high-quality skilled specialized talents, and then to high-end skilled talents. The current goal is described as: technical skilled talents. Therefore, studying the path and mechanism construction of technological skill accumulation has strong practical significance for the sustainable and healthy development of enterprises, maintaining and enhancing core competitiveness, and cultivating high skilled talents.

However, there are significant differences in the job responsibilities and technical fields that vocational college students engage in after

graduation. The phenomenon of vocational education and productivity outflow makes it difficult to match the quality of learning with social needs. Therefore, correctly handling the relationship between talents cultivated in vocational education and social needs, economic and social development, with the goal of achieving seamless integration between industry and education, zero employment gap, and mutual satisfaction between students and employers, is a key issue that vocational education needs to solve [3-4].

2. The Connotation of the Integrated Teaching Model of "Production, Education, Research, Competition and Training"

The integrated teaching model of "production, education, research, competition, and training" is based on the deep cooperation between schools and enterprises, integrating the latest design and manufacturing norms and standards of mechanical design and manufacturing enterprises, organically integrating "basic knowledge" and "professional ability", and scientifically setting it as several topics. Both schools and enterprises should rely on projects, research and development, and training platforms to strengthen training models such as job skills and comprehensive vocational abilities, and serve the local community. Guided by the project, we have prepared multi-level competition projects including test questions, material lists, and rating sheets. Carry out multi-level competition activities to promote the integration of training, training, and competition. Taking the industrial design and manufacturing competition project as an example, the sub projects involved include: software learning, inspection technology, 3D modeling, process knowledge, processing capabilities, etc. These projects are based on the actual production of enterprises, but the evaluation standards and standards effectively test the professional basic knowledge, skills, innovation level, and professional quality of students. At the same time, they encourage teachers to timely discover deviations and deficiencies in the teaching process, correct and supplement them in a timely manner, and effectively improve the quality of teaching.

3. The Implementation Path of Integrated Teaching of Industry, Education, Research, Competition and Training

3.1 The Foundation of Deep Integration Between Schools and Enterprises

By establishing an operating model of "campus factory", vocational colleges can invite enterprises or typical workshops to settle in, introduce factories into schools, establish "campus factory", provide students with practical training and vocational skills training for enterprise employees in actual production environments, and provide a good platform to improve their "practical" abilities; Realize the internationalization of vocational colleges, move classrooms to factories, and jointly establish "factory campuses" with enterprises to create opportunities for students to rotate and intern, and send training to enterprises. By bridging the gap between vocational colleges and enterprises, we can gradually alleviate the funding burden of enterprise training, avoid duplicate construction of training rooms, enhance the core competitiveness of schools and enterprises, promote the upgrading of industrial economy and society, and lay a solid foundation for achieving "win-win" and complementary advantages. Using "on campus and off campus" construction as a link, promote the development of relevant curriculum groups, enhance the construction of teaching staff, enhance teaching quality, strengthen hierarchical structure, promote innovative talent cultivation, and promote seamless integration of school enterprise talent cultivation.

On the basis of deep integration and close cooperation between schools and enterprises, the school invites representatives and experts from closely cooperating enterprises to participate in talent cultivation planning in accordance with the standards of the enterprise and industry. Combined with the specific requirements of vocational skills competition projects in vocational colleges, combined with the actual production projects of cooperating enterprises, combined with student courses and training content, small competition projects should be added, covering all core professional courses and some professional skills courses. Choosing the appropriate skills training program products and skills competition topics is the key element for effective teaching. In the optimization process, the school invites industry experts and teachers to jointly develop teaching courses based on enterprise requirements, competitive standards and

technical standards, and enterprise positions. They jointly establish teaching objectives and curriculum standards, as well as assessment standards, rules, and grade evaluations. Spiral up in difficulty, allowing students to apply and consolidate the knowledge and skills learned in the classroom into practical engineering during the teaching process.

3.2 Synchronize Theoretical Teaching with On-Site Practical Training In Enterprises

Building a production workshop in the school, introducing enterprise technology, talents, management, and funds as an extension of the enterprise workshop, constructing a "campus factory" production training base, and promoting learning through production. At the same time, setting up a "factory principal" in the enterprise, providing a "practical" on-the-job platform for students on the production line, and leveraging experienced employees of the enterprise to provide career guidance for students, making them deputy employees of the enterprise. This model achieves "seamless integration" of talent skills in the enterprise. During this process, curriculum reform should be carried out based on a workflow oriented approach; Based on the specific job requirements of enterprises, cultivate students' key abilities and basic abilities, actively promote their participation and cooperation in completing practical courses on real business cases. For some students who have a certain theoretical and skill foundation, a "teacher led apprentice" approach is adopted for improvement training. The master sets an example and constantly corrects them, making them improve and quickly become skilled talents urgently needed by the enterprise. Then, through the re training of the enterprise, they become operators, skill leaders, and team leaders in corresponding positions, driving other personnel to carry out work and promoting the sustainable and stable development of the enterprise.

3.3 Collaborative Integration of theoretical Teaching and Scientific Research Projects

In accordance with the goals of professional construction and talent cultivation, combined with the knowledge structure and ability level of students themselves, explore the transformation of scientific research topics, form a series of teaching materials such as

lesson plans, and integrate scientific research topics into teaching topics, achieving the application of learning, the combination of engineering and learning, and the integration of research and learning. On the contrary, the teaching process should be closely related to the actual production process of the enterprise, so as to make students more familiar with the work content and more proficient in using it. Then, in the following stages, we will continue to enter the stages of enterprise technology development, research, trial production, etc., carry out comprehensive skills and productive training, achieve gradual capacity building, ensure the quality of talent cultivation, and achieve the connection between talent cultivation and enterprise needs. Integrating the basic knowledge, innovative design, key technologies, process design and basic skills, professional quality of researchers, and professional quality of researchers involved in scientific research projects into the teaching classroom is more conducive to improving the overall quality of students.

Based on the actual research and development projects of enterprises, specific project tasks are provided through the task design, setting, and guidance of school teachers. There are many feasible methods for the selected research project goals, which can stimulate students' interest in exploring other feasible methods. Using existing knowledge and skills as a platform, collect relevant reference materials on your own, develop project research and development plans, plan project progress and implementation steps, guide students in the research and development process, consolidate old knowledge and new knowledge, and actively engage in innovation education. The core pursuit of project-based teaching is to guide students to find the best way to achieve results, and to demonstrate and self-evaluate in the process of cultivating students' comprehensive abilities.

3.4 Integrating the Standards and Content of Competitions into Teaching

(a) Integration of Competition Standards and Enterprise Standards into Curriculum Standards

The standards for most skills competitions stem from industry and corporate standards, and the competition process is actually a process of operating according to the standards

and norms of the enterprise, requiring participants to master industry and standard codes and documents during the competition. Strictly operate the competition standard courses in accordance with the enterprise standard standards in course practice, familiarize oneself with the requirements of the enterprise for professional skills and other aspects in advance, and cultivate good professional habits.

(b) Integrating Competition Content into Teaching Content

The selection of teaching content largely determines the direction of teaching activities and also determines the level of student ability improvement. When choosing, it is necessary to not only meet the teaching objectives, but also pay attention to the current job requirements of the enterprise, closely connect with the actual production, ensure that students can connect with social needs, and prevent the phenomenon of teaching content lagging behind or deviating from the requirements of the enterprise. The introduction of teaching modes into competitions can motivate learners, stimulate their motivation and interest in learning, and maximize their enthusiasm for learning. The content of skill competitions mainly comes from the actual projects, examination points, and competition content of enterprises, mainly examining the ability of students to master and apply skills. The examination points of competition content are divided into several knowledge and skill points, which are integrated into corresponding course chapters to understand the skills required for professional positions in enterprises. Through skill training and teaching, it provides a basis for the selection and cultivation of high skilled talents.

(c) Integration of competition mechanism into practical training projects

A skills competition is generally a simplified enterprise project that is divided into several modules to assess the level of mastery of the entire project process by participants. The skills competition, as a practical training program for trainees, not only helps them consolidate their professional skills, but also enables them to understand the assessment points of the skills competition. At the same time, they can also familiarize themselves with the actual project development experience and skills of the enterprise in advance, understand

and master its key technologies and innovations.

Combining skills, the content of skill competitions varies every year, but they are closely related to the latest and hottest technologies. In the teaching design of various majors in the mechanical specialty group, teachers have deeply integrated the competition project projects and further divided the modules of relevant competition projects in recent years into one task. The first key knowledge point is excavated, and students gradually complete the training of each task, ultimately completing the teaching process. During the training process, the trainees not only mastered their major but also acquired operational skills. The skills competition mode mainly refers to the competition conducted within the enterprise in the form of technical problem-solving groups. There should be clear division of labor among members, but they should work together to complete the entire project. Based on the knowledge structure and skills of team members, project tasks are proposed in complex backgrounds. Team members solve problems from different perspectives and work together to complete the entire project. The skills competition emphasizes the ability of team collaboration, communication, and coordination.

(d) Integration of competition evaluation methods into practical training methods

Evaluation feedback is the final stage of "teaching, learning, competition, and training". The accuracy evaluation is divided into two parts. Process evaluation refers to the evaluation of operational standards, time requirements, professional competence, and other aspects by teachers, while the accuracy of the results refers to the evaluation of students themselves, team members, and teachers. To achieve immediate results, the evaluation results should be promptly disclosed, and the details of the evaluation should be strengthened in the process of error correction and skill improvement. This is an important aspect of improving students' skills. Students themselves should also recall, provide feedback, and summarize to form a project summary report, and make corrections and improvements under the guidance of the teacher.

4. Conclusion

The teaching model of "production, teaching, research, competition, and training" organically integrates production, teaching, research, competition, and training, playing a two-way driving role in improving the quality of teaching, skill level, and employment of students. Using enterprise standard standards as the standard curriculum standards and teaching objectives, competition content as the main thread, enterprise job content as the foundation, and training methods as the guidance, develop course content, explore new organizational teaching processes, explore evaluation methods, and improve student quality awareness. The integration of production, education, research, and training is of great significance for optimizing professional construction, constructing a curriculum system, and improving social service levels.

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