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Innovative Design of a Dual-Qualified, Dual-Skilled, and Dual-Capable Training System for Vocational College Teachers in an Enterprise HR Student-Oriented Evaluation Framework

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Abstract

The core mission of vocational education is to cultivate high-quality technical and skilled talents that meet industry demands. The "Dual Qualifications, Dual Excellence, Dual Competencies" framework for teachers (i.e., "Dual Qualifications": Dual qualifications as both educators and technicians; "Dual Excellence": High teaching standards and strong practical skills; "Dual Competencies": Curriculum development and workplace guidance capabilities) serves as the key pillar for achieving this mission. Centered on corporate HR student evaluations, this study analyzes the disconnect between current vocational university teacher training systems and enterprise talent demands. By integrating HR assessment data on graduates' job adaptability, professional competence, and practical skills, it establishes a closed-loop training system encompassing "demand diagnosis, content restructuring, model innovation, implementation assurance". Through literature analysis, corporate surveys, and case studies, the research clarifies the mapping relationship between HR evaluation metrics and teacher competencies. Ultimately, it proposes innovative solutions including modular curriculum systems, industry-academia collaborative training, and dynamic evaluation feedback mechanisms, providing practical pathways for vocational universities to enhance faculty development quality and improve alignment between talent cultivation and industrial needs.

Keywords

Dual-qualified dual-skilled dual capability; Enterprise HR evaluation; Innovative design; Teacher training system; Vocational college

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1. Introduction

1.1. Research background

The National Vocational Education Reform Implementation Plan explicitly proposes to "build a high-level dual-qualified faculty team," requiring vocational college teachers to possess both solid teaching expertise and robust industry practice capabilities. However, most vocational university teacher training systems still focus primarily on "improving in-house teaching skills," neglecting enterprises actual talent demands. As direct participants in graduate recruitment and position evaluation, corporate HR professional assessments of students professional competence, practical skills, and job fit serve as crucial benchmarks for evaluating teaching effectiveness and driving faculty development.

Research indicates that 72% of corporate HR professionals identify vocational college graduates with challenges such as "inadequate practical skills" and "weak professional awareness." The root cause of these issues lies in the lack of "dual-qualified, dual-skilled, and dual-capable" teachers. While some instructors hold dual-qualification certifications, their absence of frontline industry experience results in teaching content that fails to align with real-world job requirements. Meanwhile, teachers with strong practical skills often struggle to adapt industry technologies into curriculum materials that match students' cognitive levels. Therefore, integrating corporate HR student evaluations into teacher training systems has become the key breakthrough to address the disconnect between "teaching" and "application."

1.2. Research significance

1.2.1. Theoretical significance

This study breaks through the traditional "school-centered" single perspective in teacher training, establishing a theoretical logic chain of "enterprise HR evaluation-teacher competency enhancement-talent cultivation quality optimization". It enriches the "demand-oriented" research dimension in vocational education teacher development theory, providing new theoretical support for defining the connotation and evaluation criteria of "dual-qualified, dual-skilled, and dual-capable" teachers.

1.2.2. Practical significance

By innovatively designing teacher training systems tailored to corporate needs, we can directly enhance educators' ability to transform industrial technologies into teaching resources, thereby improving students job adaptability and career competitiveness. Simultaneously, this establishes a collaborative mechanism between vocational colleges and enterprises covering talent evaluation, teacher training, and school-enterprise cooperation, enabling vocational education to better serve regional industrial development.

1.3. Research methods and framework

1.3.1. Research technique

A systematic review was conducted of both domestic and international research related to vocational education teacher training and corporate involvement in talent evaluation. The review aimed to clarify and conceptualize the framework of "Dual Teachers, Dual High Qualifications, and Dual Competencies," identifying its theoretical foundations and practical implications. Key HR assessment indicators commonly used in enterprise talent evaluation were also analyzed to establish a basis for the empirical components of this study.

To obtain first-hand data on industry evaluation of vocational graduates, semi-structured interviews were carried out with HR departments from ten representative manufacturing and service enterprises. The survey focused on collecting quantitative and qualitative data, including graduate job skill attainment rates, professional competency scores, and overall employment performance. Statistical and correlational analyses were then applied to examine the relationships between these enterprise evaluation metrics and the teaching competencies of vocational education instructors.

A pilot implementation was conducted using the Mechatronics program at Hainan Vocational University of Science and Technology as a case study. The training system developed in this research was applied within the program to assess its practical feasibility and effectiveness. Data were gathered through classroom observation, performance assessments, and enterprise feedback on student internship performance. The outcomes were analyzed to evaluate the alignment between the proposed training framework and real-world competency development needs.

2. Definition of core concepts and literature review

2.1. Defining core concepts

Corporate HR student evaluations refer to systematic assessments conducted by corporate human resources departments during recruitment, probation periods, and position evaluations. These evaluations assess graduates job fit (alignment between professional skills and job requirements), professional qualities (responsibility, teamwork, execution capabilities), and development potential (learning capacity, innovative awareness). The evaluation results directly reflect whether students meet corporate hiring standards while indirectly indicating the alignment between faculty teaching and industry demands [1–3].

The "Dual Qualifications, Dual Excellence, Dual Competencies" framework for vocational college instructors, grounded in existing research and industry demands, is defined as follows:

(1) Dual qualifications: Possess both a university teaching qualification and an industry technician-level certification or higher, with at least one year of frontline corporate experience [4];

(2) Dual excellence: Demonstrate high pedagogical proficiency (designing student-adaptive curricula and utilizing digital teaching tools) and strong practical expertise (mastering cutting-edge industry technologies to resolve real-world technical challenges);

(3) Dual competencies: Develop curriculum design skills (translating corporate technical standards into course content) and job guidance capabilities (mentoring students in workplace practices and troubleshooting technical issues during training) [5].

2.2. Literature review

2.2.1. Status quo of domestic research

Domestic scholars research on "dual-qualified" teacher training primarily focuses on "school-enterprise cooperative training models". For instance, Wang proposed a dual-track training model combining "on-the-job enterprise practice + in-school teaching seminars", though she failed to directly link corporate HR evaluations with teacher training. Zhang highlighted the disconnect between vocational college teacher training content and industry needs, yet did not propose concrete solutions guided by HR evaluation data [6].

2.2.2. Current situation of overseas research

In Germany "dual system" vocational education, companies directly participate in teacher training and curriculum design. For instance, Siemens provides regular technical training for vocational school teachers, but this model relies heavily on corporate involvement, making it difficult to directly apply to Chinas vocational education landscape. Meanwhile, U.S. community colleges use "employer advisory boards" to gather talent demands, yet fail to establish a closed-loop mechanism integrating HR evaluations with teacher training [7].

2.2.3. Research review

Existing studies have realized that the teacher training of vocational colleges needs to meet the needs of enterprises, but there is a lack of systematic design that takes "enterprise HR student evaluation" as the core orientation, and fails to establish a direct mapping relationship between evaluation data and teacher ability improvement. This study is aimed at this gap [8].

3. Analysis of the problems in the training system of "double teachers, double high and double abilities" for teachers in vocational universities

3.1. Training needs assessment divorced from corporate HR evaluation, resulting in unclear objectives

Current vocational college teacher training needs assessments predominantly rely on "in-house self-evaluation," determining training content solely through faculty questionnaires and teaching supervision feedback, without incorporating corporate HR evaluations of graduates. For instance, in a vocational colleges 2023 teacher training plan, topics like "smart manufacturing technology updates" and "digital teaching methods" accounted for 60% of the content. However, HR surveys from enterprises revealed that graduates generally lack "equipment troubleshooting skills", a critical competency not reflected in the training requirements. This disconnect between training objectives and actual corporate needs

makes it challenging to effectively enhance the "high practical skills" component of teachers "dual-high" qualifications.

3.2. The training content is overly theoretical, failing to meet the practical requirements of the "dual-qualified, dual-skilled, and dual-capable" model

The training content remains predominantly theory-based, lacking integration with frontline enterprise technologies and job scenarios. Specifically: For "dual-qualified" teacher training, the focus is mainly on "certificate preparation guidance" while neglecting the cultivation of teachers "practical enterprise experience," resulting in instructors holding certifications but lacking real-world job understanding. For "high-quality teaching" training, emphasis is placed on "innovative teaching methods" such as micro-lecture design and flipped classrooms, yet fails to address HR evaluations regarding "students operational proficiency" through specialized training on "transforming enterprise technologies into teaching materials." Regarding "dual-capability" training, there is almost no mention of "curriculum development and job guidance," making it difficult for teachers to incorporate HR-focused "job fit" considerations into their instruction [9,10].

3.3. Single training mode and lack of school-enterprise collaboration mechanism

The current training model predominantly relies on "on-campus centralized instruction," accounting for over 80% of programs. While a small number of training sessions include "corporate visits," no collaborative training mechanism between schools and enterprises has been established. This approach presents two critical issues:

(1) Instructions lack frontline industry exposure, making it difficult for them to master "cutting-edge technologies" emphasized in HR evaluations. For instance, a teacher specializing in automotive engineering only learns "traditional engine maintenance" during training, without addressing "new energy vehicle battery maintenance", a key focus for corporate HR;

(2) Enterprises are excluded from designing and implementing training programs, resulting in content that fails to align with job requirements. Consequently, HR feedback on graduates cannot be directly translated into actionable improvements for teacher training [11].

3.4. The closed loop of training evaluation is missing, and the effectiveness is difficult to be implemented

Most vocational colleges evaluate training effectiveness solely through "exams" and "questionnaires" after completion, lacking a closed-loop mechanism of "training-teaching-HR feedback". For instance, after teachers participate in "practical skills training", the school neither monitors whether they apply the training content in teaching nor collects corporate HR evaluations of students' competency improvements. This results in training effectiveness being unverifiable through students' job performance, leaving teachers "dual-qualified, dual-skilled, and dual-capable" development without a basis for continuous improvement [12].

4. Analysis of the correlation between student evaluations of enterprise HR and teachers dual-qualified, dual-skilled, and dual-capable proficiency

To build a training system oriented by enterprise HR evaluation, it is necessary to first clarify the correlation between HR evaluation indicators and teachers' abilities, and establish a mapping relationship of "evaluation indicators-teachers ability gap-training priorities", which is the core basis of training system design [13].

4.1. Extraction of HR student evaluation indicators

Through interviews and evaluation data collection from HR professionals at 10 enterprises, three core evaluation indicators were identified, as detailed in **Table 1**.

4.2. Evaluation metrics and their alignment with teachers dual-qualified, dual-skilled, and dual-capable profile

4.2.1. Job fit index: Teachers dual high qualifications and dual competencies

The low "professional skill attainment rate" reflects insufficient "practical competence" among teachers: Their

Table 1. Enterprise HR student evaluation index table

Evaluative dimension	Core metrics	Indicator description
Position fit	Professional skill attainment rate	The degree to which students professional skills match the job requirements, such as equipment operation, technical parameter debugging, etc
	Problem solving ability in position	Students ability to independently solve common problems in their positions, such as troubleshooting and process optimization
Professional quality	Responsibility and execution	The seriousness and efficiency of students in completing their work tasks, such as timely delivery and error control
	Teamwork	The ability of students to work with colleagues, such as cross-department communication and task division
Development potential	Technical learning ability	Students quickly master new industry technologies, such as new equipment operation, software application, etc
	Consciousness of innovation	Students demonstrate the ability to improve work methods, such as optimizing operational processes and reducing costs

failure to master the latest industry technical standards results in teaching content that fails to align with job skill requirements [14,15]. This also reveals a lack of "curriculum development capability," as teachers cannot effectively translate industry standards into course materials. Meanwhile, the weak "problem-solving ability for job positions" highlights deficiencies in both "practical skills" and "on-the-job guidance capabilities." Teachers lack of real-world problem-solving experience prevents them from guiding students to simulate workplace scenarios and develop problem-solving abilities during instruction [16,17].

4.2.2. Professional competence indicators: Teachers dual excellence

The lack of "responsibility and execution" reflects the absence of "professional competence integration" in teachers "high teaching proficiency." Teachers fail to incorporate corporate job standards and work discipline into their instruction, resulting in students lack of career awareness. The weak "team collaboration skills" indicate insufficient "contextual teaching ability" in teachers "high teaching proficiency." Teachers do not design collaborative teaching activities (such as project-based learning), failing to cultivate students' teamwork awareness [18].

4.2.3. Development potential indicators: Dual-qualified teachers and dual-high qualifications

The weak "technical learning capacity" reveals insufficient "practical industry experience" among dual-qualified teachers. They fail to keep up with emerging industry technologies, making it difficult to guide students in mastering cutting-edge knowledge during instruction. This also highlights the lack of "methodological guidance skills" within their "high teaching proficiency". The inadequate "innovative awareness" reflects insufficient "technological innovation capabilities" in their "strong practical skills". Teacher's absence of corporate innovation experience prevents them from stimulating students creative thinking in classroom teaching [19].

4.3. Core implications of mapping relationships for the training system

Based on the aforementioned mapping relationship, the teacher training system should focus on three core directions: For "job adaptability", strengthen training in "enterprise practice skills" and "curriculum development capabilities"; For "professional competence", supplement training in "professional competence integration into teaching" and "contextual teaching"; For "development potential", enhance training in "industry new technology tracking" and "innovative teaching".

5. Innovative design of faculty training system for enterprise HR under student evaluation orientation

Based on the mapping relationship between HR

evaluation and teachers' competence, and combined with the problems of the current training system, this paper designs an innovative training system from four dimensions: "demand diagnosis, content reconstruction, model innovation, and closed-loop evaluation".

5.1. Training needs assessment: Establishing a collaborative diagnosis mechanism for "HR evaluation and teacher competency"

Breaking away from the traditional "in-house self-assessment" model, the system adopts corporate HR evaluation data as the core basis for demand diagnosis. The specific process is as follows: At the end of each semester, vocational colleges collaborate with partner enterprises to collect HR evaluations on graduates "job fit, professional competence, and development potential," forming the "Graduates Enterprise Evaluation Report." Based on the mapping relationship between "evaluation indicators and teacher competencies," educators identify weak points in the report (e.g., "low professional skill attainment rate") and analyze corresponding competency gaps (e.g., "insufficient practical skills"). By integrating teacher self-assessments and teaching supervision feedback, a comprehensive "Teacher Training Needs List" is established to ensure training content precisely aligns with corporate requirements.

5.2. Curriculum restructuring: Developing a "three-dimensional modular" course system

Guided by HR evaluation standards and the Dual Teachers, Dual High Qualifications, Dual Competencies framework, the training program has been restructured into three core modules: Enterprise Practice, Teaching Transformation, and Competency Integration. Each module features targeted sub-courses, as outlined below:

(1) Module 1: Enterprise Practice Module (focusing on dual-qualified teachers and high practical skills)

(i) Sub-course 1 (Enterprise Internship Training): Teachers will be assigned to frontline positions (e.g., engineer assistants or technical consultants) in partner companies for at least three months, focusing on HR-relevant technical skills (e.g., new energy vehicle maintenance, industrial robot debugging) to address the issue of teachers lack of practical job knowledge;

(ii) Sub-course 2 (Industry New Technology Training): Invite enterprise technical experts and HR to deliver special lectures on the latest industry technical standards and job demand changes (such as "Smart Manufacturing Process Update" and "Modern Service Industry Digital Transformation"), helping teachers track cutting-edge technologies;

(iii) Sub-course 3 (Dual-qualified Practical Training): Moving beyond theory-focused exam preparation, this model combines real-world corporate projects (e.g., equipment troubleshooting) with certification. Teachers must complete actual enterprise projects before taking the qualification exam, ensuring the dual-qualified certification is directly linked to practical skills.

(2) Module 2: Teaching Transformation Module (focusing on "Dual Competencies" and "High Teaching Standards")

(i) Sub-Course 1 (Job-Oriented Curriculum Development): Instructors will translate HR-focused job skill standards (e.g., "logistics and warehousing workflows") into course content, master the "task decomposition, instructional design, and practical training project development" methodology, and enhance their "curriculum development capabilities";

(ii) Sub-course 2 (Innovative Practical Teaching Methods): To address the issue of weak practical skills in HR evaluations, trainers implement project-based teaching and job simulation teaching. For example, instructors are assigned to design simulated corporate order processing training projects to enhance their job guidance capabilities;

(iii) Sub-course 3 (Application of Information Technology in Teaching): Train teachers to use VR and simulation software to recreate workplace scenarios (e.g., "virtual factory operations"), addressing the shortage of on-

campus training equipment and enhancing teaching quality.

(3) Module 3: Competency Integration Module (focusing on "Advanced Teaching Standards" and Professional Competency Development)
   (i) Sub-course 1 (Professional Competency Integration): Invite HR professionals to explain job-specific competencies (e.g., quality awareness in manufacturing and service industry standards for customer support), and guide instructors to incorporate these into daily teaching (e.g., by including a quality error control assessment in practical training;
   (ii) Sub-course 2 (Teamwork and Innovative Teaching): Train teachers to design "team project training" (such as "group cooperation to complete product assembly"), and introduce the enterprise "innovation proposal system" to guide students to propose improvement plans, and enhance students teamwork and innovation awareness.

5.3. Training model innovation: Implementing the "school-enterprise collaboration + dual-mentorship" training model

Breaking the single model of "centralized classroom teaching", we establish a collaborative framework where enterprises lead practical training while schools guide pedagogical transformation. The dual-mentor system assigns each participating teacher an "enterprise mentor" and a "school mentor". Enterprise mentors are typically technical experts or HR professionals from partner companies, oversee teachers practical training and job-specific skill development. School mentors are usually distinguished faculty members, assist in translating corporate technologies into teaching materials.

The three-phase training program comprises three distinct stages. The first phase (1–2 months) involves corporate immersion, where instructors work alongside frontline HR professionals under corporate mentors to master job-specific technical competencies. The second phase (2 weeks) focuses on academic adaptation, during which instructors transform workplace insights into structured course materials and hands-on training modules guided by university mentors. The final phase (1 month) emphasizes classroom implementation, where instructors apply these adapted teaching methods. Corporate and university mentors jointly observe and evaluate instruction sessions, providing actionable feedback for continuous improvement.

By integrating online and offline resources, we have established a "School-Enterprise Training Cloud Platform" to upload corporate technical videos, HR evaluation cases, and other materials for teachers continuous learning. Additionally, an online discussion forum has been created where corporate mentors and school-based instructors collaborate with teachers in real-time to address challenges in both teaching and practical application.

5.4. Closed-loop training evaluation: Establishing a four-dimensional dynamic evaluation mechanism

Moving beyond the conventional evaluation upon training completion model, we have established a closed-loop evaluation system encompassing training process, teaching application, HR feedback, and continuous improvement. This framework conducts assessments through four key dimensions:

(1) Training process evaluation involves joint assessments by corporate mentors and campus instructors regarding teachers' performance during the "Corporate Practice" and "Teaching Transformation" phases, including "proficiency in job-specific technical skills" during corporate practice and "quality of practical training project design" during teaching transformation;
(2) Teaching application evaluation assesses whether instructors effectively integrate training content into instruction through classroom observations and student surveys, such as "implementation of job simulation training". This research focuses on innovative design of the "Dual-qualified, Dual-skilled, Dual-capable" training system for vocational college teachers under student-oriented evaluation by corporate HR;
(3) HR feedback evaluation collects assessments from corporate HR regarding students taught by these teachers at the end of the next semester,

comparing pre-and post-training changes in indicators like "job adaptability and professional competence" (e.g., "increase in professional skill attainment rate"). This component accounts for 40% of the evaluation weight, validating training effectiveness through corporate needs;

(4) Continuous improvement evaluation combines results from the first three dimensions to form a "Teacher Training Effectiveness Report", analyzing system shortcomings (e.g., "discrepancies between sub-course content and corporate technology") and feeding back to the needs diagnosis phase to optimize training content and models for the next cycle, creating a dynamic "evaluation-improvement-re-evaluation" loop.

6. Safeguard measures for the implementation of the training system

The innovative design of the training system needs to be supported by perfect safeguard measures, so as to break through the barriers of school-enterprise collaboration, ensure resource input and maintain the long-term operation of the system. The safeguard mechanism is constructed from the aspects of organization, resources and system.

6.1. Organizational support: Establish a "school-enterprise collaboration" training management institution

A "Joint Management Committee for Teacher Training" has been established through collaboration between vocational universities and partner enterprises, clarifying responsibilities and breaking down communication barriers. The university committee coordinates internal resources (including distinguished faculty and training facilities), organizes teacher participation in training programs, and monitors teaching application progress. The enterprise committee, involving HR and technical departments, provides practical training positions, dispatches corporate mentors, and supplies HR evaluation data and job requirement information. The committee holds quarterly meetings to review the "Training Needs List" and "Training Effectiveness Report", addressing coordination issues such as "insufficient corporate training positions" and "delayed HR evaluation data", ensuring the training system aligns with corporate needs.

6.2. Resource assurance: Establishing a collaborative school-enterprise resource support system

Resource allocation forms the foundation for implementing the training system, requiring support in three key areas: funding, faculty, and facilities. For financial support, a "school-enterprise co-financing + government subsidy" fund pool should be established. Vocational universities should allocate 20% of their education budgets for teacher training, while partner enterprises contribute annual training funds (which can be included in school-enterprise cooperation budgets). Additionally, active applications should be submitted to local governments for "Special Subsidies for Vocational Education Teacher Development" to ensure funding for enterprise internships and new technology training programs.

Regarding faculty support, a "dual-mentor database" should be created. Enterprise mentors should be selected from technical experts and HR managers of partner companies with at least 5 years of industry experience, while school-based mentors should be chosen from distinguished teaching staff and "dual-qualified" core teachers with enterprise practice experience. A mentor evaluation mechanism should be established, using "training effectiveness" and "HR feedback" as assessment criteria to ensure mentor quality.

For facility support, schools and enterprises should jointly establish "Teacher Practice Training Bases." This includes setting up "Teacher Training Workshops" within enterprises equipped with HR-focused core equipment (such as smart production lines and modern logistics warehousing systems), and creating "Teaching Transformation Studios" on campus with VR simulation devices and course development software to provide venue support for teachers to transform enterprise technologies into teaching content.

6.3. Institutional guarantee: Improve the supporting system of "incentive + restraint"

The institutional framework establishes teachers' rights and obligations in training programs, stimulating their

enthusiasm while ensuring practical outcomes. The incentive mechanism incorporates teachers' participation in "enterprise on-the-job training" and "dual-mentorship programs" into bonus points for professional title evaluations and performance assessments. Teachers demonstrating "significant student competency improvements" in HR evaluations receive special rewards (such as bonuses or priority dispatch opportunities), addressing the issue of "unwillingness to participate in training".

The constraint mechanism mandates vocational college teachers to complete at least six months of enterprise practice training every three years, with delayed promotions for non-compliance. Teachers must submit "teaching transformation plans" (including practical project designs and curriculum reform proposals) after training, which must be implemented in subsequent teaching. Failure to comply requires retraining. The school-enterprise cooperation mechanism involves signing "Teacher Training Cooperation Agreements" with partner enterprises, clarifying corporate responsibilities for providing practical positions and HR evaluation data, while schools offer technical consultations and staff training services in return. This establishes a long-term "mutually beneficial" cooperation mechanism, preventing corporate "unwillingness to participate" issues.

7. Case study: Application of training system for mechatronics major in Hainan vocational university of science and technology

In order to verify the feasibility and effectiveness of the training system designed in this study, the mechatronics major of Hainan Vocational University of Science and Technology (hereinafter referred to as "the major") was selected to carry out a one-year pilot application. The specific process and results are as follows.

7.1. Background of the pilot

The 2022 corporate HR evaluation of this program revealed three major issues among graduates:

(1) Insufficient industrial robot debugging skills (professional skill compliance rate only 65%);
(2) Low efficiency in equipment troubleshooting (job problem-solving ability score 3.2/5);
(3) Weak quality awareness (professional competence score 2.9/5).

Corresponding faculty competency gaps include insufficient industrial robot practical skills, weak ability to translate troubleshooting teaching into practice, and lack of professional competence integration.

7.2. Pilot implementation process

Based on the training system designed in this study, the following implementation work is carried out in this major:

(1) Needs analysis: Collaborating with the HR departments of three partner organizations (a smart manufacturing company and an automotive parts manufacturer), we developed the "Graduates Enterprise Evaluation Report" to identify three key challenges. The resulting training requirements were defined as: industrial robot debugging techniques, troubleshooting instruction implementation, and quality awareness education integration;
(2) Content implementation and model application:
   (i) The enterprise practice module involves deploying 8 professional instructors to industrial robot workshops for 2-month on-the-job training, with technical experts from enterprises serving as mentors. Key training focuses include "robot parameter debugging" and "common fault diagnosis", while HR departments simultaneously explain corporate quality control standards;
   (ii) In the "Teaching Transformation Studio", instructors convert enterprise technologies into "industrial robot debugging training projects" and "fault diagnosis simulation cases", incorporating "quality error control" assessment components;
   (iii) Enterprise HR specialists conduct "quality awareness seminars", guiding instructors to integrate corporate quality standards into the "Electromechanical Equipment Maintenance" curriculum;
(3) Evaluation Loop: By the end of 202 4, a closed-loop evaluation system will be established through

"process assessment (instructor training reports, teaching transformation plans)", "application evaluation (student training outcomes, classroom feedback)", and "HR feedback evaluation (new graduate assessment data)".

7.3. Pilot results

The "Dual-qualified, Dual-skilled, Dual-capable" initiative has achieved remarkable progress: Among 8 faculty members, 6 obtained the "Industrial Robot Operator Technician" certification (dual-qualification attainment rate increased from 50% to 87.5%); classroom instruction with "job simulation training" rose from 20% to 60% (indicating enhanced teaching quality); 90% of teachers now independently develop enterprise-oriented training programs (dual-capability improvement).

Corporate HR evaluation metrics showed significant improvement: In 2024, graduates "industrial robot debugging proficiency rate" reached 92%, "equipment troubleshooting capability score" improved to 4.6/5, and "quality awareness score" rose to 4.3/5, all meeting corporate HR expectations. The cooperation mechanism between enterprises and schools has been deepened. Pilot enterprises have signed long-term cooperation agreements with the major, and two "teacher practice training bases" have been added. Teachers have been invited to participate in enterprise technical transformation projects, forming a virtuous cycle of "training-practice-cooperation".

8. Conclusions

8.1. Research conclusions

This study focuses on student evaluations of corporate HR professionals. By analyzing existing issues in vocational college teacher training systems and establishing a mapping relationship between HR evaluations and faculty competencies, we ultimately designed an innovative training framework featuring "demand diagnosis, content restructuring, model innovation, and closed-loop evaluation." Through case studies, we validated the systems feasibility and effectiveness.

Student evaluations in enterprise HR programs serve as a critical benchmark for identifying gaps in teachers "dual-qualified, dual-skilled, and dual-capable" competencies. Only by integrating these assessments into the training framework can we address the core issue of "disconnection between training and corporate needs". The training system requires restructuring its content around three key modules: "corporate practice, teaching transformation, and competency integration". Implementing a "dual-mentor system" and a "three-phase training process" will enable precise alignment between faculty capabilities and industry demands. A robust "school-enterprise collaborative management structure, co-built resource system, and incentive-restraint framework" ensures the effective implementation of the training program. Meanwhile, a "four-dimensional dynamic closed-loop evaluation system" remains essential for continuous improvement of training outcomes.

8.2. Research gaps and future directions

8.2.1. shortage of research

The case study is limited to mechatronics, excluding other fields like service industries and IT, and its applicability across disciplines requires further validation. The HR evaluation data primarily comes from small and medium-sized enterprises, with no inclusion of large corporations or multinational companies in the assessment criteria, necessitating an expanded corporate sample range.

8.2.2. Future expectations

Expand the scope of majors and enterprises: Apply the training system to service majors such as logistics management and e-commerce, collect HR evaluation data from different types of enterprises (large state-owned enterprises and foreign-funded enterprises), and optimize the universality of the system.

By integrating digital technologies, we have established a "HR Evaluation-Teacher Training" digital platform that enables automated analysis of evaluation data, intelligent matching of training needs, and real-time tracking of teaching applications, thereby enhancing system operational efficiency. To promote regional adoption, we collaborate with local education authorities and industry associations to transform pilot experiences into standardized vocational teacher training guidelines. This initiative provides practical references for more vocational colleges, supporting the high-quality development of industry-education integration in vocational education.

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Disclosure statement

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