Research and Practice of "Two Platforms, Four Integration" Teaching Mode Reform of Electricity Courses Based on Competition Leadership

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Abstract: The main research content of this paper is to set up a student-centered teaching concept by taking the competition as the leader, taking the enterprise demand and job core skills as the guide, investigating the talent cultivation demand to set up the course orientation and teaching objectives, developing the course resources, relying on the course platform and the virtual simulation platform, exploring the "two-platform, four-integration" teaching mode reform. Through the pilot application in the national course ideology demonstration course "Power Cable", the three-dimensional goal is effectively achieved, the teaching effect is remarkable, and the quality of talent training is comprehensively improved.

Keywords: competition leading, two platforms, four integration, teaching mode reform

1 Introduction

The National Vocational College Teaching Ability Competition is the highest specification and the most influential competition in vocational colleges and universities at present, and it is the only national event organized by the Ministry of Education for teachers of vocational colleges and universities, and it is also the wind vane of teaching reform. The competition has become a display platform for transforming the development mode of vocational education driven by modern information technology, and has received more and more attention from vocational colleges and teachers. [1]

The author's teaching team in the past three years, had won the first prize, second prize, third prize in the The National Vocational College Teaching Ability Competition, the first prize of the Shandong Province, teaching ability competition four times. The team actively explore the electric power courses "two platforms, four integration" teaching mode reform practice based on the competition lead, at the same time combined with the cultivation needs of electric power talents.

The research of this paper takes students as the main body, teachers as the main line, quality as the core, highlights the practicality and innovation, and forms the core concept of "taking the teachers' competence competition as the leader, relying on the construction of informatization teaching-learning platform, and integrating the 'jobs, curriculum system, students' skills

ITEI 2023, November 24-26, Zhengzhou, People's Republic of China

DOI 10.4108/eai.24-11-2023.2343667

competitions, and vocational skills level certificates". [2] The core concept of "integration of work position, curriculum system, students' skills competition and vocational skills level certificate" is formed to reform and innovate the teaching mode of electric power courses.

2 "Two Platforms, Four Integration" Teaching Mode Research Ideas

Adhere to the Teaching Ability Competition as a leader. Encourage full-time teachers and enterprise teachers to collaborate and participate in skill competitions at all levels. Enhance the teaching ability of vocational teachers and enhance their professional competence through competitions. At the same time, promote the construction of high-level and structured teaching teams for teachers, improve their professional ethics, teaching abilities, comprehensive education abilities, and self-development abilities. Through the competition, teachers will enhance their awareness of docking standards, including docking national teaching standards, occupational standards, industry standards, enterprise technical specifications, etc., analyze the development trend of industry and enterprise, accurately position the talent training specifications, scientifically formulate curriculum standards, and enhance the connotation of professional construction.

Reform and innovation of "two platforms, four integration" teaching mode. Leading by the competition, taking the enterprise demand and job core skills as the guide, establishing the student-centered teaching concept. Conduct research on talent cultivation needs, establish course positioning and teaching objectives, and develop course resources. Exploring the reform and research content of the "Two Platforms, Four Integration" teaching model based on course platforms and virtual simulation platforms (see Figure 1), Adopting diversified evaluation methods, and verifying the teaching mode. Adopting diversified evaluation methods to verify the effect of teaching mode reform and continuously optimize the teaching objectives of the course.

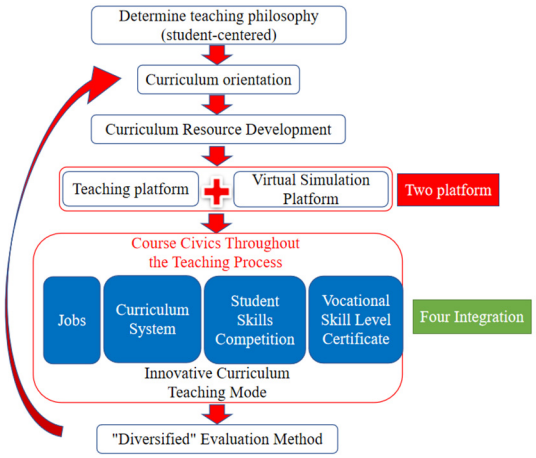

Figure 1: Research content of "two platforms, four integration" teaching mode reform

3 Research on “two platforms, four integration” teaching mode

3.1 Research on “two platforms” curriculum resource system

1. Construction of opening and sharing curriculum resources

Using modern information technology, building a structured course resource library for students, teachers, and industry enterprises, and open it online, Develop diverse auxiliary online resources and build a networked and three-dimensional learning environment. [3]Develop new forms of integrated teaching materials (including digital resources). Collaborate with enterprises to develop related video courses and improve the construction of teaching resource platforms.

2. Innovate the form of new loose-leaf teaching materials.

The new type of loose leaf teaching materials are developed and designed according to the concept of "student-centered, learning outcome oriented, and promoting self-directed learning". Weakening the characteristics of "teaching materials" and strengthening the function of "learning materials", making "job requirements, professional standards, work processes or products of enterprise positions (groups)" the main content of the textbook. And organically integrate "moral education and ideological and political education in curriculum" into textbooks, providing various types of three-dimensional and information-based course resources that are rich, applicable, and lead innovation.

3. Build a virtual simulation platform

There are pain points in the operation of electric power training, such as electric shock injuries and difficulty in repeated operations. By combining real work scenarios to build a virtual simulation exercise platform, electric shock injuries can be avoided. [4]The school collaborates with enterprises to develop simulation software and electric power VR. Through the virtual simulation platform, students can quickly master on-site knowledge of the power industry, improve their professional skills, and become familiar with the operation process of the power industry. Effectively addressing high-risk issues in the process of cultivating electric power talents and improving the quality of talent cultivation. The Implementation of the “two platforms” study can be found in Figure 2.

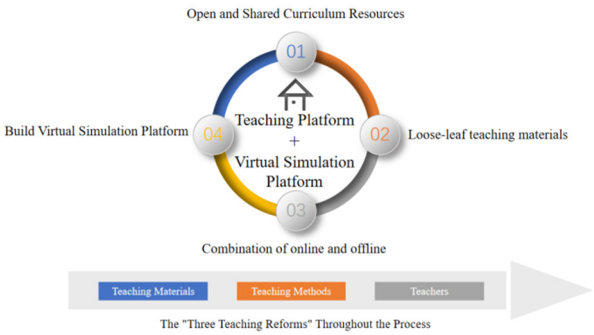

Figure 2: Implementation of the “two platforms” study

3.2 Research on the teaching system of the “four integrated” courses

The “Four integration” research implementation content is shown in figure 3.

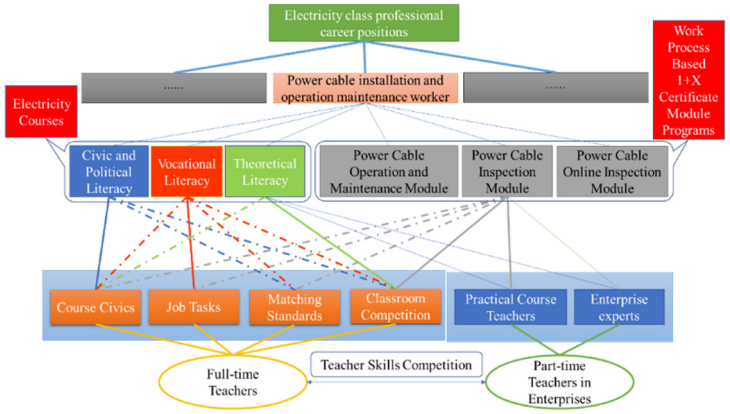

Figure 3 “Four integration” research implementation content

1. Job research lays the foundation for the reform of teaching mode.

Conduct thorough research within the industry and enterprises, scientifically position curriculum standards and talent development goals. The reform of teaching mode must meet the job requirements, job responsibilities, and required professional abilities. During the implementation of teaching, professional ethics, job responsibilities, job responsibilities, and processes should be integrated to enable students to have a comprehensive understanding of their positions. The practical skills teacher is composed of full-time teachers and enterprise teachers, who introduce students into real enterprise projects and provide practical training according to job requirements, learning and doing at the same time. Through project teaching and practical job training, effective integration between coursework and on-the-job responsibilities can be achieved, enhancing students' practical skills and adaptability.[5]

2.Reconstruction of vocational courses

Using "job, certificate, and competition" as the carrier, implement project-based curriculum reform, and integrate the four contents of "basic ability cultivation, core ability cultivation, comprehensive ability cultivation, and expanded ability cultivation" into an "advanced training" system. In the integrated curriculum system of "job, course, certificate, and competition", students not only need to pass the assessment of school teachers and part-time teachers in enterprises, but also gain benefits in vocational skill level evaluation and professional skill competitions, To be able to pass the comprehensive assessment of "four in one".

3.Carrying out students’ skill competitions according to the core job competence.

Conduct student skill competitions based on core job abilities. Sort out the rules, content, and requirements of skill competitions, and extract the knowledge and skills points of the competition. And incorporate competition sub projects into the entire process of curriculum implementation, breaking down the barriers of disconnection between competition and curriculum. Through skill competitions, promote the development of competitions at all levels,

enhance students' innovative awareness and ability, efficiently achieve teaching goals, and comprehensively improve teaching quality.[6]

4. Align with occupational skill level standards

Closely follow the talent training program for electric power professionals, and combine it with the urgently needed electric power technical skilled personnel in current electric power positions, efficiently connect with the vocational skill level certificate (1+X) standards. [7]According to the requirements of basic, intermediate, and advanced abilities, revise the curriculum standards and introduce new technologies, concepts, and standards in the power industry. And carry out modular teaching according to job tasks, optimize and determine task knowledge and skill points, and comprehensively enhance students' professional literacy.

5. Organic integration of curriculum politics

Starting from the characteristics of electric power majors, integrating ideological and political education elements into the knowledge system, and modifying talent training programs. Incorporate the cultivation of labor education, craftsmanship spirit, professional ethics, and other qualities into the talent training objectives, so as to unify the curriculum objectives of the electric power major with the talent training objectives. [8] By designing the course objectives, content, classroom teaching, and assessment evaluation in all aspects, deeply integrating schools and enterprises, constructing a real and rich case library of electric power courses, and classifying the case library according to projects, integrating the spirit of craftsmanship, labor, safety education, and other content through real enterprise cases, promoting ideological and political education silently and enhancing students' ideological and political literacy.

4 Practice of "Two Platforms, Four Integration" Teaching Mode

4.1 Basic idea of teaching mode construction

Starting from the actual implementation process of the "two platforms, four integrations" teaching model, taking into account the systematic and flexible nature of targeted student source teaching. We will explore and practice teaching implementation, teaching resource construction, faculty optimization, and teaching quality evaluation through four teaching modules: online teaching, offline teaching, independent exploration, and assessment and evaluation, which will be conducted in a hierarchical and phased manner. Based on clear teaching objectives, enriched teaching content, high-quality teacher growth, and guaranteed teaching effectiveness, a virtuous cycle development process of generating teaching feedback, reflection, and optimization is generated to effectively improve teaching efficiency.[9] The framework of the idea is shown in Figure 4.

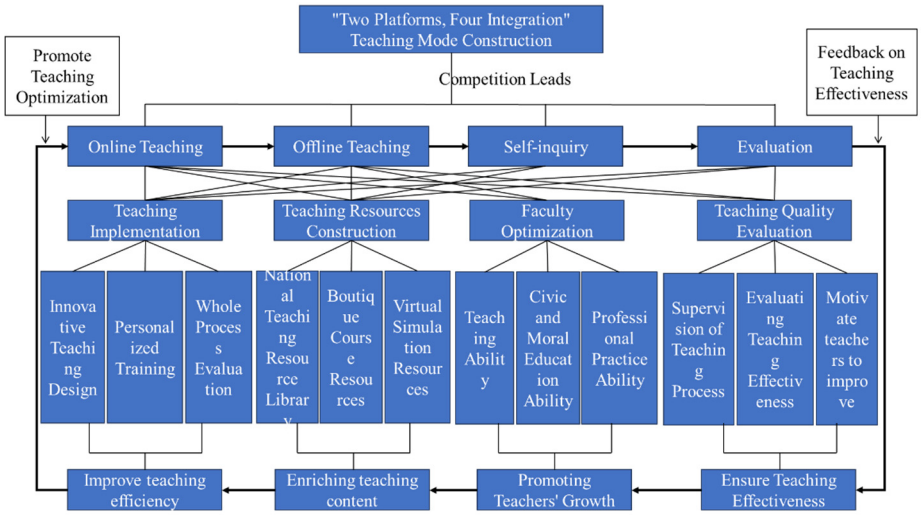

Figure 4 Basic idea of "two platforms, four integration" teaching mode construction

4.2 Implementation of teaching mode

1. Teaching design

(1) Take students as the main body and emphasize autonomy.

The teaching design focuses on cultivating students' subjective consciousness and improving their independent learning ability. Combining the student-oriented teaching concept with rich and diverse informatization teaching means, giving full play to the advantages of the online platform, changing the traditional on-campus teaching format, guiding students to independently arrange their study time, choose the difficulty of their study, plan their study progress, and complete their study tasks, optimizing their learning experience and enhancing their interest in learning.

(2) Implementing personalized training and highlighting flexibility

Teachers take into account the actual situation of enrollment, ensure the quality of talent training as a prerequisite, pay attention to the long-term development of each student, and formulate student-centered, personalized curriculum standards for enrollment expansion. In addition, teachers divide students into groups according to their knowledge base and willingness to learn, tap students' personalized strengths, teach students according to their aptitude, achieve hierarchical training through group teaching, and guide students to plan their learning independently.

(3) Reshaping the knowledge framework and highlighting hierarchy

The deconstruction and reorganization of knowledge content should highlight the hierarchical nature of the course content using modularization to divide the difficulty level, the integration of the power cable course planning for "cognitive cable lines-power cable operation and maintenance and overhaul-power cable inspector maintenance-power cable online monitoring" four learning projects, and the knowledge of each part of the division of the primary module,

The knowledge of each part is divided into primary module, advanced module and expansion module. Combined with the curriculum system, we configure the teaching modules and select the teaching contents according to the characteristics of students' learning situation, and organically combine the blended teaching with the modularized teaching, case study teaching and the course politics to enhance the effectiveness of teaching.

2. Teaching implementation

Teachers guide students to use the digital learning platform of Shandong University of Electronic Science and Technology for learning through various online and offline methods. To achieve teaching objectives, each teaching task is designed in three parts: pre class, in class, and post class extension. Teaching is carried out through six important stages: thinking, clarifying, analyzing, exploring, practicing, and expanding (as shown in Figure 5). Six stages are deeply integrated, action oriented, and case based tasks are used as carriers to organize teaching activities according to actual cable work scenarios. During the learning process, ideological and political education runs through the entire teaching process, strengthening safety awareness, cultivating a sense of responsibility, and developing the ability to learn independently; Students complete their learning through case analysis, skill training, and task testing, achieving "teaching by doing, learning by doing". During the learning process, utilizing information technology such as power cable virtual simulation and power VR to highlight key content, and introducing industry and enterprise standards to overcome difficult problems. Adopting a retrospective approach for role-playing in practical projects, truly putting students at the center, conducting teaching activities, and improving operational skills. By utilizing a personalized teaching platform, the entire teaching process is recorded, and teaching objectives are checked through multiple evaluations, continuously revising the "two platforms, four integrations" teaching model.

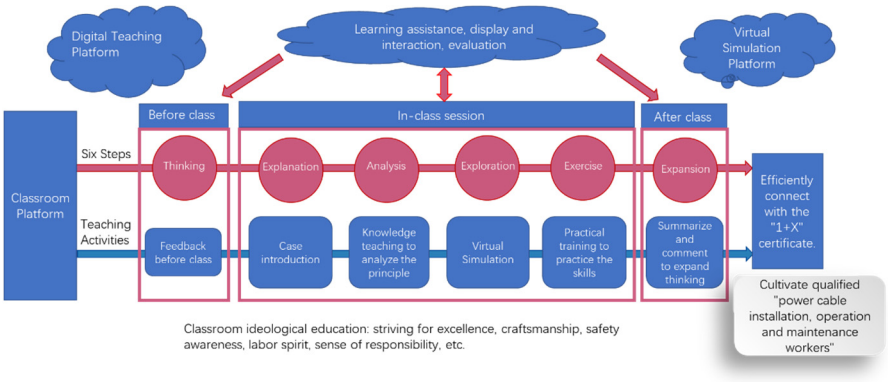

Figure 5 Teaching implementation process

3. "Diversified" assessment and evaluation

Innovative "diversified" assessment and evaluation system, using "task process evaluation + project summative evaluation" learning effect evaluation, effective implementation of teaching and learning behavior analysis. The task process evaluation includes 4 level indicators of "course learning, job competence, skills competition and 1+X certificate"; the project summary

evaluation includes 6 indicators of project works. The evaluation body is based on self-assessment, supported by machine assessment, and other assessment (teacher assessment, enterprise assessment and group mutual assessment) as the core of the three ways to carry out three-dimensional evaluation, which provides strong data support for the teachers' teaching and students' learning effects.[10] At the same time, we have designed the evaluation system of "students' personal growth e-portfolio", which can truly reflect students' learning through objective data presentation, so that students can clearly grasp the value-added situation of their own learning, and they can truly experience the progress and success of their own learning, and at the same time, in the case of students' internships and employment, it can be directly provided to the employers as the reference data.

5 Implementation Effect

The pilot application of the teaching mode of "two platforms, four integration" in the course of "Electric Power Cable" has achieved remarkable results in teaching, solved the problems of integrating the ideology and politics of the course into the classroom, the application of curriculum resources in the reform of classroom teaching, and the insufficiency of innovation and entrepreneurship ability of the students, so that the three-dimensional objectives of the students have been reached effectively, and the quality of talent cultivation has been improved comprehensively.

5.1 Effectiveness of Teaching Reform

1. The cooperation between schools and enterprises in building a case library has solved the problem of integrating ideological and political education into professional courses in the classroom, allowing the ideological and political elements of courses to be internalized in the form of a case library. Deeply integrating schools and enterprises, constructing a real and rich case library of electric power courses, and categorizing the case library according to projects. Through real enterprise cases, the spirit of craftsmanship, labor, safety education, and other content are organically integrated, making the classroom more vivid and convincing, and effectively promoting ideological and political education.

2. Relying on the "two platforms", we have solved the problems of curriculum resources and classroom teaching reform, insufficient independent learning of students, few teaching hours, focusing on classroom but not extracurricular, focusing on results but not the process, and the problem of single evaluation. Reconstructing teaching resources on the basis of the teaching platform, through the development and uploading of teaching courseware, teaching videos, operation videos and other resources to the platform, students can carry out targeted independent learning outside the classroom according to their own learning needs and learning interests. Relying on virtual simulation, students can repeatedly practice skills operation, solving the high-risk, difficult to repeat operation problems in the process of electric power personnel training. At the same time, through the multi-dimensional evaluation system, to solve the traditional teaching evaluation methods and means of teaching a single, can not fully evaluate the problem of students.

3. Strengthen the "four integration", solve the problem of insufficient innovation and entrepreneurship ability of students, and improve the adaptability of students' electric power

jobs. At the same time, it also solves the problems of emphasizing individual rather than cooperation, emphasizing the first classroom rather than the second classroom, and insufficient practical innovation ability. Through the integration of graduation certificate and vocational certificate, integration of course content and job tasks, integration of course practice and skills competition, integration of professional courses and political education, deepen the 1+X certificate, reconstruct the curriculum module, scientifically locate the curriculum standard and cultivation objectives, and effectively solve the problem of disconnection between the school's talent output and the enterprise's demand for talents. The problem of disconnection between the school's talent output and the enterprises' talent demand is effectively solved.

5.2 Student Learning Effect

1. Achievement of teaching objectives

The online and offline activities run through three stages: theoretical learning, virtual simulation, and practical training, expanding the time and space of traditional classroom teaching and learning. Highlighting key content through the use of team combat videos, animations, and other information technology means. Introduce industry and corporate standards to overcome difficult issues. Through the analysis of the examination system, there has been a significant improvement in student motivation, academic performance and practical level.

2. Vocational skills significantly improved

Before the start of the class, none of the students had used equipment such as peeling and cutting tools, fault rangefinders, high-voltage signal generators, and intelligent fault fixers. Adopting a "project review" approach in the classroom, involving all students in the classroom. After the project is completed, all students will master the usage methods of tools and instruments. Through practical assessment of job positions, students have significantly improved their professional skills, and they have won one gold and one silver award in the innovation and entrepreneurship competition themed on cable projects.

3. Strengthening of Civic and Political Literacy

Integrating ideological and political education into professional classrooms, this course extracts 8 key themes such as "striving for excellence", "labor glory", and "craftsman spirit". Through studying practical exercises of enterprise teams, playing a series of videos such as national craftsmen and era models, and silently enhancing students' ideological and political literacy, this course has been awarded the National Course Ideological and Political Demonstration Course.

6 Conclusion

This article transforms the results of teaching skills competitions and constructs a "two platforms, four integrations" teaching model suitable for vocational college students majoring in electrical engineering. It summarizes the experience of the reform of teaching models in electrical engineering courses in leading competitions, relying on platforms, and integrating documentary evidence. It plays a demonstrative role and comprehensively promotes and applies it, providing successful experience for vocational colleges to implement school enterprise integration education and explore the growth laws of technical and skilled talents. By widely applying it in the course of Power Cable, it can provide reference for the teaching of power

courses in similar schools, better improve teaching quality, and have certain promotion and application value.

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