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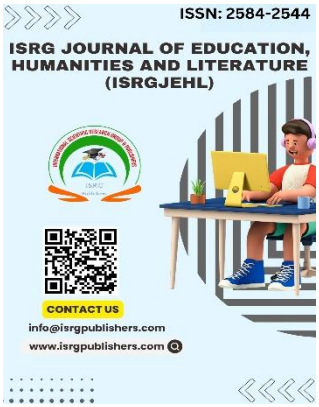

Constructing a Synergistic "Five-in-One" Mechanism for 3+2 Articulated E-Commerce Programs in Chinese Applied Universities

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Abstract

Against the backdrop of China's national strategy to strengthen the cultivation of technically skilled talents in the new era, advancing the integration of vocational and undergraduate education through the "3+2" articulated model has become a critical task in optimizing the higher education system and deepening vocational education reform. This study conducts a comparative analysis of domestic and international segmented training models between vocational colleges and undergraduate institutions, systematically reviewing the theoretical foundations, practical logic, and institutional evolution of the "3+2" pathway. It proposes an integrated talent cultivation framework centered on a "capability-oriented, platform-supported, and structurally progressive" model. Using the E-Commerce program as a representative case, the study identifies key issues in the transition phase, such as curriculum redundancy, capability disconnection, and lack of coordination mechanisms. To address these challenges, the paper advocates for a task-driven curriculum system, a diversified collaborative education mechanism, and a data-enabled support platform as the core of systemic reform. The study argues that the essence of the "3+2" model should shift from mere academic articulation to competency articulation, with the core lying in the synergy of updated educational philosophies, collaborative teaching mechanisms, and coherent policy support. Theoretically, this research enriches the discourse on articulation models in China's vocational education; practically, it offers a strategic reference for constructing a modern vocational education system with Chinese characteristics.

Keywords: 3+2 articulation; talent cultivation model; curriculum system; coordination mechanism; competency-based education

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1. Introduction

With the accelerated development of the digital economy and the growing demand for high-quality, technically skilled professionals, constructing a talent cultivation mechanism that not only aligns with national strategic objectives but also responds to local industrial development needs has become a key task in the reform of China's higher education system. A series of policy documents—such as the Implementation Plan for the Reform of National Vocational Education and the Opinions on Promoting the High-Quality Development of Modern Vocational Education—have been issued, clearly calling for the integration of secondary vocational, higher vocational, and undergraduate education. These policies aim to enable vocational and academic undergraduate education to compete on the same platform, thereby fostering a modern vocational education system that is diversified in type and seamless in progression. Against this backdrop, the "3+2" vocational-undergraduate articulation model has emerged and become an important breakthrough in recent years for deepening vocational education reform in China.

The "3+2" model refers to a five-year consecutive talent training pathway that connects higher vocational and undergraduate stages through systematic alignment in curriculum design, credit recognition, and management mechanisms. This model not only alleviates the academic ceiling faced by vocational graduates but also expands the typological function of undergraduate education, thereby enhancing the overall social recognition and talent output capacity of the vocational education system. However, in practice, the "3+2" model commonly faces issues such as "smooth academic progression but fragmented educational experience" and "curricular integration without corresponding coordination in governance." These problems significantly undermine the systemic effectiveness of articulation-based talent cultivation and hinder the model's intended transition from a focus on degree continuity to one on competency integration. In response to these challenges, the traditional "3+2" model—primarily designed around curriculum alignment and institutional fusion—is increasingly unable to meet the structural talent demands of emerging industries, especially in fields like digital commerce and platform economies. This issue is particularly prominent in emerging interdisciplinary programs such as e-commerce, where technology, management, and services are deeply intertwined. In such cases, achieving a systemic reconstruction of talent cultivation models, precise coordination of teaching mechanisms, and efficient sharing of resource platforms urgently requires the introduction of more systematic educational governance concepts and frameworks.

To address these issues, this paper introduces the concept and practical pathway of a "Five-in-One" collaborative education mechanism, aiming to move beyond the conventional focus on course articulation and academic continuity. It explores a more systemic, structured, and synergistic model for "3+2" articulated talent cultivation in the field of e-commerce. The "Five-in-One" mechanism includes the collaborative design and coordinated operation of five core components: seamless major alignment, tiered curriculum progression, synchronized student management, integrated faculty development, and deep industry-education integration. Specifically, major alignment emphasizes balanced segmentation and independent class organization; curriculum structure promotes a three-stage progression combined with service learning; student management adopts inclusive services and a dual-mentorship system; faculty development emphasizes joint research and mutual training and exchange; and industry-education integration facilitates cross-sector collaboration among government, universities, communities, and enterprises to build an interconnected talent development ecosystem.

Based on this framework, the study focuses on the e-commerce major and uses application-oriented undergraduate universities in China as representative cases. Building upon the analysis of domestic and international experiences in vocational-undergraduate articulation, the paper constructs a theoretical framework for the "Five-in-One" collaborative education model, analyzes current implementation challenges, distills typical pathways, and proposes scalable optimization strategies. This research aims to respond to the systemic challenges confronting the "3+2" model in its new development stage and contribute to the continuous advancement of China's high-level and high-skilled talent cultivation system.

2. Theoretical Foundations and Literature Review

2.1 Theoretical Foundations: A Composite Perspective of Collaborative Governance and Competency-Oriented Education

The reform of the "3+2" articulated education model is not merely an institutional innovation in academic structure but a systemic reconstruction of the talent cultivation paradigm. Building a "Five-in-One" collaborative education mechanism requires a theoretical foundation grounded in systems coordination theory, constructivist learning theory, and competency-based education (CBE). These perspectives together address the structural fragmentation and functional disconnect that exist within the segmented education framework. Systems coordination theory emphasizes the structural coupling and functional integration among subsystems within an educational system. It posits that the improvement of educational quality depends not only on the optimization of individual modules but more importantly on the coordinated functionality and dynamic adjustment of the system as a whole (Yang Xiaoli, 2022). In the context of the "3+2" model, components such as major design, curriculum systems, faculty development, teaching organization, and student support must be advanced in synergy under a unified goal orientation, thereby avoiding the structural risk of "merged teaching but fragmented cultivation." Constructivist learning theory underscores the student-centered process of knowledge construction. It advocates that learning should be situated in authentic contexts, supported by social interaction and grounded in practical tasks (Tian Cong, 2022). This provides a strong theoretical basis for applied and rapidly evolving disciplines like e-commerce: teaching activities must revolve around real-world issues, integrating practice-oriented courses with service learning to encourage students to construct knowledge and develop competencies through project-based experiences. Competency-Based Education (CBE) focuses on whether students have truly acquired the capabilities required for the workplace, including transferable and lifelong learning skills. It has become the dominant direction in international vocational education reform (Liu Banggui, 2023). Within the "3+2" collaborative education model, talent cultivation should align with actual industry competency standards in the e-commerce

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sector, targeting key skill domains such as digital literacy, cross-border operation, business execution, and data analytics. These competencies should serve as the foundation for restructuring curriculum objectives and redesigning assessment mechanisms.

In addition, the collaborative education mechanism is inspired by insights from organizational behavior and educational governance theories. These theories advocate for the establishment of cooperative mechanisms among diverse organizations—such as vocational colleges, undergraduate institutions, enterprises, government agencies, and social organizations—based on mutual trust, reciprocity, and shared benefit. The goal is to form a new model of collaborative education in which responsibilities are jointly assumed, processes co-managed, and outcomes collectively shared.

2.2 Literature Review and Development Assessment: Domestic and International Perspectives

Internationally, developed countries have accumulated extensive experience in integrated vocational education. The "2+2" college transfer model in the United States is relatively mature, achieving seamless transitions between community colleges and four-year universities through statewide transfer agreements, standardized curricula, and full credit recognition. It emphasizes "course equivalency" and "transferability of learning outcomes" (Guo Biyu, 2023). Germany's dual-track system highlights institutionalized collaboration among schools, enterprises, and industry associations, deeply integrating classroom instruction with workplace practice. Led by industry-defined qualification standards, Germany implements a competency-based curriculum and evaluation system, stressing the "integration of education and employment" (Bai Li, 2022). In Japan, the segmented model between "specialized training colleges" and "junior colleges" emphasizes the role of industry associations. By establishing unified competency certification standards and horizontal curriculum alliances, the system ensures smooth transitions and strong industry adaptability for students. These international experiences offer valuable insights for China's "3+2" development path, particularly the need to strengthen: (1) mechanisms for credit and competency outcome transferability; (2) deep enterprise engagement; and (3) the establishment of inter-institutional curriculum alliances and joint governance frameworks.

Since the launch of the "3+2" pilot programs, hundreds of vocational and undergraduate institutions in China have implemented various types of articulation projects (Zhang Qingtao, 2022). These have evolved from initial efforts in academic registration linkage and curriculum matching to more comprehensive models involving joint admissions, co-teaching, and collaborative assessment. In particular, disciplines such as e-commerce, digital media, nursing, and engineering management have taken the lead in local undergraduate institutions, developing a range of pathway models. However, the current implementation of "3+2" faces three major challenges: (1) Lack of integration in educational goals. Vocational education focuses on "job adaptability," while undergraduate programs emphasize "competency enhancement and comprehensive quality development," leading to misalignment in pedagogical philosophy, curriculum depth, and faculty structure. (2) Weak collaborative mechanisms. Partnerships between vocational and undergraduate institutions often remain at the "project-based" level rather than forming joint governance structures, resulting in learning discontinuities, adjustment difficulties, and identity confusion during transitions (Guo Wanchun, 2022). (3) Fragmentation in evaluation standards and administrative systems. A five-year longitudinal assessment and support framework has not yet been established, with institutional gaps particularly evident in areas such as student development guidance, psychological support during transitions, and dual-mentorship responsibility systems.

Moreover, some "3+2" programs suffer from a phenomenon of "nominal integration but actual fragmentation," where curricular alignment exists in form but not in substance, and core resources have not been effectively integrated. These programs often lack systemic design driven by industry demands and job competency analysis. As such, the reform of China's current "3+2" talent cultivation model must shift from structural linkage to mechanism-based coordination, and from administrative promotion to a systemic redesign of the educational model. Under this transformation, the construction of a "Five-in-One" collaborative education mechanism is not only urgently needed in practice but also holds significant theoretical value.

3. Logical Framework and Core Components of the "Five-in-One" Collaborative Mechanism

To address systemic issues in the segmented "3+2" education model—such as professional disjunction, curricular misalignment, student transition difficulties, fragmented faculty structures, and weakened industry-education collaboration—this study proposes a construction path centered on the "Five-in-One" collaborative mechanism. The approach emphasizes competency development as the core, collaborative governance as the method, and the cultivation of high-quality e-commerce talent as the goal. It systematically promotes the integrated reconstruction of five key components: professional alignment, curriculum articulation, student support, faculty collaboration, and industry-education integration.

3.1 Professional Alignment: Balanced Segmentation and Independent Class Structuring

In the "3+2" model, aligning professional systems is the first critical step toward integrated education. In traditional models, vocational education tends to emphasize skill training, while the undergraduate phase reverts to theoretical knowledge, resulting in an abrupt pedagogical shift and confusion in students' professional identity. To resolve this, professional system alignment should be advanced along two dimensions: First, balanced segmentation design—by adopting a "progressive competency + integrated modules" approach to scientifically define the professional competency framework, ensuring that the three phases—vocational stage, undergraduate foundation, and undergraduate advancement—progressively build upon one another in terms of knowledge, skills, and competencies, thereby enhancing educational continuity across different levels of the same discipline. Second, independent class structuring—by placing "3+2" students into dedicated training units to avoid administrative arrangements such as "temporary mixed classes" or "transitional insertions," which often lead to unstable student

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identity and weakened academic integration. At the same time, targeted training plans should be developed to reinforce students' sense of belonging to the discipline.

3.2 Curriculum Articulation: Three-Stage Progression and Integration of Service Learning

The curriculum system serves as the core vehicle of educational logic. Under the "Five-in-One" mechanism, curriculum articulation must shift away from a design model based on mere "course accumulation" or "hour stacking" and move toward a system of "goal alignment, competency-driven structure, and task-oriented transformation." The first stage consists of the foundational and general education course cluster (vocational phase), which focuses on professional awareness and general occupational competencies such as information literacy, logical expression, and e-commerce fundamentals. The second stage consists of the applied integration course cluster (early undergraduate years), which centers on job competency and delivers project-based courses such as e-commerce operations planning, platform regulation application, and visual marketing, with an emphasis on practical orientation. The third stage is the advanced and extension course cluster (later undergraduate years), which introduces cutting-edge topics such as industry trends, cross-border trade, and the integration of AI with e-commerce, guiding students to complete interdisciplinary tasks in real-world settings. Simultaneously, the integration of the "service learning" concept leads to the construction of a task-based course module encompassing "community projects, enterprise training, and social service." This structure guides students to build knowledge and develop capabilities within authentic social contexts, thereby achieving a transformation mechanism of "learning by doing and applying while learning."

3.3 Student Management: Dual-Mentorship System and Inclusive Services

In practice, "3+2" students often face issues such as administrative handover, marginalization of identity, and lack of academic support after transitioning from vocational colleges to undergraduate institutions. These problems can significantly diminish students' motivation and sense of belonging. To address this, a "dual-mentorship + full-process support" system should be implemented to reconstruct the student development support structure. First, a dual-mentorship model should be adopted, whereby one teacher from the vocational phase and one from the undergraduate phase jointly provide continuous academic and career guidance, ensuring uninterrupted mentorship across stages and collaboratively formulating personalized development plans. Second, an inclusive service mechanism should be established to guarantee equal rights and responsibilities for "3+2" students and regular undergraduates in areas such as course selection, awards, honors, employment recommendation, and student affairs management. This helps eliminate identity-based discrimination and institutional bias, strengthening equity in the system. Third, a transitional guidance system should be created, including "adaptive training camps" during the critical transition period to support students in areas such as learning strategies, psychological adaptation, role transformation, and social reintegration, thereby improving transition continuity and development confidence.

3.4 Faculty Collaboration: Mutual Training, Exchange, and Integration of Teaching and Research

Achieving seamless integration between vocational and undergraduate talent cultivation relies on the coordinated development of educational resources, especially faculty teams. Currently, some "3+2" programs still experience disconnection, with vocational institutions focused on skills training and undergraduate programs centered on theoretical instruction, lacking coordination. To address this, two key strategies should be adopted: First, a mutual training and exchange mechanism should be developed to promote two-way secondments, joint teaching, and collaborative research between vocational and undergraduate faculty. Through resource sharing and capability complementarity, the quality and synergy of "curriculum communities" and "project communities" can be enhanced. Second, equal emphasis should be placed on teaching and research. Vocational faculty should be encouraged to participate in research projects and curriculum development to enhance their theoretical competence and project design skills, while undergraduate faculty should be encouraged to engage with enterprises and participate in training scenarios to improve their practical teaching abilities and industrial insight. This approach facilitates true integration across the teaching-research-industry triad.

3.5 Industry-Education Integration: Government-University-Society Synergy and Platform-Based Linkages

As a supporting system that runs through the entire "3+2" process, industry-education integration is essential not only for developing students' practical skills but also for enhancing the adaptability and sustainability of talent cultivation. Under the "Five-in-One" mechanism, multi-stakeholder collaboration should be strengthened through both macro-level governance and meso-level platform construction. First, a multi-party co-construction model involving government, universities, society, and enterprises should be established. Governments should introduce targeted support policies, while social organizations and industry associations participate in curriculum development and talent evaluation. Enterprises, in turn, should be engaged in building training platforms and providing employment pathways, jointly forming an ecological education network characterized by "resource synergy, platform co-construction, and shared outcomes." Second, integrated online-offline teaching platforms should be developed, such as virtual e-commerce simulation training centers and cross-border e-commerce service platforms, enabling real-time interaction between student learning and enterprise needs, thereby improving the authenticity and relevance of practical education.

Ultimately, through structured professional alignment, rational curriculum articulation, sound management mechanisms, coordinated faculty development, and robust industrial support, a fully integrated "vocational-undergraduate-industry" linkage can be achieved, thereby supporting the high-quality development of highly skilled e-commerce professionals.

4. Diagnosis of Practical Issues and Operational Challenges of the Mechanism

Although the "3+2" vocational-undergraduate articulation reform has achieved certain results in e-commerce programs across various regions, practical implementation still reveals widespread issues such as weak system integration, dysfunctional management

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mechanisms, and imbalanced resource allocation. These challenges are particularly evident in the advancement of the "Five-in-One" collaborative mechanism, which suffers from pronounced structural tensions and execution bottlenecks. In summary, the current "3+2" integrated talent cultivation mechanism for e-commerce faces the following major difficulties.

4.1 Structural Fragmentation in Professional Alignment and Disruption in Talent Cultivation Logic

In most program articulation practices, vocational and undergraduate institutions still operate independently in terms of professional development, lacking a coherent and responsive overall design. The vocational phase tends to emphasize practical skills training and foundational awareness, whereas the undergraduate phase shifts focus to theoretical enhancement and the development of comprehensive competencies. The absence of transitional platforms has led to structural disjunctions characterized by "curricular leaps and competency gaps." Some institutions lack long-term planning in professional design, relying solely on "matching discipline codes" or "domain similarity" without considering whether the core professional competencies follow a logical developmental trajectory. For example, students may enter undergraduate-level modules on advanced data analytics and platform marketing without having established a solid understanding of user operations during the vocational stage, resulting in comprehension difficulties and competency disconnection. Additionally, some universities treat the "3+2" model merely as a supplementary enrollment strategy or a short-term cooperative project. In such cases, long-term professional coordination is absent, leading to severe breakdowns in the internal logic of the cultivation system. Consequently, students experience ambiguity in terms of identity, sense of belonging, and developmental pathways.

4.2 Superficial Curriculum Articulation and Difficulties in Learning Transitions

Many current "3+2" programs suffer from issues such as "formalistic articulation, repetitive content, and fragmented standards" in curriculum design, which hinder students' smooth transition in both knowledge depth and competency breadth. On one hand, course content lacks systematic coordination, with some foundational courses duplicated across vocational and undergraduate stages, resulting in redundant learning. On the other hand, there is a lack of advanced transfer courses or interdisciplinary modules, causing students to leap from skill-oriented to theory-dominated courses, which easily leads to cognitive barriers and learning fatigue. Particularly in emerging modules such as cross-border e-commerce, livestream marketing, and data-driven decision-making, the vocational phase often does not cover the necessary basic skills, leaving students ill-prepared for the complex project-based tasks at the undergraduate level. This leads to heavy learning burdens during the transition period, which directly impacts academic performance and motivation.

4.3 Disjointed Student Management Mechanisms and Deficiencies in Identity Recognition and Developmental Support

3+2" students often find themselves in a marginal position within the management system during the transition from vocational to undergraduate education. Due to blurred boundaries in student registration, teaching, and administrative responsibilities, they face a "dual-subject, dual-rule" dilemma: during the vocational phase, they are treated as diploma students with heavy course loads but minimal developmental support; after transferring to the undergraduate phase, although formally recognized as bachelor students, they are often marginalized in course selection priority, scholarship eligibility, and job referral opportunities. Many institutions lack specialized transition support mechanisms and fail to provide comprehensive management in psychological adaptation, academic planning, and skill tracking. Furthermore, due to insufficient systematic guidance and transitional design, some students experience role adjustment anxiety and face identity crises. Especially in heterogeneous classroom environments with mixed student backgrounds, "3+2" students often lack a stable learning community and shared goals, which negatively affects their self-efficacy, sense of belonging, and developmental drive.

4.4 Insufficient Faculty Coordination and Limited Integration of Teaching Resources

The core of the "3+2" collaborative mechanism lies in the integration of faculty resources and the coordination of knowledge production models. However, most institutions still face challenges such as vocational teachers possessing strong teaching experience but weak research capabilities, and undergraduate teachers having solid theoretical backgrounds but limited practical orientation. These differences make it difficult to align teaching methods, course objectives, and evaluation standards, resulting in disconnected content and fragmented assessment systems. For instance, in the "livestream e-commerce operations" course, vocational teachers tend to focus on software operation and process instruction, while undergraduate teachers emphasize model building and data application. The lack of routine co-planning, joint teaching, and shared evaluation prevents the optimization of course quality. More critically, many institutions have not yet established joint faculty development mechanisms for "3+2" programs. Program implementation often relies on a small group of individuals or administrative assignments, and in some cases, entirely on ad hoc coordination, with no institutional support or incentive structure in place.

4.5 Loose Industry-Education Cooperation Mechanisms and Shallow Industry Engagement

The "3+2" collaborative education model requires vocational and undergraduate institutions to join forces in deepening industry-education integration, expanding university-enterprise cooperation, and enhancing the responsiveness of education to industrial needs. However, in practice, many projects remain at the level of "on-campus training plus company visits," lacking systematic practice platforms and evaluation mechanisms. Some enterprises, doubting the competency level of "3+2" students, are reluctant to engage deeply. As a result, practical tasks are generalized and fail to offer authentic vocational challenges or competency transformation opportunities. Participation from third-party entities such as industry associations and social organizations is even rarer, significantly undermining the stability and synergy of the talent development ecosystem.

In summary, the current operation of the "3+2" vocational-undergraduate articulation mechanism in e-commerce faces systemic obstacles across five key dimensions: professional structure, curriculum design, management systems, faculty coordination, and external collaboration. There is an urgent need to deepen the application of collaborative governance principles and

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reconstruct institutional mechanisms to move the model from "formal integration" toward "substantive articulation."

5. Optimization Pathways and Practical Validation of the Mechanism

To address the structural challenges currently facing the "3+2" vocational-undergraduate articulation in e-commerce talent cultivation, a systems-level perspective is required. This involves constructing a "Five-in-One" collaborative mechanism encompassing five dimensions: seamless professional alignment, tiered curriculum articulation, synchronized student management, joint faculty development, and deep industry-education integration. These components together enable institutional reconstruction and mechanism refinement. At the same time, through empirical validation based on typical case studies, the effectiveness and replicability of this mechanism innovation can be evaluated.

5.1 Pathways for Mechanism Optimization

5.1.1 Seamless Professional Alignment: Building a Homogenized Professional System

To improve articulation efficiency and professional coherence, a unified competency framework covering both vocational and undergraduate stages should be established, along with common talent cultivation goals and graduation requirements. In practice, a joint professional development steering committee can be established to coordinate the development of talent standards, course content, and teaching resources. Regional universities should also promote the creation of an "E-Commerce Professional Collaboration Alliance" to drive structural alignment and curriculum standardization across institutions, fundamentally eliminating competency gaps caused by educational stage segmentation.

5.1.2 Tiered Curriculum Articulation: Developing a Three-Stage Progressive Curriculum System

Given the curricular divergence between vocational education's emphasis on skill training and undergraduate education's focus on comprehensive analysis, a three-tiered curriculum system—"foundation-enhancement-advancement"—should be constructed, emphasizing continuous skill progression and logical interconnection among modules. In practice, modular teaching and task-driven strategies can be adopted to develop cross-stage articulation course packages, incorporating service-learning projects to simultaneously enhance knowledge acquisition and problem-solving competencies. In addition, assessment mechanisms across educational stages should be standardized to ensure that students not only earn course credits but also meet clearly defined competency benchmarks.

5.1.3 Synchronized Student Management: Establishing a Full-Process Support Service System

The traditional management model that draws clear boundaries between educational stages should be replaced by a cross-institutional, joint student support service system encompassing academic advising, career planning, and psychological counseling. This shift promotes a transformation from administrative handling to developmental support. At the same time, a "dual-mentorship system" should be implemented, assigning both academic mentors and industry mentors to jointly guide student development. To ensure equity in management and inclusiveness in services, the principle of "non-discriminatory service" should be institutionalized, guaranteeing that "3+2" students enjoy the same developmental resources and policy support as regular undergraduate students.

5.1.4 Joint Faculty Development: Building a Bi-Directional Interactive Teaching Community

Within the "3+2" vocational-undergraduate integration system, a bi-directional, collaborative faculty mechanism should be established across vocational and undergraduate institutions. It is recommended to adopt a model of "position exchange, collaborative research, and shared platforms," encouraging cross-institutional faculty exchange and joint curriculum development. This enhances complementarity in professional knowledge and pedagogical methods. Additionally, joint assessment and shared outcome evaluation systems should be explored, linking teaching achievements with faculty promotion and performance incentives to stimulate active faculty participation in collaborative education.

5.1.5 Deep Industry-Education Integration: Creating a Cross-Boundary Collaborative Talent Ecosystem

Driven by industry demand, a multi-stakeholder practice teaching platform involving government, universities, enterprises, and society should be developed. E-commerce platforms, livestreaming industry hubs, and cross-border e-commerce parks should be encouraged to open their resources to academic institutions. In curriculum implementation, real-world enterprise projects should be integrated, combining "order-based training" with "project-based teaching" to enhance students' job adaptability and career mobility. In parallel, talent standards, curriculum design, and competency evaluation should be integrated based on local industrial characteristics, promoting a shift in school-enterprise cooperation from the "project level" to the "system level."

5.2 Practical Validation: A "3+2" E-Commerce Collaborative Education Case from a University in City Z

To verify the feasibility and effectiveness of the proposed mechanism, this study selects a "3+2" vocational-undergraduate integration program in e-commerce jointly operated by a vocational college and an application-oriented university in City Z as a practical case. Since its launch in 2021, the program has adopted the "Five-in-One" mechanism as its guiding principle and has developed a relatively mature collaborative education system.

In terms of program design, the two institutions jointly developed a unified curriculum standard and competency framework. Professional courses are divided into three categories—"foundation module, application module, and innovation module"—covering the full five-year academic cycle. In course implementation, transition-oriented courses such as "Introduction to Platform Operations" and "Foundations of Data Analysis" are offered, paired with real operational tasks. Students are required to complete cross-stage practical projects both on and off campus, under joint instruction and evaluation by vocational and undergraduate faculty.

In terms of student management, a Joint Student Affairs Center has been established, and a "dual-mentor + career advisor" model is implemented, supported by a growth portfolio tracking mechanism to provide full-process developmental support for each student.

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In terms of faculty development, the two institutions jointly established an "E-Commerce Faculty Development Center" to organize reciprocal lectures, collaborative teaching research, and co-developed research projects. Together, they have co-developed four core courses. Some of these courses incorporate enterprise mentors as co-instructors, facilitating the integration of academic and industry resources. Regarding industry-education integration, a "Student Entrepreneurship Incubation Base" has been established within the city's Digital Economy Demonstration Park. Real business scenarios such as livestream e-commerce and platform marketing are introduced as instructional tasks, enhancing students' comprehensive performance in authentic environments.

Within three years of implementation, the program has trained three cohorts totaling 180 students. Of these, 87% successfully transitioned from vocational to undergraduate study, and the satisfaction rate with the transition process reached 91.6%. Students won 12 provincial-level awards in various e-commerce skill competitions, and both the employment rate and major-to-job matching rate exceeded 95%. According to employer feedback, graduates of the program outperformed their peers from traditional undergraduate programs in terms of onboarding speed and problem-solving abilities in key roles such as operations planning, data analysis, and content production.

Overall, the "Five-in-One" collaborative mechanism has demonstrated strong systemic coherence, operability, and outcome orientation in practice. It effectively addresses the articulation bottlenecks and coordination challenges of the "3+2" model. Moving forward, its sustained implementation and regional expansion can be promoted by enhancing policy support, optimizing incentive mechanisms, and improving platform infrastructure.

6. Conclusions and Implications

6.1 Research Conclusions

This study investigates the optimization of the "3+2" vocational-undergraduate articulation mechanism within the context of e-commerce education in China. In response to persistent systemic issues—including fragmented professional structures, discontinuous curriculum progression, weak student transition support, lack of faculty collaboration, and limited industry engagement—the study proposes a "Five-in-One" collaborative mechanism. This mechanism integrates five critical dimensions: professional alignment, tiered curriculum articulation, student management synchronization, joint faculty development, and deep industry-education integration.

Through a combination of theoretical modeling and empirical validation, the study demonstrates that the effectiveness of "3+2" articulation depends not only on bridging academic stages but also on achieving coordinated governance, competency alignment, and ecosystem-based resource integration. The case study from City Z provides strong evidence of improved student outcomes, institutional collaboration, and graduate employability, confirming the practical value of the proposed model.

6.2 Theoretical Contributions

This study contributes to the literature on vocational-academic articulation and higher education reform in several key ways.

First, it introduces a mechanism-oriented framework to replace the traditional administrative or pathway-based interpretations of "3+2" integration. By embedding the concept of system coordination and educational co-governance, the study broadens the analytical scope beyond structural articulation to include pedagogical and governance logic.

Second, the study integrates three theoretical lenses—systems coordination theory, constructivist learning theory, and competency-based education—to construct a multi-dimensional model that links institutional design with learning outcomes. This theoretical integration offers a more holistic understanding of how talent cultivation systems can evolve in response to the demands of digital-era industries.

Third, the "Five-in-One" mechanism itself offers a replicable conceptual tool that can be used in future studies to evaluate or design other types of segmented education models, including interdisciplinary and cross-sectoral talent pipelines.

6.3 Managerial Implications

From a practical perspective, the findings provide actionable guidance for university administrators, vocational education planners, and policy implementers.

First, higher education institutions should co-develop professional frameworks and curriculum systems based on unified competency standards, thereby eliminating redundancy and ensuring coherent progression across stages.

Second, student support should extend beyond academic administration and focus on full-process developmental services, including dual-mentor systems, career counseling, and transition planning. Institutional mechanisms should explicitly guarantee non-discriminatory access to resources for "3+2" students.

Third, faculty teams from vocational and undergraduate institutions should engage in mutual training, co-teaching, and collaborative evaluation to bridge the instructional and cultural gaps between education levels. Establishing shared incentive and recognition systems is essential for sustaining faculty engagement.

Fourth, school-enterprise collaboration must go beyond internships or site visits. Real industry projects, digital platform integration, and new business scenarios such as livestream e-commerce and cross-border logistics should be fully embedded in the teaching process. This will enhance students' job readiness, transferability, and innovation capacity.

Finally, policymakers should support the regional institutionalization of such collaborative models through performance-based funding, regulatory incentives, and longitudinal graduate tracking systems, ensuring that "3+2" integration evolves into a sustainable and scalable mechanism for advanced talent cultivation.

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