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Exploration and Practice of Constructing a Blended "Golden Course" for "Safety Management" under the Background of Industry-Education Integration

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Abstract: Against the dual backdrop of the digital transformation of vocational education and the deepening integration of industry and education, "Safety Management," as a core course in engineering safety majors, faces challenges such as the disconnection between teaching content and industry demands, rigid teaching modes, and a singular evaluation system. Based on research from an educational and teaching reform project, this paper precisely identifies course issues through three-dimensional surveys involving universities, enterprises, and students. It constructs a pathway for constructing a blended "golden course" that involves "reconstructing teaching content, optimizing teaching modes, and improving the evaluation system," achieving deep integration of "post-class-competition-certification". Practice demonstrates that this pathway effectively enhances the quality of course teaching and students' autonomous learning abilities, providing a replicable practical paradigm for similar curricular reforms in higher vocational education.

Keywords: Industry-education integration; Blended teaching; Golden course construction; Safety management; Post-class-competition-certification

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1. Research background on golden course construction

With the implementation of policies such as the "Opinions on Deepening the Reform of the Modern Vocational Education System" and the "Action Plan for the Digital Transformation of Vocational Education (2023-2025)", industry-education integration has become the core engine for the high-quality development of vocational education, while the construction of "golden courses" serves as a key approach to improving the quality of talent cultivation. The Ministry of Education specifies that "golden courses" should possess advanced, innovative, and challenging characteristics, requiring course content to align with industry

demands, teaching modes to be suitable for student cognition, and evaluation methods to balance process and outcomes [1]. Among these, the core features of a "golden course"—its "two characteristics and one degree" (advanced nature, innovation, and challenge level)—are the key criteria distinguishing "golden courses" from "watered-down courses". Advanced nature emphasizes the organic integration of knowledge, abilities, and qualities; innovation requires the content to be cutting-edge and teaching forms to be interactive; and challenge level demands that course difficulty align with students' progressive ability needs. This definition provides clear quality standards for curriculum reform [2].

As a core foundational course within the cluster of construction engineering technology majors, "Safety Management" shoulders the important mission of cultivating high-quality skilled personnel in safety management for construction sites. The quality of its teaching directly influences students' job adaptability and career development potential. However, there are prominent contradictions in the current course teaching: On one hand, the digital transformation of the industry is driving safety management positions to continuously elevate their requirements for capabilities such as the application of new technologies and practical risk identification skills. On the other hand, the course still faces issues such as a disconnect between theory and practice, a scarcity of teaching resources, and insufficient interactivity, making it difficult to meet the "Golden Course" construction standards and industry talent demands. Against this backdrop, leveraging the policy dividends of industry-education integration, constructing a blended online-offline "Golden Course" has become an inevitable choice to address the teaching challenges and achieve seamless alignment between talent cultivation and industry needs.

2. Analysis of the current teaching situation in safety management courses

To accurately diagnose the current teaching situation and core issues of this course, the research team conducted a specialized survey in 2025, covering 15 higher vocational colleges offering relevant majors across the country, 10 industry-representative employing enterprises (including construction enterprises, safety consulting service agencies, property operation and maintenance companies, etc.), as well as a total of 268 current and graduated students from the past three cohorts at our institution. The survey results are as follows:

2.1. Analysis of survey results from higher vocational colleges

The survey revealed that all 15 institutions position "Safety Management" as a core professional course, with class hours concentrated between 48 and 80. However, three prominent issues were identified. First, there is a disconnect between the course content and industry demands. The course knowledge system still primarily focuses on traditional theories, with only three institutions integrating new industry technologies and regulations. Seventy percent of the institutions have not aligned with the job competency standards for professional certificates and the requirements of vocational skill competitions, failing to match actual job demands. Second, the teaching mode is rigid and monotonous. All institutions primarily adopt a lecture-based teaching approach, with case-based teaching and group discussion methods accounting for less than 50%. The application rate of blended teaching methods is only 18.18%, resulting in insufficient classroom interactivity and innovation. Thirdly, the support for teaching resources is weak, with 80% of institutions lacking supporting virtual simulation training software and high-quality online resources. On average, practical teaching hours account for less than 20% of the total teaching hours, making it difficult for students to translate theoretical knowledge into practical skills. Moreover, course evaluation primarily relies on final

exams (accounting for over 60%), with a lack of process-oriented evaluation, which fails to provide timely feedback on learning outcomes.

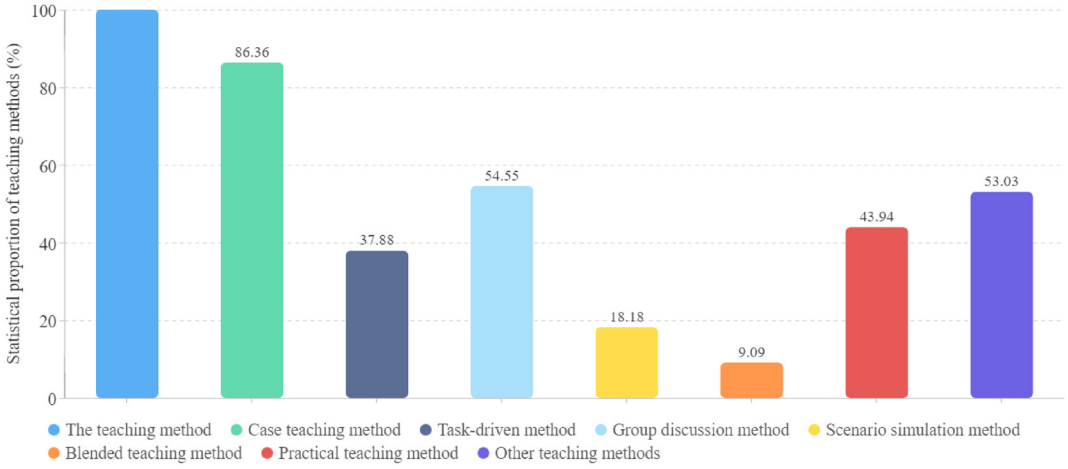


Figure 1. Survey on the Application Rate of Teaching in the "Safety Management" Course in Colleges and Universities.

2.2. Analysis of enterprise survey results

The annual demand for safety management positions in 10 enterprises is approximately 200 individuals, with the core requirement being that graduates possess practical skills such as risk identification, emergency response to incidents, and application of safety regulations. However, the survey reveals that 86% of enterprises report three major capability gaps among graduates: first, inadequate mastery of new industry regulations and technologies, limiting them to basic theoretical applications and making them ill-suited for actual job scenarios; second, a lack of practical skills, resulting in unfamiliarity with core work processes such as identifying safety hazards on construction sites and formulating emergency plans, necessitating 3-6 months of secondary training by enterprises before they can work independently; third, a need for improvement in professional qualities, with gaps existing between graduates' safety responsibility awareness, teamwork abilities, and enterprise expectations. Enterprises generally expect colleges and universities to achieve precise alignment between course standards and job requirements by restructuring course content, strengthening practical teaching, and incorporating real-world cases.

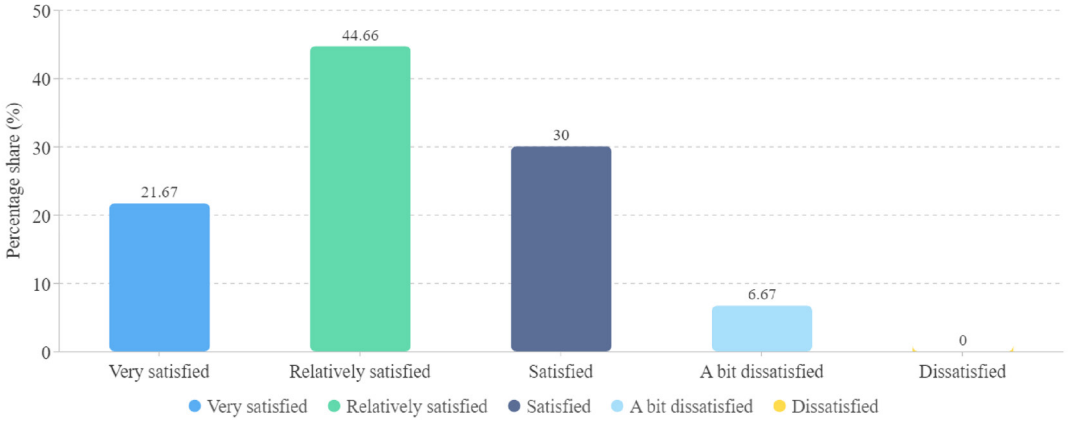


Figure 2. Survey on Enterprise Satisfaction with Graduates' Practical Skills.

2.3. Analysis of student survey results

81.63% of students recognize the importance of the "Safety Management" course for their career development, but only 44.9% of students express high satisfaction with the teaching effectiveness, while 14.29% of students harbor dissatisfaction, with core issues concentrated in three aspects. Firstly, the practicality of the teaching content is insufficient. 76.47% of students report that the theoretical knowledge is cumbersome and abstract, the teaching cases are outdated and limited in number, and the correlation with actual job tasks is low, making it difficult to understand and remember. Secondly, the teaching mode lacks appeal. 91.18% of students believe that classroom teaching is dull, primarily dominated by "teacher-centered lectures", with insufficient interaction between teachers and students as well as among students themselves, resulting in a lack of motivation for independent learning. Thirdly, the evaluation and feedback mechanism is lagging. 68.3% of students indicate that the feedback cycle for homework and learning queries exceeds three days after class, and the process-based evaluation is opaque, making it impossible to promptly identify and improve learning weaknesses. Additionally, 39.7% of current students fail the written exams for the course, with only 8.82% scoring above 70, indicating a severe deficiency in achieving the course objectives.

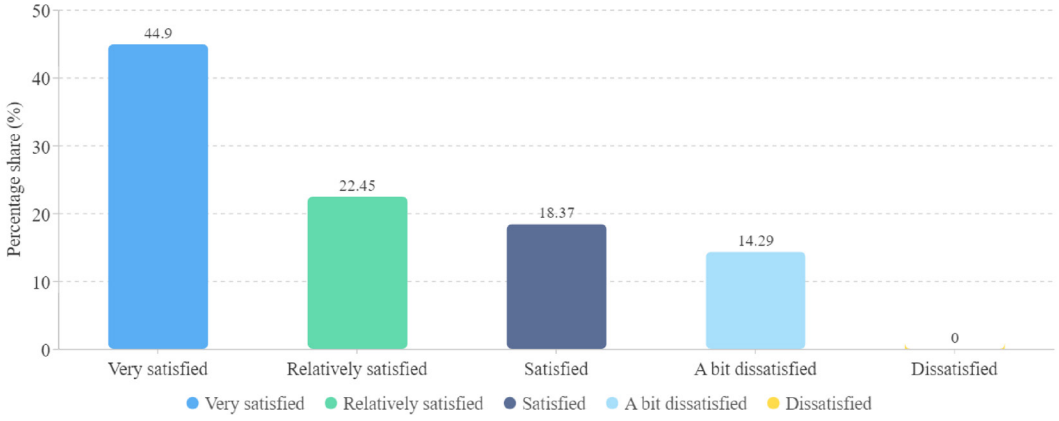


Figure 3. Survey on Student Satisfaction with the Teaching Effectiveness of the "Safety Management" Course.

3. Construction path for blended "Golden Courses" in "Safety Management" under the background of industry-education integration

3.1. Reconstruct teaching content and develop online courses

Leverage the role of the industry-education integration community to collaboratively develop course standards and teaching content between schools and enterprises. Firstly, deconstruct and reorganize the knowledge system. Based on the training objectives of the professional cluster in construction engineering technology, the original course content is deconstructed into three levels: low, medium, and high. The low level consists of memory-based knowledge such as basic theories of safety management and laws and regulations; the medium level comprises application-oriented knowledge such as risk identification methods and safety inspection procedures; and the high level involves creative knowledge such as emergency plan design and safety control in complex scenarios [3]. Secondly, integrate core industry elements. Fully align with the competency standards for occupational certification positions and the requirements of vocational skill competitions, and embed new construction safety technologies, regulations, and real-world enterprise

cases to ensure that the content keeps pace with job demands. Thirdly, Develop high-quality online resources tailored to knowledge at different levels: For low-level knowledge, create online resources such as micro-lecture videos and interactive quizzes to support self-directed learning; for intermediate-level knowledge, develop resources like case analyses and virtual simulation operations to integrate online explanations with offline practice; for high-level knowledge, establish modules such as real-time interactive projects and live Q&A sessions with industry experts to guide in-depth exploration. Additionally, establish a dynamic updating mechanism to optimize and adjust course content each semester based on feedback from enterprises and industry developments.

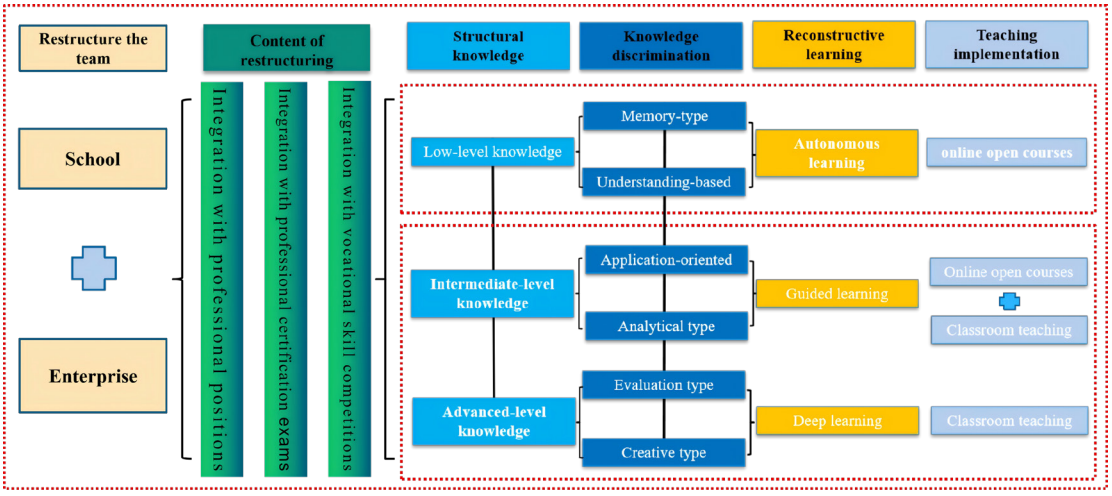


Figure 4. Schematic Diagram of Reconstructed Teaching Content.

3.2. Optimize teaching models and innovate teaching implementation

Based on the concept of "teacher-led and student-centered", a three-stage blended teaching model combining online and offline learning is constructed, encompassing "pre-class guidance, in-class deepening, and post-class expansion". This model incorporates elements of "post-class competition-certification" as well as "ideological and political guidance", creating a student-centered classroom ecosystem.

During the pre-class guidance phase (online), teachers issue preview tasks through an intelligent teaching platform, including micro-lectures on low-level knowledge, pre-class quizzes, and industry case studies. Students watch videos, complete quizzes, and raise questions in the discussion area; teachers review learning outcome data to accurately identify key teaching points and difficulties, laying an efficient foundation for the "pre-class guidance" segment.

In the in-class deepening phase (offline), a progressive process of "case introduction—group exploration—practical training—ideological and political integration" is adopted. Enterprise instructors introduce real-world work cases, and students, organized into groups, explore problems and clarify learning objectives; teachers conduct case analyses and operational demonstrations. After studying cases and engaging in interactive Q&A sessions, students collaborate in groups to formulate practical plans and undergo practical training such as safety inspections and emergency response using virtual simulation equipment. Throughout this process, elements of professional ethics and safety responsibility are integrated. Finally, through the task evaluation segment, teachers summarize and review, while students listen and absorb to achieve knowledge internalization, completing the capability development in the "in-class deepening" phase.

In the post-class expansion phase (online + offline), teachers assign expansion tasks online, including mind map creation, case analysis reports, peer evaluations, etc., and students complete these tasks to strengthen the application of knowledge transfer. At the same time, offline activities such as enterprise visits and hands-on practice at training bases are organized to comprehensively expand the boundaries of learning and achieve the knowledge deepening goal of "post-class consolidation and expansion". The teaching process adheres to the cognitive pattern of "questioning, thinking, learning, comprehension, and action" among higher vocational students, aligns with the developmental path of vocational abilities from novice to expert, and achieves a profound integration of theory and practice, as well as skills and qualities.

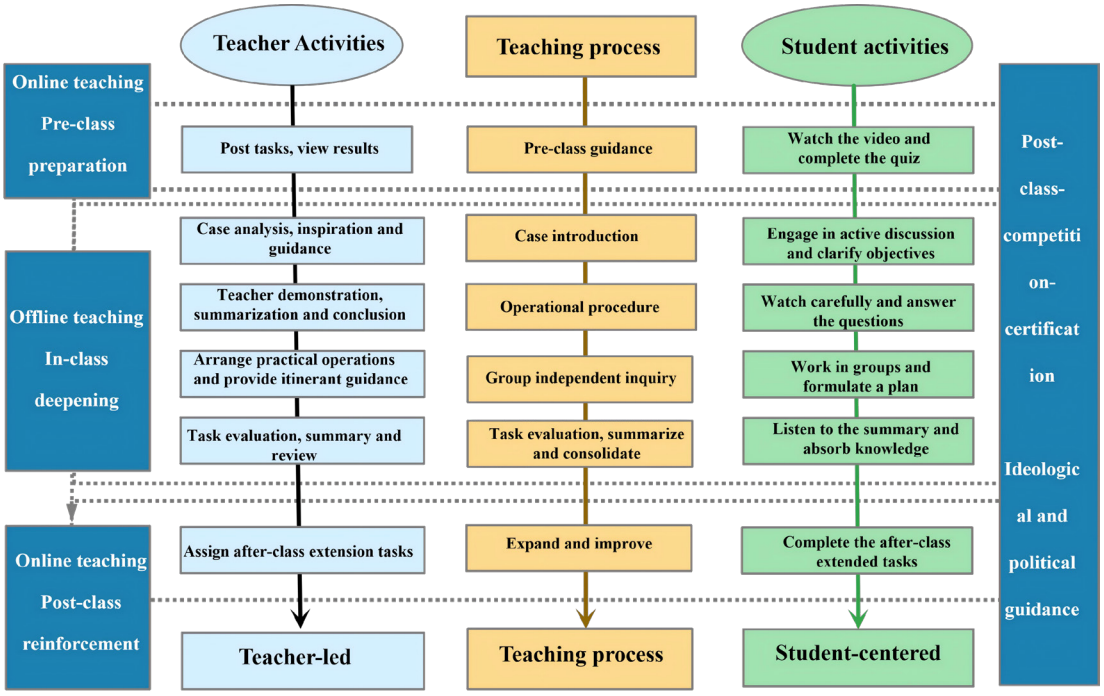


Figure 5. Online-Offline Blended Teaching Model.

3.3. Improving the evaluation model and strengthening process control

Course evaluation is a crucial link in ensuring the achievement of teaching outcomes. This study draws on the Outcome-Based Education (OBE) concept, emphasizing the core focus on students' learning outcomes and designing the evaluation system in reverse [4]. Leveraging the Chongqing Vocational Education Smart Education Platform and Chaoxing Learning Pass, a dynamic evaluation system featuring "whole-process, multi-dimensional, diversified, and multi-participant" characteristics has been constructed. The evaluation dimensions cover three major aspects: pre-class online self-study (video learning duration, test scores, discussion activity), in-class offline performance (attendance, classroom participation, practical skills, group tasks), and post-class expansion and improvement (quality of homework completion, knowledge transfer and application). The evaluation involves multiple participants, including school teachers, enterprise mentors, student self-evaluations, and peer evaluations. Teachers focus on evaluating knowledge mastery and method guidance, enterprise mentors concentrate on evaluating practical abilities and job suitability, while students achieve self-reflection and mutual improvement through self-evaluations and peer evaluations.

The evaluation weights are scientifically determined, with process evaluation accounting for 60% (30% pre-class + 30% in-class) and summative evaluation accounting for 40% (final exam + vocational skill certification simulation). The content of the summative evaluation aligns with the examination standards for the Construction Safety Officer C Certificate, achieving the goals of "evaluation promoting learning and evaluation promoting improvement". All evaluation data is collected and analyzed in real time through the platform, generating personalized learning reports that provide support for teaching optimization and precise student guidance.

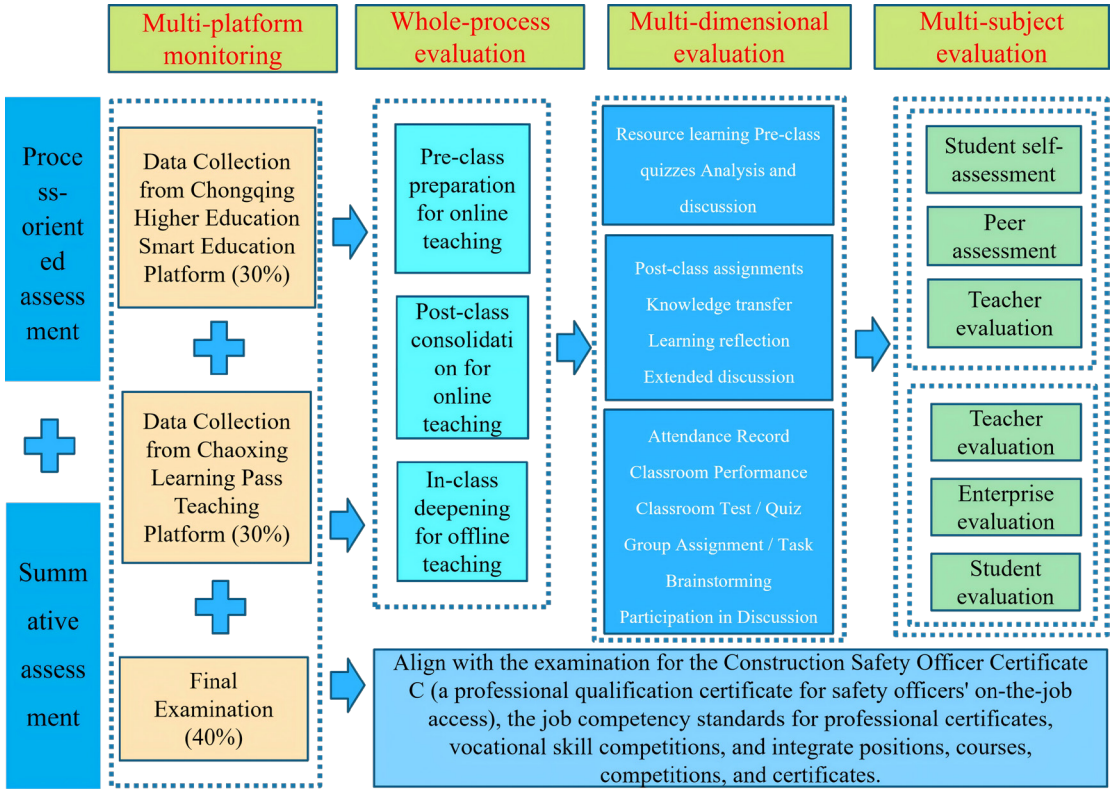


Figure 6. Evaluation of Online-Offline Blended Teaching.

4. Practical application effects

4.1. Systematic optimization of course teaching quality

The construction of blended "high-quality courses" effectively addresses the core pain points of traditional teaching, significantly enhancing the overall quality of the courses. By reconstructing teaching content through school-enterprise collaboration, precise alignment has been achieved between course standards and job requirements as well as industry norms, highlighting the advanced and practical characteristics of the courses. The blended online-offline teaching model breaks the limitations of single lecture-based instruction, forming a closed-loop teaching ecosystem of "pre-class guidance—in-class exploration—post-class expansion", significantly enhancing classroom interactivity and innovation. The implementation of a comprehensive and diversified evaluation system replaces traditional single summative evaluation, achieving a virtuous cycle of "evaluation for promoting learning and evaluation for promoting teaching". The three-dimensional teaching resources and modular teaching plans developed during the course construction process

have been promoted and referenced in similar courses at multiple peer institutions, playing a demonstrative and leading role.

4.2. Comprehensive enhancement of students' comprehensive abilities

The reformed teaching model fully stimulates students' learning initiative, shifting students from passive knowledge acceptance to active ability construction. The online self-learning platform provides students with flexible learning paths, effectively cultivating their abilities to plan and explore independently. The offline practical sessions, through forms such as virtual simulation operations, discussions of real enterprise cases, and group collaborative tasks, strengthen students' core practical skills in risk identification and emergency response. The organic integration of ideological and political education in courses and the cultivation of professional qualities further enhance students' safety responsibility awareness and teamwork abilities, significantly improving their career adaptability. The problem-solving thinking and on-the-job practical abilities developed by students during the course learning lay a solid foundation for their subsequent career development.

4.3. In-depth implementation of the talent cultivation mechanism integrating industry and education

Through the implementation of a hybrid teaching model, school-enterprise collaborative talent cultivation has transitioned from formal cooperation to substantive integration. Enterprises deeply participate in the entire process of course content design, teaching process implementation, and teaching effectiveness evaluation, transforming real-world work scenarios and cutting-edge industry needs into teaching resources and assessment criteria, achieving precise alignment between teaching and production practices. Corporate mentors regularly participate in teaching through online tutoring and offline instruction, bringing students firsthand industry experience and professional insights, effectively compensating for the practical shortcomings of on-campus instruction. This talent cultivation model of "school-locality symbiosis and school-enterprise mutual benefit" not only enhances the relevance of talent cultivation but also prepares potential talents for enterprises that meet job requirements, fostering a virtuous ecosystem of collaborative development between industry and education.

5. Reflection and outlook

5.1. Reflection

There are still three shortcomings in the practice of curriculum reform: First, the frequency of updates to online teaching resources does not keep pace with the rapid iteration of industry technologies, and the scenario coverage of some virtual simulation resources is not comprehensive enough. Second, corporate mentors' sustained participation in teaching is insufficient, and due to work schedules, the frequency of offline instruction and online tutoring is difficult to guarantee consistently. Third, the implementation of personalized teaching is not precise enough, and the stratified teaching strategies for students with different foundations still need to be optimized.

5.2. Outlook

In the future, curriculum development will be deepened in three aspects: First, we will enrich the integration

of industry and education by collaborating with enterprises to build a "Safety Management Teaching Resource Library", introducing more real-world project cases and real-time data to ensure that teaching content stays updated in sync with industry developments. Second, we will optimize collaborative teaching mechanisms by employing methods such as mutual hiring between schools and enterprises and flexible scheduling to maintain consistent participation from enterprise instructors, thereby jointly building a dual-qualified teaching team. Third, we will empower digital teaching by utilizing artificial intelligence technology to analyze student learning behavior data, precisely delivering personalized learning resources and tutoring plans to enhance teaching adaptability. Meanwhile, we will summarize the experience in curriculum development to form a replicable and scalable model for constructing hybrid "Golden Courses" in higher vocational education, which will then be applied to other courses within the construction engineering program cluster, contributing to an overall improvement in the quality of talent cultivation in vocational education.

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Disclosure statement

The author declares no conflict of interest.

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