

Research on the Concepts and Implementation Paths of Higher Vocational Curriculum System Reform Driven by Vocational Skill Certificates

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Abstract: The vocational skill certificate system is a critical institutional design for deepening vocational education reform and promoting industry-education integration. Under this institutional framework, higher vocational curriculum systems are facing profound transformations: from "discipline-oriented" to "competence-oriented," from "closed systems" to "open systems," and from "static presets" to "dynamic adaptation." Based on an explanation of the driving logic of the vocational skill certificate system on higher vocational curriculum reform, this paper systematically discusses the concepts that should guide curriculum system transformation, and further proposes implementation paths such as constructing competence-oriented modular curriculum systems, drawing curriculum competence maps based on occupational post competencies, and improving the "certificate-in-lieu-of-examination" mechanism for recognition and conversion of learning outcomes. The aim is to provide theoretical references and practical guidance for higher vocational institutions to advance curriculum system reform.

Keywords: vocational skill certificate system; higher vocational education; curriculum system reform; integration of courses and certificates

1. Introduction

In 2019, the "National Plan for Vocational Education Reform" explicitly proposed the launch of the "academic certificate + several vocational skill level certificates" system[1], marking a new stage in China's vocational education evaluation system. The vocational skill certificate system organically combines academic certificates with vocational skill level certificates, aiming to build a diversified vocational competence certification system that meets society's demand for high-quality technical and skilled talent. As the primary base for cultivating skilled personnel, higher vocational institutions must closely align with this institutional reform and explore new paths for curriculum system innovation.

The curriculum system is the core carrier of talent cultivation. Driven by the vocational skill certificate system, how to achieve systematic reform of higher vocational curriculum systems from concept to practice has become a critical topic in vocational education research. Currently, higher vocational curriculum systems still face problems such as rigid structures, mismatches between content and skill level certificates, and a lack of practical scenarios. Addressing these challenges requires an in-depth grasp of the intrinsic requirements of the vocational skill certificate system, a clear definition of the conceptual direction for curriculum reform, and exploration of feasible implementation paths.

2. The Logic of Curriculum System Reform Driven by the Vocational Skill Certificate System

2.1 Institutional Connotation and Reform Direction

The core essence of the vocational skill certificate system lies in "course-certificate integration"—organically linking academic education with vocational skill level certificates [2]. This institutional design requires that professional course content be deeply integrated with vocational skill level standards, and a "course-certificate integration system" should be built that aligns course content with occupational standards, coordinates teaching processes with work processes, and connects academic certificates with vocational skill level certificates. In pioneering regions such as Beijing, the process starts with occupational competence analysis, strongly promoting deep integration of professional course content with vocational skill level standards, resulting in a match rate exceeding 90%

between professional teaching and occupational standards.

2.2 Practical Needs for Curriculum System Reform

The implementation of the vocational skill certificate system imposes multiple reform requirements on higher vocational curriculum systems. First, course content needs to align with certificate standards to resolve disconnection issues. Second, curriculum structures need sufficient flexibility to accommodate students' needs to obtain multiple vocational skill level certificates. Third, curriculum implementation needs to strengthen practical orientation, designing and developing courses according to actual production and job requirements, and developing modular, systematic practical training course systems. Fourth, curriculum evaluation needs to establish diversified evaluation mechanisms linked to certificate assessments.

However, current higher vocational curriculum systems still face many challenges in aligning with the vocational skill certificate system: weak integration between curriculum systems and certificate systems, lack of systematic construction of curriculum systems, and a lack of dynamic mechanisms in curriculum assessment and evaluation. These issues urgently require higher vocational institutions to promote systematic curriculum reform from concept to practice.

3. Conceptual Shifts in Curriculum System Reform

3.1 From "Discipline-Oriented" to "Competence-Oriented"

Traditional higher vocational curriculum systems are organized along the logic of disciplinary knowledge, emphasizing the systematicity and completeness of knowledge while somewhat neglecting the cultivation of vocational competencies. The vocational skill certificate system, with vocational competence assessment at its core, compels curriculum systems to shift from a "discipline-oriented" to a "competence-oriented" paradigm. This shift requires curriculum design to start from vocational competence analysis, transforming occupational task into learning tasks and occupational standards into course objectives. Course content no longer pursues the integrity of the disciplinary system but focuses on the knowledge, skills, and competencies essential for occupational posts (groups), enabling students to possess corresponding vocational abilities upon course completion.

3.2 From "Closed System" to "Open System"

Traditional curriculum systems are often relatively closed—once course offerings are determined, they remain unchanged for long periods, with course content update cycles lasting 3 to 5 years. Under the vocational skill certificate system, curriculum systems must become open systems. This openness is reflected in two dimensions: external openness, meaning the curriculum system must promptly absorb new technologies, new processes, new norms, and new standards from industries and enterprises; and internal openness, meaning the curriculum system should provide diversified choices for students' personalized development, allowing students to select different certificate directions and course modules according to their own career plans. The modular curriculum system built by higher vocational institutions in Beijing, featuring "shared foundation, integrated middle layer, and elective upper layer," is a typical practice of this open concept.

3.3 From "Static Preset" to "Dynamic Adaptation"

Rapid technological iteration in industry places dynamic updating requirements on the knowledge and competence structures of skilled talent. The vocational skill certificate system itself is also in a process of continuous improvement, with certificate standards and assessment requirements adjusting along with industrial changes. This requires curriculum systems to shift from a "one-time design, long-term use" static preset model to a "continuous iteration, dynamic adaptation" renewal model. Following the requirement that "course content keeps pace with technological change and aligns with occupational standards," an integrated update system linking "courses—skill certificates—competitions—industry" should be established. Core courses should undergo comprehensive updates every 1 to 2 years, and static textbooks should be integrated with dynamic resources through digital loose-leaf teaching materials.

4. Implementation Paths for Curriculum System Reform

4.1 Constructing a Competence-Oriented Modular Curriculum System

A modular curriculum system is the organizational foundation for achieving course-certificate integration [3]. Based on vocational skill certificate assessment standards, a staged, progressive professional course system should be constructed with student competence cultivation as the core and project tasks as the carrier.

In structural design, a "platform + module" architecture can be adopted. Platform courses ensure the development of foundational professional competencies, while module courses align with different vocational certificate directions. Specifically, a three-tier modular system can be constructed: the bottom tier consists of general education and foundational modules to ensure students' basic literacy and professional foundations; the middle tier integrates core course competencies with single vocational certificate modules, achieving deep alignment between individual core professional courses and individual vocational certificates; the upper tier consists of comprehensive and expansion modules, aligning comprehensive skills with advanced vocational certificates. In module design, the "building-block modularization" concept can be borrowed to functionally reorganize teaching content into flexible combinable "competence blocks" [4]. Each teaching module should have clear learning objectives and evaluation criteria, mainly including knowledge points, operational skills, and professional quality requirements, supporting students in progressively accumulating their professional competence according to their needs. The module hierarchy can be further refined into a four-level progressive structure: "major post direction module → learning area course module → course project sub-module → project task micro-module."

In content development, leading industry enterprises and vocational skill certification bodies should be jointly engaged to deconstruct "foundational skills, core skills, and frontier skills" of target posts, integrating vocational skill level certificate standards into course modules. Competency points for primary certificates can be incorporated into foundational professional course teaching, while intermediate certificate competency points can be integrated into the applied professional teaching stage. Course content should be practical and authentic, incorporating new technologies, new processes, new norms, and typical production cases in a timely manner.

4.2 Drawing Curriculum Competence Maps Based on Occupational Post Competencies

The curriculum competence map is a core tool for achieving precise curriculum provision [5]. A curriculum competence map is not a simple listing of courses; it aims to standardize course development, clarify the sources of course modules and the formation of projects, and transform industrial post requirements through scientific deconstruction and restructuring into internalized, structured curricula and learning pathways, ultimately achieving precise provision of technical and skilled talent cultivation. Starting from real job requirements, the competence map systematically and structurally presents the knowledge and skill requirements of frontline production and service posts, providing a scientific basis for curriculum development and effectively promoting the shift from "knowledge transmission" to "competence cultivation" in teaching paradigms [5].

In terms of mapping methods, a "school-enterprise joint decoding team" should be established, involving enterprise technical experts, core professional teachers, and curriculum development specialists. First, through enterprise surveys and job analysis, typical work tasks of core professional posts are selected, and enterprise experts are invited to fully describe task processes, difficulties, and evaluation criteria. Second, using the "deconstruction-reconstruction" method, fuzzy job requirements are translated into clear, specific, teachable, and assessable competence units, specifying the knowledge points, skill points, and quality points corresponding to each competence unit. Third, following the three-layer mapping logic of "requirements to competence, competence to knowledge, knowledge to curriculum," a visualized core curriculum competence map is drawn. The top layer defines core professional posts and training objectives, the middle layer clusters closely related competence units into course modules, and the bottom layer specifies the competence units, project carriers, and class hours under each module.

At the application level, a "competence-course objective" support matrix should be established based on the curriculum competence map, precisely mapping competence units to course modules. Around the three dimensions of knowledge, skills, and quality, a competence map containing specific post competencies should be drawn, and a "competence-knowledge point" mapping matrix established.

At the same time, a dynamic iteration mechanism for the map should be established, regularly updating competence units and adjusting course modules in line with industrial technological iteration and changes in job requirements, to keep the map always up to date. The construction of a four-tier competence map—"industry—post—competence—curriculum"—can also be explored, starting from macro-level industry demands and progressively breaking them down into typical post groups and core post competencies, ultimately mapping them to specific course modules.

4.3 Improving the "Certificate-in-Lieu-of-Examination" Mechanism for Recognition and Conversion of Learning Outcomes

"Certificate-in-lieu-of-examination" is a key mechanism for achieving course-certificate integration[6]. Under the vocational skill certificate system framework, recognition and conversion channels between vocational skill level certificates and course credits should be established, enabling students to fulfill corresponding course academic requirements upon obtaining certificates. The essence of this mechanism is to incorporate non-formal education outcomes (vocational skill level certificates) into the formal education evaluation system, realizing the recognition, accumulation, and conversion of learning outcomes.

At the institutional design level, each institution should, in conjunction with its own professional talent cultivation plans and course standards, formulate specific implementation rules for credit recognition and conversion of vocational skill level certificates [7], specifying the certificate levels eligible for conversion, corresponding courses (or course modules), and the number of convertible credits. In principle, students who obtain national vocational qualification certificates (including 1+X vocational skill level certificates) may apply for recognition of credits for one or more corresponding courses. The total credits recognized and converted generally should not exceed a certain percentage of the total graduation credits stipulated in the talent cultivation plan (typically 15%–25%). Certificate outcomes with identical or similar content shall not be converted repeatedly.

At the operational mechanism level, an evaluation system that "links course assessment with certificate assessment" should be established. On the one hand, the assessment content of vocational skill level certificates can be integrated into course standards, making course teaching itself an integral part of certificate training. On the other hand, conversion rules between courses, certificates, and competition outcomes should be formulated to achieve mutual recognition and sharing of learning outcomes. After completing corresponding modular courses, students may directly obtain eligibility for the "X" certificate examination, and the certificate assessment results can serve as the final examination results for corresponding courses, breaking down the barrier between academic education and vocational competence certification. Relying on the lifelong education credit bank platform [8], recognized learning outcomes can be directly converted into corresponding course credits, allowing students to apply for course exemption. This "certificate-in-lieu-of-examination" mechanism not only reduces students' academic burden but also enhances the relevance and effectiveness of course learning.

4.4 Constructing a Comprehensive "Post-Course-Competition-Certificate" Education Model

The "post-course-competition-certificate" comprehensive education model is an important lever for curriculum system reform under the vocational skill certificate system[9]. This model uses "posts" to set standards—transforming real enterprise post tasks into teaching projects; "courses" for implementation—restructuring course modules; "competitions" to promote learning—introducing skill competition standards to increase teaching difficulty and frontier relevance; and "certificates" for evaluation—using X certificate assessments to test learning outcomes.

At the practical level, "post-course-competition-certificate" integration requires the curriculum system to achieve four alignments: course objectives aligning with post competency needs, course content aligning with vocational skill standards, teaching processes aligning with work processes, and teaching evaluation aligning with certificate assessment requirements. The core value of this model lies in breaking the isolated state of course teaching, skill competitions, and certificate assessments, constructing an integrated "teaching—training—certification" curriculum implementation system. Through "post-course-competition-certificate" integration, the curriculum system is no longer merely a classroom teaching carrier but becomes a comprehensive education platform integrating competence cultivation, skill training, and certificate acquisition.

4.5 Innovating a Diversified Collaborative Evaluation System

Curriculum evaluation is an important safeguard for curriculum system reform. Traditional curriculum evaluation is mainly teacher-centered, emphasizing knowledge assessment, and cannot fully reflect students' vocational competence levels. Under the vocational skill certificate system, curriculum evaluation should shift from single-mode evaluation to diversified collaborative evaluation.

First, an evaluation mechanism linking course assessment with certificate assessment should be established. The assessment standards of vocational skill level certificates should be integrated into course assessment standards, making course assessment itself a process of competence certification. Second, industry and enterprise participation in evaluation should be introduced. Enterprise mentors and industry experts should be invited to participate in practical training evaluation, implementing a joint evaluation of "course teaching—skill competition—enterprise certification—engineer assessment." Third, a combination of formative and summative evaluation should be established, focusing on students' competence growth throughout the entire learning process rather than solely on final examination results.

4.6 Strengthening Faculty and Resource Guarantees

The implementation of curriculum system reform cannot be separated from the support of faculty and teaching resources. In faculty development, efforts should focus on building a "dual-qualified" teacher workforce. On the one hand, backbone teachers should be selected to participate in X certificate pilot training to enhance their certificate training and practical teaching abilities. On the other hand, a two-way mobility mechanism of "bringing enterprises into teaching" and "sending teachers into enterprises" should be established. Through flexible positions such as "industry professors" and skill master studios, enterprise technical backbone personnel can be attracted to participate in teaching.

In terms of teaching resources, textbooks and digital resources adapted to the new curriculum system should be developed. School-enterprise collaborative textbook development should be carried out with regional leading enterprises, compiling textbook content tailored to regional industrial post needs. Digital loose-leaf teaching materials should be promoted, linking to real enterprise production videos, 3D animations, and other digital resources via QR codes, achieving dynamic synchronization between textbook content and industrial practice. At the same time, practical training bases and digital teaching platforms matching certificate assessment standards should be constructed to provide hardware support for curriculum implementation.

5. Conclusion

The vocational skill certificate system provides important institutional driving force for higher vocational curriculum system reform and also sets clear directional requirements for curriculum reform [10]. At the conceptual level, curriculum systems need to achieve profound shifts from "discipline-oriented" to "competence-oriented," from "closed systems" to "open systems," and from "static presets" to "dynamic adaptation." At the practical level, implementation requires constructing competence-oriented modular curriculum systems, drawing curriculum competence maps based on occupational post competencies, improving the "certificate-in-lieu-of-examination" mechanism for recognition and conversion of learning outcomes, constructing a "post-course-competition-certificate" comprehensive education model, innovating diversified collaborative evaluation systems, and strengthening faculty and resource guarantees.

It should be noted that curriculum system reform is a systematic project involving coordinated adjustments across multiple dimensions, including training objectives, curriculum structures, teaching content, teaching methods, and evaluation mechanisms. Different majors and institutions, when advancing curriculum system reform, should explore reform paths suited to their own professional characteristics, industrial contexts, and institutional conditions. Future research could further focus on the evaluation of implementation effects of curriculum system reform, differentiated strategies for curriculum reform across different majors, and the deeper impact of national qualifications framework development on curriculum system reform, in order to promote theoretical deepening and practical expansion of higher vocational curriculum system reform under the vocational skill certificate system.

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