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Exploration of the Comprehensive Education Model Integrating Positions, Courses, Competitions, and Certifications: A Case Study of the Construction Engineering Technology Major

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Abstract: With the rapid development of the social economy, the importance of vocational education is becoming increasingly prominent. Taking construction engineering and construction specialty as an example, this paper explores the comprehensive education and training model of integrating "position-related courses, skills competitions, and certifications", aiming to improve the quality of vocational education and the competitiveness of students in employment. By analyzing the theoretical basis and current development status of the integration of "position-related courses, skills competitions, and certifications", designing and implementing specific training models for this specialty, further evaluating their training effects, and proposing improvement strategies, this paper provides a theoretical basis and practical reference for the reform and development of vocational education.

Keywords: Integration of position-related courses, skills competitions, and certifications; Comprehensive education and training; Vocational education; Construction engineering and construction; Training model

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1. Introduction

Vocational education plays an important role in modern society, aiming to cultivate high-quality technical talents with practical operational capabilities and professional qualities. As an important part of vocational education, the construction engineering and construction specialty face the challenge of better adapting to industry needs and technological progress. The integration of the "position-related courses, skills competitions, and certifications" training model integrates the advantages of job practices, curriculum teaching, skills competitions, and professional qualification certificates, aiming to comprehensively improve students' comprehensive qualities and professional abilities. Research shows that the integration model of "position-related courses, skills competitions, and certifications" effectively improves students' professional qualities and practical abilities, providing an important reference for the innovative development of vocational education.

2. Theoretical basis and current development status of the integration of "position-related courses, skills competitions, and certifications"

2.1. Connotation and theoretical basis of the integration of "position-related courses, skills competitions, and certifications"

The integration of the "position-related courses, skills competitions, and certifications" is a comprehensive education and training model that combines job practices, curriculum teaching, skills competitions, and professional qualifications. The core of this model is to comprehensively improve students' professional qualities and practical operational capabilities through practical work experience in actual positions, systematic learning of theoretical knowledge, skills training in competitions, and qualification certification. In this model, students not only systematically learn theoretical knowledge in the classroom but also practice in real work environments, applying their knowledge to actual work. In addition, by participating in various skills competitions, students can enhance their skills through competition, and obtaining professional qualification certificates provides authoritative recognition of their abilities, enhancing their employability.

Theoretically, the integration model of "position-related courses, skills competitions, and certifications" is based on constructivist learning theory and practice teaching theory, emphasizing learning in real contexts and continuously improving skills through practice. Constructivist learning theory suggests that knowledge is not passively received but is actively constructed by learners in practical contexts. Therefore, the integration model of the "position-related courses, skills competitions, and certifications" enables students to actively explore and solve problems in specific contexts through practical teaching in real work environments, gradually constructing a deep understanding of knowledge and application capabilities. The practice teaching theory emphasizes that practice is a key part of learning. Through work experience in actual positions, students can combine theoretical knowledge with practical skills, improving their comprehensive qualities and professional abilities.

Additionally, the integration model of the "position-related courses, skills competitions, and certifications" also draws on the core ideas of multiple intelligences theory and lifelong learning theory. Multiple intelligences theory proposes that each student has different types of intelligence and learning styles, and education should be tailored to individual differences. The integration model of "Position-related courses, skills competitions, and certifications" can stimulate students' potential in multiple ways through various teaching forms and practical activities, improving their comprehensive qualities. Lifelong learning theory emphasizes that vocational education is not only an extension of school education but also an important part of individual career development. Through continuous learning, practice, and certification, the integration model of "position-related courses, skills competitions, and certifications" helps students adapt to the rapidly changing social and industry demands, promoting their sustainable development in lifelong learning and careers [1].

2.2. Analysis of the current situation of the integration of "position-related courses, skills competitions, and certifications" in domestic and foreign education models

In China, the integration model of "position-related courses, skills competitions, and certifications" has gradually received attention in the field of vocational education. Various vocational schools actively promote the implementation of this model through school-enterprise cooperation, establishment of training bases, and participation in skills competitions. For example, many vocational schools cooperate with enterprises to formulate training programs, and students intern in enterprises and participate in skills competitions organized by enterprises, verifying their abilities by obtaining professional qualification certificates. This model not only improves students' practical skills but also enhances the close relationship between schools and enterprises, forming a win-win situation for both.

Internationally, Germany's "dual system" education model and Australia's TAFE (Technical and Further

Education) system are typical examples of the integration of "position-related courses, skills competitions, and certifications." Germany's "dual system" educates students through parallel tracks of work in enterprises and systematic theoretical education in schools. Australia's TAFE provides courses and training oriented towards professional qualifications through cooperation with industry associations and enterprises. The successful experiences of these international models provide valuable references for exploring the integration model of "position-related courses, skills competitions, and certifications" in China.

2.3. Application status of "position-related courses, skills competitions, and certifications" in construction engineering and construction specialty

In the construction engineering and construction specialty, the application of the integration model of "position-related courses, skills competitions, and certifications" has achieved significant results. Many secondary vocational schools have established stable training bases through cooperation with construction enterprises, allowing students to practice in real construction environments. This not only improves students' practical operational capabilities but also enables them to quickly adapt to job requirements after graduation. Additionally, schools have introduced skills competitions in the construction industry, encouraging students to participate and improve their professional skills and competitiveness.

However, there are still some problems in the current application of this model in the construction engineering and construction specialty. For example, the depth and breadth of school-enterprise cooperation need to be strengthened, and the enthusiasm of some enterprises for participation is not high, leading to uneven training quality for students. Furthermore, the connection between curriculum content and actual job requirements is not close enough, and the combination of skills competitions and professional qualification certificates needs further improvement. Therefore, in promoting the integration model of "position-related courses, skills competitions, and certifications" in the future, efforts should be made to strengthen school-enterprise cooperation, optimize curriculum design, and enhance students' comprehensive qualities through competitions and certifications [2].

3. Design and implementation of the integration model of "position-related courses, skills competitions, and certifications" in construction engineering and construction specialty

3.1. Effective combination of job practices and curriculum teaching

The effective combination of job practices and curriculum teaching is the core link of the integration model of "position-related courses, skills competitions, and certifications." Firstly, schools should establish close cooperation with construction enterprises to jointly formulate practical teaching plans. Enterprises provide practical projects and operation sites according to actual job requirements, while schools are responsible for theoretical teaching and basic training. Through this approach, students can apply theoretical knowledge to practical operations in a real work environment, enhancing their comprehensive abilities.

Secondly, curriculum teaching should be closely designed around job practices. Theoretical courses should focus on explaining basic knowledge while combining case analysis and practical training to enhance student's understanding and application abilities. For example, when teaching structural mechanics in construction, combining it with actual construction cases and organizing students for on-site observation and operational practice makes theoretical knowledge more vivid and concrete. This way, students can not only master solid theoretical knowledge but also improve practical operational skills.

Lastly, schools should regularly organize job practice activities and arrange for students to intern in

cooperating enterprises. During the internship, students participate in the construction and management of actual engineering projects under the guidance of enterprise mentors, accumulating valuable practical experience. Schools should adjust and improve course content and teaching methods based on feedback from enterprises on students' practical performance, ensuring seamless integration of job practices and curriculum teaching.

3.2. Integration of competition incentive mechanisms and skills certification acquisition

The integration of competition incentive mechanisms and skills certification acquisition is an important part of the "position-related courses, skills competitions, and certifications" model. Firstly, schools should encourage students to actively participate in various skills competitions to stimulate their enthusiasm for learning and innovation through competition. Schools can establish a special competition guidance team, and invite industry experts and enterprise technicians as guiding teachers to help students prepare for competitions and improve their skills. Competition results not only reflect students' abilities but also provide strong support for their career development.

Secondly, schools should combine skills competitions with the acquisition of professional qualifications. Through participating in competitions, students can not only gain honor and rewards but also accumulate the skills and experience required to obtain professional qualification certificates. Schools should cooperate with relevant professional certification institutions to ensure the connection between competition projects and certification standards so that the skills learned by students in competitions can be recognized by authoritative institutions. This way, students can not only demonstrate their abilities in competitions but also increase their employability by obtaining professional qualification certificates.

Lastly, schools should establish a sound competition incentive mechanism to reward students who achieve outstanding results in skills competitions. Reward measures can include material rewards, honorary titles, credit rewards, and so on, to encourage students to continuously challenge themselves and improve their skills. Through the effective integration of competition incentive mechanisms and skills certification acquisition, schools can comprehensively improve students' professional qualities and career capabilities, laying a solid foundation for their career development [3].

3.3. Specific implementation path of comprehensive education and training model

The specific implementation path of the comprehensive education and training model requires multi-party coordination and systematic promotion. Firstly, schools should develop detailed implementation plans, clarifying the goals and tasks of each link. The implementation plan should include curriculum design, practice arrangements, competition plans, and certificate acquisition, ensuring orderly coordination and mutual promotion of various links. Schools should establish a dedicated working group responsible for coordinating and implementing various tasks to ensure the smooth implementation of the comprehensive education and training model.

Secondly, schools should strengthen cooperation with enterprises to jointly promote the implementation of the comprehensive education and training model. Schools can invite enterprise experts to participate in curriculum design and teaching to ensure the close integration of curriculum content with industry needs. Enterprises can provide practical opportunities and technical support for students, and participate in student internship guidance, and skills training. Through school-enterprise cooperation, schools and enterprises can jointly build a high-level comprehensive education and training platform, providing students with high-quality educational resources and practical opportunities.

Lastly, schools should establish a sound evaluation and feedback mechanism to timely understand the implementation effects of the comprehensive education and training model. Schools can regularly organize teacher-student symposiums and enterprise symposiums to listen to opinions and suggestions from all parties, and continuously improve and optimize the comprehensive education and training model. Through evaluation and feedback, schools can timely discover problems, summarize experiences, adjust strategies, and ensure the scientificity and effectiveness of the comprehensive education and training model.

3.4. Specific practices in the construction engineering and construction specialty

In the specific practices of the construction engineering and construction specialty, the implementation of the integration model of "position-related courses, skills competitions, and certifications" requires fine-grained design according to the characteristics of the specialty. Firstly, schools should design practical courses and projects tailored to the actual needs of construction engineering construction. For example, courses such as construction technology, project management, and structural design can be offered, combined with actual engineering projects for teaching, allowing students to come into contact with and participate in real construction projects during the learning process.

Secondly, schools should establish long-term cooperation relationships with construction enterprises to jointly develop and implement practical projects. Enterprises can provide real construction sites and technical support, while schools can provide talent and research results to enterprises. Through this cooperation, students can exercise operational skills, accumulate practical experience, and improve professional qualities in actual engineering projects. At the same time, enterprises can discover and cultivate outstanding talents through cooperative projects to meet their own talent needs [4].

Lastly, schools should establish a sound evaluation and feedback mechanism to ensure the quality and effectiveness of practical teaching. Schools can evaluate students' practical abilities and professional levels by regularly organizing students for practical operation assessments and skills competitions. Enterprises can understand students' performance and abilities through participation in practical projects and intern guidance, and provide improvement suggestions. Through evaluation and feedback, schools can continuously improve the content and methods of practical teaching, and enhance the quality and effectiveness of practical teaching.

4. Evaluation and improvement strategies of the integration model of "position-related courses, skills competitions, and certifications" in construction engineering and construction specialty

4.1. Construction of evaluation system

Constructing a scientific evaluation system is crucial to ensuring the effective operation of the integration model of "position-related courses, skills competitions, and certifications." The evaluation system should include multidimensional and multilevel evaluation indicators, comprehensively reflecting students' growth in knowledge, skills, and qualities. For example, evaluation indicators can include students' mastery of theoretical knowledge, practical operational capabilities, competition results, acquisition of professional qualifications, and comprehensive development of qualities. Through multidimensional evaluation, a comprehensive understanding of students' training effects can be achieved.

The evaluation system should focus on the combination of process evaluation and result evaluation. Process evaluation focuses on students' performance in learning and practice processes, including classroom participation, practical performance, and participation in competitions. Result evaluation focuses on students' final learning outcomes, such as exam scores, skills assessment scores, competition results, and acquisition

of professional qualifications. Through the combination of process evaluation and result evaluation, students' training effects can be comprehensively and objectively evaluated, providing a scientific basis for education and teaching.

The construction of the evaluation system should also emphasize the diversification of evaluation methods and the scientific nature of evaluation tools. In addition to traditional written tests and practical assessments, various evaluation methods such as project evaluation, task evaluation, academic records, and comprehensive quality evaluation can be introduced. Through diversified evaluation methods and scientific evaluation tools, students' training effects can be more comprehensively and accurately evaluated, continuously optimizing and improving the integration model of "position-related courses, skills competitions, and certifications."

4.2. Investigation and analysis of implementation effects

The investigation and analysis of implementation effects are important means to evaluate the integration model of "position-related courses, skills competitions, and certifications." Schools should regularly conduct student surveys and interviews to understand students' opinions and suggestions on curriculum design, teaching content, and practice arrangements. Through student feedback, problems in the teaching process can be identified, and students' actual needs can be understood to provide references for improving teaching.

Schools should organize comprehensive evaluations of students' performance by teachers and enterprise mentors. Teachers can assess students' mastery of theoretical knowledge through classroom performance, assignment scores, and exam scores; enterprise mentors can assess students' practical abilities through internship performance, practical operational capabilities, and work attitudes. Through comprehensive evaluations by teachers and enterprise mentors, a comprehensive understanding of students' performance in theory and practice can be achieved, providing data support for teaching improvement.

4.3. Existing problems and challenges

During the implementation of the integration model of "position-related courses, skills competitions, and certifications," there are some problems and challenges. The depth and breadth of cooperation between schools and enterprises are limited. Some school-enterprise cooperation mainly stays on the surface, lacking deep cooperation mechanisms and long-term cooperation models, which leads to students not getting sufficient practical opportunities and guidance during internships. In addition, enterprises often face pressures of human resources and time costs when participating in the education and teaching process, affecting the effectiveness of cooperation [5].

Insufficient teaching resources and faculty strength are also major challenges. To implement the integration of "position-related courses, skills competitions, and certifications," schools need to be equipped with sufficient practical training equipment and a high-level teaching team. However, many schools lack in teaching resources and faculty strength, making it difficult to meet the demands of the integration model of "position-related courses, skills competitions, and certifications." In addition, some teachers lack practical experience in enterprises, making it difficult to effectively guide students' practical operations, affecting teaching effectiveness.

3.4. Improvement strategies and future development directions

To address the problems and challenges, proposing corresponding improvement strategies and future development directions is key to enhancing the effectiveness of the integration model of "position-related courses, skills competitions, and certifications." Firstly, schools should strengthen in-depth cooperation with enterprises and establish long-term cooperation mechanisms. Schools can deepen cooperation with enterprises

by signing long-term cooperation agreements, jointly building training bases, and so on, to ensure that students can get sufficient practical opportunities and guidance during internships. Additionally, schools can invite enterprise experts to participate in curriculum design and teaching to enhance the practicality and relevance of teaching content.

Secondly, schools should increase investment in teaching resources and improve faculty strength. Schools can improve teaching resources and faculty levels by introducing advanced training equipment, conducting teacher training, and so on. It is particularly important to strengthen teachers' practical experience in enterprises so that teachers can better guide students' practical operations. Additionally, schools can improve teachers' professional levels and research capabilities by carrying out collaborative research projects with enterprises, organizing academic seminars, and so on, thus providing solid faculty support for the integration model of "position-related courses, skills competitions, and certifications."

In the future, schools can further explore innovative paths for the integration model of "Position-related courses, skills competitions, and certifications." For example, leveraging information technology to carry out a combined teaching mode online and offline, enriching students' learning and practice approaches through virtual simulation training, online competitions, and so on. Through continuous innovation and improvement, the integration model of "position-related courses, skills competitions, and certifications" will be perfect, providing more effective pathways and methods for the training of talents in the construction engineering and construction specialty [6].

5. Conclusion

This paper systematically explores the comprehensive education and training model of "position-related courses, skills competitions, and certifications" in the construction engineering and construction specialty, and verifies its effectiveness through specific practices. The study finds that the model has significant effects in improving students' professional skills and comprehensive qualities, but there are still some problems and challenges in the implementation process. Future research should further focus on the continuous optimization and innovative development of the model, explore more diverse and effective implementation paths, and better serve the high-quality development of vocational education. It is also recommended to strengthen policy support and resource input, promote the widespread application and in-depth practice of the integration model of "position-related courses, skills competitions, and certifications", and provide references for various vocational education specialties.

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