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ORIGINAL RESEARCH PAPER

OPTIMIZING SCHOOL-ENTERPRISE COLLABORATIVE CAREER GUIDANCE IN HIGHER VOCATIONAL EDUCATION: A CASE STUDY IN CHONGQING, CHINA

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ABSTRACT

As the global labor market transitions toward digitalization and green economies, bridging the school-to-work gap through effective career guidance has become a critical challenge for higher vocational education. Drawing on synergetics, this study investigates the operational mechanism of school-enterprise collaborative career guidance in China. Using a qualitative case study approach at College A in Chongqing, data were collected through semi-structured interviews with 29 stakeholders and field observations of six typical collaborative activities. The findings reveal significant "synergy failures" within the current mechanism, characterized by fragmented information flows, structurally disconnected faculty capacity, siloed cross-departmental coordination, and imbalanced interest allocation. Viewed through the lens of synergetics, these structural barriers represent a failure of subsystem coupling and an absence of effective order parameters, which ultimately lead to persistent mismatches in students' career clarity, skill development, and job-major alignment. To transition the system from fragmented operation to synergetic evolution and self-organization, this study argues that institutional optimization must move beyond isolated interventions. It proposes a deeply integrated "synergetic governance" model that couples information sharing, cross-empowered teaching staff, unified managerial coordination, and mutual interest realization. This research contributes to international debates on vocational education governance and provides actionable insights for countries seeking to enhance youth employability through multi-actor collaboration.

Keywords: Higher vocational education, School-enterprise collaboration, Career guidance, Synergetics, Case study

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1. Introduction

Globally, the accelerating momentum of digitalization, intelligent technologies, and green transitions has profoundly reshaped labor-market structures. While low-skill jobs continue to contract, demand for medium- and high-skill workers is rising sharply, intensifying skill-mismatch pressures across economies (Cramarenco et al., 2023). Technological and AI-driven transformations further require workers to engage in continuous reskilling and upskilling; without such adaptation, they risk becoming trapped in structural unemployment and persistent mismatch (Poláková et al., 2023). Comprehensive assessments by international organizations such as the OECD and the International Labor Organization (ILO) highlight that young people worldwide face significant barriers in the school-to-work transition, including unemployment, underemployment, and skill mismatch. Despite the ongoing expansion of higher education, the proportion of youth not in employment, education or training (NEET) remains high, and delayed entry into stable employment has become a widespread structural challenge. The COVID-19 pandemic has further magnified these issues, exposing young labor-market entrants to heightened risks of unemployment and skill mismatch (Choudhry & Pastore, 2023). In response to these challenges, several European countries have renewed their policy attention to dual-track vocational education and apprenticeship systems following the global financial crisis, positioning them as key reform strategies to enhance youth employment and strengthen the school-to-work linkage (Martínez-Izquierdo & Sánchez, 2022). At the same time, a growing body of empirical evidence demonstrates that work-based learning experiences significantly improve graduates' labor-market outcomes, particularly by increasing the likelihood of securing full-time employment (Jackson & Rowe, 2023). Within this domain, work-integrated learning (WIL) has been widely recognized as a crucial pathway for developing graduate employability. Drawing on national graduate survey data from Australia, studies indicate that various forms of WIL contribute to skill formation and employment readiness, with work-based WIL showing especially strong effects in enhancing graduates' perceived overall job preparedness (Jackson & Dean, 2023). Moreover, WIL engagement is consistently associated with more favorable labor-market outcomes, including higher chances of obtaining full-time employment and reduced perceived overqualification (Jackson & Rowe, 2023).

As China's industrial structure continues to shift toward high-end and intelligent development, the demand for highly skilled technical workers has increased rapidly, accompanied by the rapid expansion of higher vocational education (Li et al., 2021). However, this quantitative growth has not translated into improved employment outcomes. Misalignment among program structures, students' competencies, and job requirements has become increasingly pronounced, weakening the effectiveness of career guidance and limiting the capacity of vocational education to support regional economic development (Liu & Yang, 2026). Although national policies have emphasized strengthening industry-education integration, enterprise participation in curriculum co-development, career guidance, and work-based learning remains limited, and career services within colleges often follow a supply-driven and slow-response model that insufficiently reflects evolving labor market needs or students' diverse career aspirations (Zhang et al., 2025).

Structurally, the long-cycle, standardized nature of higher vocational education contrasts sharply with the highly volatile and short-cycle demands of industry (Zhu & Shao, 2025). Unlike several advanced economies that have adopted data driven career guidance systems, Chinese vocational colleges are still at an early stage in employment data analytics, employer feedback mechanisms, and regional labor market intelligence integration (Zhong & Xie, 2026). This creates challenges in delivering precise, individualized, and future skills-oriented career guidance at scale. Chongqing, as a national pilot city for industry-education integration, provides a representative context. Despite favorable policy conditions and rich enterprise resources, the focal institution-Chongqing A Vocational College (hereinafter referred to as College A)-continues to face barriers such as information asymmetry, teachers' limited industry experience, low internal coordination efficiency, and weak mechanisms for capturing and responding to student needs. These issues mirror common international challenges in WIL and university-industry partnerships-such as blurred responsibilities and insufficient incentives-while also reflecting local characteristics such as regional disparities and societal perceptions of vocational education in China.

Although research on industry-education integration, apprenticeships, and career services has grown (Pan et al., 2025; Wang & Li, 2026),

studies specifically examining the governance of career guidance mechanisms remain limited. In particular, few analyses adopt a systemic perspective that considers government, institutions, enterprises, and students as interconnected actors within a unified collaborative framework. Empirical research situated in the context of Chinese higher vocational education is especially scarce, leaving notable theoretical and practical gaps in the global literature.

To address these gaps, this study draws on synergetics to conceptualize career guidance mechanisms in higher vocational colleges as an open system involving government, institutions, enterprises, and students. Using College A as a case, the study examines the current functioning of its collaborative career guidance system, identifies structural barriers affecting its effectiveness by operationalizing key synergetic concepts (self-organization, order parameters, and subsystem coupling) and develops actionable strategies for building a system characterized by clear responsibilities, aligned incentives, and effective collaboration. The findings contribute to international debates on vocational education governance and multi-actor collaboration, while providing insights from the Chinese context for countries and regions undergoing industrial transformation and seeking to enhance vocational education reform and youth employment outcomes.

2. Theoretical framework

This study employs synergetics as the theoretical framework. The term synergetics was coined by Professor Hermann Haken of the University of Stuttgart, Germany (Kharchenko, 2008). It derives from the ancient Greek word synergea, meaning "joint" or "coordinated action" (Chkhutiashvili et al., 2023). In observing transitions from disorder to order, Haken found that different systems tended to exhibit similar patterns of behavior, which he termed the synergetic effect (Kharchenko, 2008). The theory was pioneeringly proposed by Haken in 1971, formally established in his systematic exposition published in 1977 (Haken, 1977), and further enriched and refined in 1983 (Haken, 1983). Synergetics focuses on the operating laws of open systems. It posits that a macroscopic system composed of nonlinearly interacting subsystems can, through continuous exchanges of energy, matter, and information with the external environment, spontaneously undergo self-organization and evolve into ordered structures in temporal, spatial, and functional dimensions, even in the absence of external command or intervention (Haken, 1983). This principle of self-organization indicates that openness is a necessary condition for the maintenance of order: once a system becomes closed and lacks exchange with its external environment, its internal structure will gradually descend into disorder, regardless of how ordered its initial state may have been. During the process of interaction and coordination among internal elements, different units, or departments, interference and mutual constraints are inevitable; the sound development of the system is achieved precisely through such dynamic balance. As a quantitative analytical tool within synergetics, the Haken model can identify order parameters in nonequilibrium systems and measure the synergetic effects among subsystems during system evolution (Yi et al., 2023; Zhong et al., 2019). The synergetic mechanism among subsystems constitutes the core driving force that propels a system from a state of disorder toward one of order (Haken, 1977). Since this principle is universal, synergetics has expanded interdisciplinarily from its original application in the study of thermodynamic phase transitions to a wide range of fields, including economics, tourism ecosystems, and environmental science (Wu et al., 2024a; Wang et al., 2023; Zhu et al., 2021).

The collaborative employment guidance mechanism between higher vocational institutions and enterprises is, in itself, a typical open system. Vocational colleges, enterprises, and the broader labor market constitute its core elements, while government and students function as key participants; together, these actors form a complete and interconnected system. To operationalize synergetics for this study, three core concepts are defined within the context of vocational education. First, self-organization refers to the system's ability to spontaneously adjust career guidance content and formats in response to dynamic labor market signals without relying solely on top-down administrative mandates. Second, order parameters are the dominant variables that govern the behavior of the system's parts; in this context, they represent unified institutional rules, shared assessment metrics, or integrated digital platforms that align the disparate actions of schools and enterprises. Third, subsystem coupling denotes the structural and functional integration between different domains or the seamless coordination across different administrative departments.

Within this system, colleges cultivate and supply talent while providing employment guidance;

enterprises offer employment opportunities and feed back their workforce needs; government agencies build coordination platforms and allocate resources; and students' needs and competence development, in turn, influence the behavior of both colleges and enterprises. Continuous exchanges of matter, energy, and information take place among these actors, including matter in the form of talent, job opportunities, and material resources; energy in the form of knowledge, practical experience, and policy support; and information in the form of labor market demand, industry trends, job-seeking expectations, and curricular adjustments. Synergetics thus provides a vital theoretical foundation for understanding how this system can achieve effective coordination among actors and facilitate the smooth flow of key elements.

In formulating optimization strategies, this study is likewise guided by synergetics, with particular emphasis on two interrelated dimensions: improving coordination among internal system elements and maintaining open, continuous interaction between the system and its external environment. On this basis, the study clarifies the roles and rules of collaboration among the four stakeholders in employment guidance, thereby addressing the longstanding problem of fragmented and isolated action. At the same time, it seeks to ensure sustained interaction between the employment guidance mechanism and the regional industrial market, so that the mechanism can remain responsive to evolving industrial demands and shifts in job requirements. This helps prevent the system from becoming closed or rigid and promotes its efficient and orderly operation.

3. Methodology

3.1. Research Design

This study adopts a qualitative case study method, aiming to reveal the operation and existing problems of the school-enterprise collaborative employment guidance mechanism in higher vocational education. If the research subject is a "bounded system" enveloped by its context and the boundary between the phenomenon and the environment is unclear, case study can conduct an overall investigation in the real world. Moreover, Case studies can integrate various sources of information such as interviews, observations, literature, and archives to achieve data triangulation and enhance the reliability of conclusions (Hyett et al., 2014). This research takes College A in Chongqing as a single case, collecting data through semi-structured interviews and field observations, and using different data sources for triangulation to comprehensively capture the subjective experiences of various stakeholders (the college, enterprises, and students) as well as the objective practice scenarios of the mechanism's operation.

College A was selected as the case institution for two main reasons: its typicality and its representativeness of common challenges in vocational education. The case is analytically valuable because it combines mature school-enterprise collaboration with persistent implementation problems, making it suitable for examining both the strengths and limitations of collaborative career guidance.

First, the college is a highly typical case of school-enterprise collaboration in China's higher vocational sector. It is among the first group of national demonstration practice bases for collaborative employment, entrepreneurship, and innovation between schools and enterprises. Its industry-education integration model has been included in both the Collection of Industry-Education Integration Cases issued by the Ministry of Industry and Information Technology and the Ministry of Education's database of typical school-enterprise cooperation cases in vocational education. From the perspective of institutions, College A is a high-level vocational college in Chongqing with relatively strong practical training resources, a stable student population, and professional clusters closely aligned with regional industries such as intelligent manufacturing, automobiles, electronics, and digital technology. As a representative vocational college in Chongqing, it aligns its talent cultivation with local pillar industries such as automobiles, electronics, and equipment manufacturing. This regional embeddedness is important because Chongqing is a major manufacturing base in western China and a key city in the Chengdu-Chongqing economic circle, where demand for technically skilled graduates is closely linked to industrial upgrading. It has also developed relatively mature practices in jointly established industrial colleges and order-based training programs, making it a useful case for understanding institutionalized forms of collaboration.

Second, the college reflects several structural problems that are widely observed in vocational colleges' employment guidance

mechanisms. These include insufficient information exchange between schools and enterprises, delays in updating enterprise recruitment needs in response to industrial change, and low student use of public employment platforms. In addition, many school-based employment guidance teachers lack direct enterprise experience, while enterprise mentors often have limited pedagogical training. Coordination across departments is also inefficient, as employment guidance, internships, and curriculum development are managed separately, resulting in lengthy collaboration processes. Therefore, College A is not selected as a statistically representative case, but as an exemplary and problem-revealing case. Its experience can provide transferable insights into why formal school-enterprise cooperation does not always translate into effective career guidance.

3.2. Research Context and Participants

Based on purposive sampling, the core stakeholders involved in the employment service mechanism of College A were selected as interviewees for this study. To ensure a comprehensive perspective, the participants covered all aspects of the mechanism's operation. Ultimately, 29 interviewees were recruited, with their demographic information shown below (Table 1):

3.3. Data Collection

The data collection comprehensively adopted both interview and observation methods to achieve mutual complementarity between "subjective perception" and "practical scenarios".

The interview protocol was designed to focus on three core dimensions: (1) Cooperation foundation (policy implementation, frequency of information exchange, division of rights and responsibilities); (2) Implementation process (teachers' practical background, organization of training sessions/lectures and other activities, cross-departmental collaboration and assessment); (3) Actual effectiveness (students' career directions, improvement of job-seeking skills and job fit). The interviews were conducted in flexible ways, including face-to-face and online video/audio (Tencent Meeting, WeChat).

To capture the real-world dynamics of the employment guidance mechanism, field observations were conducted across six representative university-industry collaborative activities at College A. These events were purposively selected to cover core stages of the employment process, including information dissemination, skills coaching, and job matching. Specifically, the observed events included: two corporate campus recruitment presentations (one for the Artificial Intelligence program and one for Big Data), two career guidance lectures, one major autumn career fair, and one institutional employment mobilization assembly.

The observational strategy primarily adopted a non-participant approach, supplemented by participant observation where appropriate, to minimize researcher interference while maintaining contextual engagement. Data were systematically documented using a pre-designed, structured observation protocol encompassing six key dimensions: basic event information, participating stakeholders, procedural flow, resource allocation, stakeholder interactions, and perceived outcomes. To ensure data accuracy and mitigate recall bias, raw field notes were expanded, categorized, and annotated within one hour following the conclusion of each event, ultimately yielding six comprehensive observational transcripts.

3.4. Data Analysis

A rigorous, reflexive Thematic Analysis approach was employed to analyze the transcribed interview data and observational field notes. The analytical process followed six systematic phases. First, researchers immersed themselves in the data through repeated reading of transcripts and field notes. Second, initial open coding was conducted manually to capture recurring concepts pertinent to "structural tensions" and "implementation gaps" (e.g., "policy delay," "one-way communication"). Third, these initial codes were iteratively collated into potential sub-themes. Fourth, sub-themes were reviewed and mapped against the synergetics theoretical framework, specifically sensitizing the analysis to moments of system friction. Fifth, the themes were defined and named. Finally, data triangulation was utilized to corroborate subjective stakeholder perspectives against objective behavioral patterns documented during observations. Table 2 illustrates the progression from initial empirical codes to the final themes, ensuring methodological transparency.

Table 1.
Demographic information of interviewees

Code	Category	Gender	Age	Education level	Interview
JY1	Employment department staff	Female	46	Master	Face-to-face
JY2	Employment department staff	Male	39	Bachelor	Face-to-face
ZYJS1	Teacher	Male	37	Master	WeChat
ZYJS2	Teacher	Female	34	Master	Face-to-face
ZYJS3	Teacher	Male	43	Master	Face-to-face
FDY1	Counselor	Female	33	Master	Tencent Meeting
FDY2	Counselor	Female	32	Master	Face-to-face
BYS1	Graduate	Female	22	Associate	WeChat
BYS2	Graduate	Female	22	Bachelor	Tencent Meeting
BYS3	Graduate	Female	23	Associate	Tencent Meeting
BYS4	Graduate	Male	22	Associate	Tencent Meeting
BYS5	Graduate	Male	23	Bachelor	Tencent Meeting
BYS6	Graduate	Male	22	Associate	Telephone
BYS7	Graduate	Female	21	Bachelor	Tencent Meeting
BYS8	Graduate	Male	23	Bachelor	Tencent Meeting
ZXS1	Student	Female	19	Associate (2nd yr)	Face-to-face
ZXS2	Student	Female	19	Associate (2nd yr)	Face-to-face
ZXS3	Student	Male	20	Associate (3rd yr)	Face-to-face
ZXS4	Student	Male	20	Associate (3rd yr)	Telephone
ZXS5	Student	Male	20	Associate (3rd yr)	Face-to-face
ZXS6	Student	Female	19	Associate (1st yr)	Face-to-face
ZXS7	Student	Male	19	Associate (1st yr)	Face-to-face
ZXS8	Student	Female	19	Associate (2nd yr)	Face-to-face
ZXS9	Student	Male	20	Bachelor (2nd yr)	Face-to-face
QY1	Enterprise representative	Male	35	Bachelor	Telephone
QY2	Enterprise representative	Female	38	Bachelor	Face-to-face
QY3	Enterprise representative	Male	39	Bachelor	Telephone
QY4	Enterprise representative	Female	44	Bachelor	Telephone
QY5	Enterprise representative	Female	37	Master	Face-to-face

Table 2.
Coding Framework for Thematic Analysis

Initial empirical codes	Sub-themes	Final themes
• SMEs find applying for policy incentives too cumbersome (JY1) • Apprenticeship subsidies lag behind the internship cycle (JY1) • Lack of follow-up subsidies for specific industries like AI/Data (QY2) • Students are confused by policy application processes despite receiving brochures • Mobilization meetings are top-down with a lack of personalized Q&A	Continuing Gaps in Policy Implementation	Institutional foundations of cooperation
• School-enterprise information sharing operates on "dual tracks" or flows one-way (JY2) • National employment platform is web-only and has low usage (FDY1) • Teachers and students are unfamiliar with government-led matching platforms (ZXS2, FDY2) • Blended online-offline formats yield higher engagement (e.g., AI info sessions) • Uneven popularity at job fair booths (long lines for emerging tech, empty for traditional services)	Continuing Gaps in Information Delivery	
• Schools are proactive while enterprises remain passive in follow-ups • Cooperative agreements have vague definitions of resource inputs and responsibility boundaries • Lack of institutional basis to require specific follow-up actions from enterprises • Enterprise engagement level correlates with the seniority of dispatched personnel (executives for deep ties, junior HR for loose ties)	Continuing Gaps in Responsibility Allocation	
• "Double-qualified" teachers lack recent industry practice experience (ZYJS) • Career guidance relies heavily on counselors' personal experiences and verbal lectures (FDY1) • Disconnect between teachers' instruction and employers' implicit expectations (JY1) • Enterprise mentors possess strong professional skills but lack pedagogical techniques (FDY2) • Joint teaching improves engagement and interview performance but only covers ~40% of students	Continuing Gaps in Faculty Preparation	Implementation dynamics of the guidance process
• Functional silos exist within colleges (e.g., developing one course requires 4 meetings across 4 departments) (JY1) • Sluggish communication, redundant work, and lack of proactive collaboration (FDY2) • Fragmentation and working in isolation during daily routines • Brief cross-disciplinary/departmental integration is only achieved during large-scale events (e.g., autumn recruitment)	Continuing Gaps in Interdepartmental Coordination	
• External evaluation metrics (e.g., employment rates) lead to "inflated data" (FDY1) • Weak penalties for failing to meet year-end assessment targets with no substantial impact (JY1) • Assessment indicators prioritize numerical output over employment quality • Current assessments fail to reflect students' true engagement in classroom sharing (less than 1/3 active participation)	Continuing Gaps in Assessment Practices	
• Low awareness of major-specific employment directions prior to info sessions (ZXS2) • Limited knowledge of government employment policies (BYS1) • Overly theoretical mobilization meetings lead to student inattention • Students react much more positively to information tied to specific industries, majors, or job requirements	Uneven Career Clarity	Actual outcomes for students
• Enterprise-targeted classes only cover approximately 20% of students • Teaching leans heavily on basic theory, lacking hands-on practice based on real enterprise projects (BYS3, BYS4) • Students exhibit gaps in practical operations, latest toolchains, and agile development processes (QY5) • Enterprise presentations are mostly one-way technical briefings with few student participation opportunities	Uneven Practical Skill Development	
• Actual jobs are completely unrelated to studied majors (e.g., CS majors doing marketing) (BYS2) • Mismatch between software/tools taught at school and those actually used in enterprise development (BYS5) • Partner enterprises are the main recruiting force (81.3% of intended signings), but on-site screening is rough • Lack of a routine "matching-feedback" mechanism	Uneven Job-Major Alignment	

3.5. Ethical Considerations

Strict ethical standards were adhered to throughout the research process. Prior to data collection, the research objectives, procedures, and data usage policies were comprehensively explained to all participants, and voluntary informed consent was formally obtained. To ensure confidentiality and protect participant privacy, the participating institution and all individual respondents were completely anonymized using pseudonyms. Participants were assured that all collected data would be securely stored and utilized exclusively for academic research purposes.

4. Findings

A triangulated analysis of interview data and observational records from six college-enterprise activities indicates that College A has established a basic operational framework for its collaborative employment guidance mechanism. Through multiple forms of cooperation-including industry colleges and enterprise-oriented classes-the college has made measurable progress in resource integration and employment promotion. Nevertheless, the data also show continuing practical challenges in policy implementation, information delivery, responsibility allocation, implementation coordination, and student outcomes. To present these findings in a coherent and analytically integrated manner, the results are organized around three overarching themes that emerged from thematic analysis: (1) institutional foundations of cooperation, (2) implementation dynamics of the guidance process, and (3) actual outcomes for students. Rather than exhaustively cataloging all empirical observations, the following narrative selectively highlights the most explanatory patterns that reveal the underlying disconnect between formal collaborative structures and their substantive execution.

4.1. Theme 1: Institutional Foundations of Cooperation- Policy Implementation Delays, Uneven Information Access, and Ambiguous Responsibilities

The first theme concerns the institutional underpinnings of college-enterprise collaboration, which both interview and observational evidence suggest remain underdeveloped along three interrelated dimensions: policy implementation, information sharing, and the allocation of rights and responsibilities.

Delays and limited targeting in policy implementation emerged as a recurring concern. The explanatory pattern here is a temporal and structural misalignment between government incentives and actual enterprise operations. As the head of the Admissions and Employment Office (JY1) observed, policy incentives often lag behind the academic calendar, noting that "sometimes the students have already finished their internships before the subsidy is paid." Furthermore, generic policies fail to motivate specialized sectors; an enterprise representative (QY2) similarly noted that follow-up subsidies tailored to AI or data service companies would encourage deeper engagement. Observational evidence corroborated these accounts: during the autumn campus job fair, although government staff distributed 500 policy brochures and answered queries from more than 30 students, over half of attending students still reported confusion about application procedures. The employment mobilization meeting compounded this problem by adopting a top-down format dominated by leadership speeches, lacking the interactive mechanisms necessary to translate macro-policies into actionable guidance for students.

Uneven information access and one-way information flow constituted a second structural weakness. The data reveal a persistent "dual-track" system (JY2) where information asymmetry is exacerbated by non-interactive platforms. A counselor (FDY1) noted that the national 24365 employment platform is restricted to web access, while both students and staff admitted unfamiliarity with government-run matching platforms. Field observations highlighted that engagement levels are directly contingent on the interactivity of the delivery format. The artificial intelligence program's recruitment presentation, which combined offline delivery with online interaction, attracted 52 on-site registrations and 46 online résumé submissions, suggesting that more interactive formats can mitigate information asymmetry. However, this model had not been expanded to other partner enterprises observed in the study, and uneven booth traffic at the autumn job fair-long queues at AI and big-data booths, sparse engagement at traditional service-sector booths-showed that information delivery was not consistently tailored to different student groups or employment fields.

The third issue concerned the allocation of rights and responsibilities. The core pattern identified is that contractual ambiguity allows

enterprises to calibrate their engagement based on convenience rather than commitment. Cooperation agreements often define resource input and responsibility boundaries in ambiguous terms, leaving the college without a clear basis for enforcing accountability. This pattern was directly visible during field observations: enterprises engaged in deeper cooperation dispatched senior personnel such as HR directors and technical supervisors to discuss training course design, whereas more loosely engaged enterprises sent only junior HR staff who lacked authority to commit to substantive collaboration. Consequently, the college assumes a disproportionately proactive role, while enterprise participation remains highly variable and dependent on informal goodwill rather than institutionalized obligations.

4.2. Theme 2: Implementation Dynamics-Faculty Capacity, Cross-Departmental Coordination, and Assessment Orientation

The second theme captures how the mechanism operates in practice. Three sub-dimensions-faculty capacity, cross-departmental coordination, and assessment orientation-jointly shape implementation quality.

Faculty capacity emerged as a critical bottleneck. The data indicate a structural divide between academic theory and industry practice within the teaching staff. Participants described the "dual-qualified" teaching team as stronger in formal designation than in industry-based practice. A teacher (ZYJS) acknowledged having "no practical experience in industry," leading to guidance that is "mostly experience-based and verbal" (FDY1). This results in a "disconnection" (JY1) where teachers fail to decode the hidden expectations of employers, while enterprise mentors, though professionally strong, lack pedagogical skills (FDY2). Observational data, however, suggested that structured co-teaching can partially offset these limitations: in the joint courses Career Planning and Job Matching and Job-Seeking Skills and Interview Practice, student participation exceeded 90%, and in mock interview sessions, 8 of 12 students initially unable to articulate project experience showed marked improvement after enterprise-mentor guidance. Yet, because this intensive co-teaching model only covers about 40% of students, the structural capacity gap remains largely unresolved for the majority.

Cross-departmental coordination presented a similarly mixed picture, characterized by administrative fragmentation. Functional silos within the college were widely reported. JY1 recounted that co-developing a single livestream e-commerce course with JD.com required four separate meetings across four different departments (Academic Affairs, training center, secondary college, and employment office) just to align basic logistics. FDY2 likewise pointed to "delayed communication, reduced efficiency, duplicated work." Field observations revealed that while such fragmentation can be temporarily suspended during high-profile events—such as the autumn job fair, where faculty and HR jointly provided over 300 instances of guidance—it remains deeply entrenched in routine, day-to-day operations.

Assessment orientation reinforced these implementation weaknesses by prioritizing metric-driven compliance over substantive quality. FDY1 acknowledged that key indicators (employment rate, job-major match rate) are used by external authorities to evaluate the college, creating incentives for "inflation in the numbers." Furthermore, JY1 noted that failure to meet targets carries only minor consequences in year-end evaluations, lacking "any substantive impact." This evaluation logic distorts the implementation process: it shifts institutional attention toward generating favorable numerical outputs rather than addressing the uneven student engagement observed in classrooms (where fewer than one-third of students actively participate).

4.3. Theme 3: Actual Outcomes for Students - Career Clarity, Skill Development, and Job-Major Alignment

The third theme addresses the effectiveness of the mechanism from the students' perspective, focusing on three persistent mismatches: insufficient clarification of career direction, limited skill development, and weak job-major alignment.

Career direction guidance was widely perceived as overly general. The data show that students respond to targeted, industry-specific information but disengage from abstract policy dissemination. Current student ZXS2 reported that pre-presentation awareness of major-related career options was low and that the talk helped clarify the hardware track and fresher requirements: "Before the talk, I didn't really know what kind of jobs people in our major usually go into. After the

talk, I understood that there's a hardware track, and I also got a sense of the job requirements for fresh graduates." Yet graduate BYS1 noted limited awareness of government employment policies, recognizing only the Three Supports and One Assistance Program and the Western Plan: "I don't really know much about government employment policies. The only ones I've heard of are the Three Supports and One Assistance Program and the Western Plan."

Observational data partially supported these views: although the autumn job fair attracted approximately 3,000 students and enterprise presentations elicited engaged listening from nearly 80% of attendees, the employment mobilization meeting-attended by about 1,000 students-was largely theoretical, and signs of inattention were visible throughout the session. Together, these patterns indicate that students responded more actively when employment information was linked to specific industries, majors, or job requirements than when it was delivered as general guidance.

Skill development outcomes were similarly constrained by a persistent theory-practice gap. Enterprise-oriented classes reach only about 20% of enrolled students. Multiple graduates (BYS3, BYS4) and enterprise representatives (QY5) consistently identified the same deficit: the college curriculum overemphasizes basic theory at the expense of hands-on, project-based practice. As QY5 observed, students have "little exposure to the latest toolchains or agile development processes."

Observational findings reinforced this concern: enterprise presentations were largely one-way technical briefings, and the practical components embedded in joint courses lacked the breadth to transform the broader student body's skill sets.

Job-major alignment, the final outcome dimension, remained problematic due to a lack of institutionalized feedback loops. Graduates reported stark mismatches, such as computer science majors doing marketing (BYS2), or discrepancies between the software taught at school and the tools actually used in enterprise development (BYS5). The job-matching data observed at the autumn fair contextualize these accounts: although partner enterprises accounted for 81.3% of intended signings—evidence of the central role of collaboration—the on-site screening process was rudimentary. Crucially, the absence of a closed-loop "matching-feedback" mechanism means that these alignment failures are rarely fed back into the college's curriculum design.

Taken together, the three themes show that College A has established several formal arrangements for college-enterprise employment guidance, including cooperation agreements, enterprise presentations, joint courses, and campus recruitment activities. At the same time, the empirical evidence shows continuing gaps in policy implementation, information delivery, responsibility allocation, faculty preparation, interdepartmental coordination, assessment practices, and student outcomes. Students' reported experiences and observed activities indicate that career clarity, practical skill development, and job-major alignment remain uneven across majors and student groups. These empirical patterns provide the basis for the theoretical interpretation developed in the following discussion.

5. Discussion

5.1. The Role of Information Flows in Shaping Collaborative Order

Synergetics positions information as a key driving variable in system evolution, with the efficiency of information circulation directly conditioning the level of collaboration among actors (Mallillin, 2023). The findings of this study lend strong empirical support to this proposition. As evidenced by the "dual-track" communication system (JY2) and the low usage of web-only national platforms (FDY1) mentioned in the findings, the fragmented policy communication, low platform usage, and uneven booth traffic observed at College A all point to an underdeveloped information subsystem in which actors operate on parallel tracks rather than within a shared information field, preventing the system from achieving self-organization.

This pattern resonates with international research on WIL and graduate employability. Empirical work in the Australian context has shown that WIL participation, particularly work-based WIL, is associated with stronger perceived job preparedness and more favourable labour-market outcomes such as full-time employment and reduced overqualification (Jackson & Dean, 2023; Jackson & Rowe, 2023). The case of College A adds a complementary insight: even when WIL-type arrangements exist in formal terms-such as industry colleges and enterprise-oriented classes-

their effectiveness can be substantially constrained when the information environment surrounding them remains fragmented. This suggests that the labor-market benefits documented in advanced economies may be difficult to replicate in contexts where governance fragmentation prevents stable information exchange across actors.

A second implication concerns the directionality of information. The interview data show that current flows are predominantly top-down, with limited feedback from students or enterprises into curriculum and guidance design. Synergetics suggests that without continuous feedback loops, a system cannot generate the self-organizing dynamics that move it from disorder to order (Haken, 1983). This theoretical claim is directly supported by the findings, where the absence of a "matching-feedback" mechanism resulted in persistent job-major mismatches (e.g., discrepancies in software tools reported by BYS5). This is also consistent with broader observations that Chinese vocational colleges remain at an early stage in employment data analytics, employer feedback mechanisms, and labor-market intelligence integration (Zhong & Xie, 2026), and that career services in many institutions still follow a supply-driven, slow-response model (Zhang et al., 2025). The implication is that building cyclical chains of demand identification, guidance provision, outcome feedback, and adjustment is not merely an operational refinement but a structural prerequisite for synergetic evolution.

5.2. Faculty Capacity as a Coupling Mechanism Between Educational and Industrial Logics

Synergetics emphasizes that system effectiveness depends on functional complementarity among key actors and the amplification of collaborative effects (Chen, 2023; Wu & Sarker, 2022). The findings of this study illustrate this principle through the contrasting competencies of college teachers and enterprise mentors. As highlighted by the empirical evidence in Section 4.2, college teachers acknowledge relying on "verbal" guidance due to a lack of industry practice (ZYJS, FDY1), while enterprise mentors lack pedagogical skills (FDY2). When these two groups operate in parallel rather than in coupled interaction, the faculty subsystem fails to generate synergistic gains, regardless of how many "dual-qualified" certifications are awarded. In synergetic terms, this represents a failure of subsystem coupling between educational and industrial logics.

This observation contributes to international debates on dual-track vocational education and apprenticeship systems (Martínez-Izquierdo & Sánchez, 2022). As Martínez-Izquierdo & Sánchez (2022) note in the European context, dual-track and apprenticeship reforms have been positioned as central strategies for strengthening the school-to-work linkage, suggesting that the credibility of such systems depends on substantive integration between school-based and workplace-based learning rather than on formal designation alone. The case suggests that, in Chinese higher vocational colleges, this interdependence is recognized in principle but rarely operationalized through structured two-way mobility. From a synergetic perspective, the implication is that genuine faculty synergy requires institutional embedding-not merely the co-presence of two faculty types-and that order parameters such as unified joint-teaching standards and shared evaluation metrics need to be stabilized through formal evaluative and incentive rules. The observational data showing marked student improvement during structured co-teaching mock interviews provides concrete evidence that when these subsystems are temporarily coupled, synergetic effects are immediately realized.

5.3. Governance Structures and the Coupling of Subsystems

Synergetics points out that system disorder often arises from segmented organizational boundaries and unclear interfaces between rules (Sun, 2025). The findings of this study illuminate how this principle operates at the institutional level. The high coordination costs reported in interviews-specifically the four-meeting process required across four departments to launch a single course (JY1)-and the contrast between siloed routine operations and large-event coordination observed in the field data both provide robust evidence for the absence of a stable cross-subsystem coupling mechanism.

This finding aligns with broader observations that, despite expanding policy attention to industry-education integration, enterprise participation in curriculum co-development and career guidance in Chinese vocational colleges remains limited, while career services often follow a supply-driven and slow-response model (Zhang et al., 2025). The structural mismatch between the long-cycle, standardized nature of higher vocational education and the volatile, short-cycle demands of industry (Zhu & Shao, 2025) further amplifies these

governance challenges. The Chinese case adds a distinctive structural dimension: in higher vocational colleges, employment guidance, curriculum development, and internship management are typically managed by separate units, each accountable to different external regulators. The resulting governance fragmentation suggests that synergetic evolution between talent cultivation and labor-market demand cannot be achieved through bottom-up coordination alone; it also requires the institutional coupling of curriculum, practical training, and employment services within a unified governance framework.

From a theoretical standpoint, this implies that governance synergy operates as a higher-order order parameter. Without it, the gains achieved in information or faculty synergy tend to dissipate across departmental boundaries. The case therefore extends the application of synergetics to vocational education governance by highlighting the importance of multi-actor coordination mechanisms-encompassing government, college, enterprises, and students-as institutional vehicles for sustained subsystem coupling.

5.4. Interest Alignment and the Sustainability of Collaboration

Finally, synergetics holds that the sustainability of collaborative relationships depends on whether all actors can form stable expectations and receive positive incentives (Liu et al., 2025). In synergetic terms, mutual interest acts as the continuous energy input required to maintain an ordered state. The findings of this study suggest that the most persistent weakness of the case lies precisely in this dimension. As demonstrated by the empirical data, where enterprises dispatch junior staff for loose ties and senior staff only for deep ties, and where policy subsidies lag behind internship cycles (JY1), enterprises participate at uneven depths, students report limited gains, and the college bears a disproportionate share of input. This pattern risks reverting the system to loose cooperation rather than synergetic evolution.

This interpretation can be situated within the wider context of labor-market restructuring identified in the international literature. As digitalization, AI, and green transitions reshape skill demand and intensify mismatch pressures (Cramarenco et al., 2023; Poláková et al., 2023), enterprises face strong incentives to access skilled graduates, yet often lack stable institutional channels for sustained engagement with vocational colleges. The case illustrates how, in the absence of well-designed incentives and risk-sharing mechanisms, enterprise involvement tends to settle at the level of short-term recruitment rather than deep educational partnership. From a stakeholder-theoretic perspective, this implies that interest synergy is not simply about distributing benefits but about constructing stable expectations through mechanisms such as internship liability insurance, detailed cooperation agreements, and retention incentives. This is particularly relevant for small and medium-sized enterprises, which dominate the regional industrial landscape and face distinct cost structures that generic policy instruments rarely address.

A second implication concerns the position of students within the synergetic system. The findings indicate that students are typically treated as beneficiaries rather than co-evaluators of the mechanism. Yet synergetics suggests that the legitimacy and stability of the system depend on whether students' sense of gain is continuously fed back into institutional decision-making. Incorporating student evaluations into departmental assessment and enterprise cooperation review thus emerges as a theoretically significant move-not merely a managerial refinement-because it reconfigures students from passive recipients into active agents shaping the system's order parameters.

5.5. Theoretical and Practical Implications

Taken together, the four analytical strands above suggest that the difficulties observed at College A are not isolated operational problems but expressions of an underdeveloped synergetic architecture. The case demonstrates, first, that synergetics provides an explanatory framework capable of integrating the disparate weaknesses identified in the findings-information asymmetries, faculty disconnection, governance fragmentation, and interest misalignment-into a coherent account of system underperformance. Second, using synergetics, the case illustrates how the structural and motivational dimensions of multi-actor collaboration are mutually constitutive: order parameters (such as unified governance and assessment metrics) cannot stabilize without aligned interests, and aligned interests cannot be sustained without the institutional coupling of subsystems.

For international debates on vocational education governance, the case offers two contributions. It provides empirical evidence from an under-represented Chinese context that complements the predominantly European and Anglophone literature on WIL and apprenticeship reform. It also illustrates how synergetic perspectives, originally developed in the natural sciences, can be extended to the governance of education-industry collaboration in transitional economies. For policy and practice, the discussion implies that reform efforts should move beyond isolated interventions-such as adding new platforms or launching new training programs-and instead address the systemic conditions under which information, faculty, governance, and interest can co-evolve and self-organize.

6. Conclusion

This study contributes to the ongoing international discourse on vocational education reform by investigating the school-enterprise collaborative career guidance mechanism through the theoretical lens of synergetics. Amidst rapid industrial transformation, the findings from College A indicate that unilateral efforts and fragmented institutional arrangements are insufficient to solve complex youth employment challenges. By operationalizing synergetic concepts, this study demonstrates that the existing structural barriers – asymmetrical information flows, isolated faculty resources, siloed administrative governance, and imbalanced interest distribution – are fundamentally failures of "subsystem coupling." Furthermore, the reliance on superficial administrative metrics rather than substantive "order parameters" prevents the collaborative system from achieving self-organization and orderly evolution.

By adopting a multi-stakeholder perspective, this study concludes that optimizing the career guidance mechanism requires transitioning from a disconnected, episodic approach to a deeply integrated "synergetic governance" model. This paradigm shift relies on the institutional coupling of information, faculty, management, and stakeholder interests to ensure sustained responsiveness to dynamic labor-market demands.

Despite its theoretical and practical contributions, this study has certain limitations. As a qualitative single-case study focusing on one vocational college in Chongqing, China, the findings are inevitably influenced by specific regional economic characteristics and local institutional contexts, which may limit their generalizability. Future research could employ multi-case comparative designs across different regions or utilize quantitative survey methods to validate the effectiveness of the proposed synergetic optimization strategies in broader international educational settings.

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References

Chen, F. (2024). Research on the collaborative educational mechanism of school-enterprise cooperation in higher vocational colleges based on deep learning. *Applied Mathematics and Nonlinear Sciences, 9*(1), 1-15.

Chkhutiashvili, L. V., Chkhutiashvili, N. V., Gubin, A. M., & Golubeva, G. F. (2023). Synergetic approach in public administration. In *Smart green innovations in Industry 4.0 for climate change risk management* (pp. 116-121). Springer.

Choudhry, M., & Pastore, F. (2023). Determinants of school-to-work transition: Global outlook. *International Journal of Manpower*. 44(6), 989-999.

Cramarenco, R. E., Burcă-Voicu, M. I., & Dabija, D.-C. (2023). The impact of artificial intelligence (AI) on employees' skills and well-being in global labor markets: A systematic review. *Oeconomia Copernicana, 14*(3), 731-767.

Haken, H. (1977). Synergetics. *Physics Bulletin, 28*(9), 412-414.

Haken, H. (1983). *Advanced synergetics: Instability hierarchies of self-organizing systems and devices*. Springer-Verlag.

Hyett, N., Kenny, A., & Dickson-Swift, V. (2014). Methodology or method? A critical review of qualitative case study reports. *International Journal of Qualitative Studies on Health and Well-Being, 9*(1), Article 23606.

Jackson, D., & Dean, B. (2022). The contribution of different types of work-integrated learning to graduate employability. *Higher Education Research & Development, 42*, 93-110.

Jackson, D., & Rowe, A. (2023). Impact of work-integrated learning and co-curricular activities on graduate labour force outcomes. *Studies in Higher Education, 48*, 490-506.

Kharchenko, K. V. (2008). *Sociology of management: From theory to technology*. Regional Printing House.

Li, S., Luo, C., & Kong, Q. (2021). The connotation and path selection of high-quality development in "Double High Plan" institutions. *Journal of Vocational Education*, (3), 150-153.

Liu, J., Wang, X., Miao, W., & Wang, X. (2025). What factors enable sustainable university-industry collaboration communities? Evidence from a symbiosis theory perspective. *Sustainable Futures, 10*, 101166.

Liu, Y., & Yang, P. (2026). The formation and employment effect of employability capital: An empirical analysis based on the national employment survey of higher vocational college graduates. *Chinese Vocational and Technical Education*, (7), 5-17.

Mallillin, L. L. D. (2023). Educational system theory, concept, and framework. *Asian Journal of Social Sciences and Legal Studies, 5*(1), 1-17.

Martínez-Izquierdo, L., & Sánchez, M. (2022). Dual vocational education and training systems' governance model and policy transfer: The role of the European Union in its diffusion. *Social Sciences*. 11(9), 403.

Pan, H., Fu, Y., Guo, M., & Yang, H. (2025). Enriching and deepening the industry-education integration of vocational education with "one body, two wings" as the core: New progress in research and practice of industry-education integration of vocational education in 2024. *Chinese Vocational and Technical Education*, (2), 22-30.

Poláková, M., Suleimanová, J., Madzík, P., Copuš, L., Molnárová, I., & Polednová, J. (2023). Soft skills and their importance in the labour market under the conditions of Industry 5.0. *Heliyon, 9(8)*. e18670.

Sun, J. (2025). Research on innovation and practice path of collaborative mechanism of college student management from the perspective of "three-round education." *Journal of Sociology and Education, 2*.1-8.

Wang, L., Hu, H., Wang, X., Zhang, X., Yan, Z., & Liang, Z. (2023). The synergistic evolution of resilience and efficiency in the digital economy and its path identification: Evidence from China. *Systems, 11*(8), 433.

Wang, S., & Li, H. (2026). Study on the generation logic, practical dilemmas, and optimization paths of the apprenticeship system with Chinese characteristics. *Education and Vocation*, (3), 30-38.

Wu, M., & Sarker, M. (2022). Assessment of multiple subjects' synergetic governance in vocational education. *Frontiers in Psychology, 13*. 947665.

Wu, W., Huang, Y., Zhang, Y., & Zhou, B. (2024). Research on the synergistic effects of urbanization and ecological environment in the Chengdu-Chongqing urban agglomeration based on the Haken model. *Scientific Reports, 14*(1), 117.

Yi, P., Dong, Q., Li, W., & Wang, L. (2023). Assessment of city sustainability with the consideration of synergy among economy-society-environment criteria. *Environment, Development and Sustainability, 25*(8), 7645-7668.

Zhang, P., Ma, X., & Yuan, D. (2025). Influencing factors and mechanism of internationalized development of higher vocational colleges under the background of jointly building the Belt and Road: A grounded theory study. *Education and Vocation*, (7), 39-47.

Zhong, B., & Xie, A. (2026). Structural pressures and strategic compromise: A qualitative study on the formation mechanism of bottlenecks to high-quality employment for rural vocational college students. *Tsinghua Journal of Education*, (2), 125-139.

Zhong, W., Song, J., Ren, J., Yang, W., & Wang, S. (2019). Revealing the nexus among energy-economy system with Haken model: Evidence from China's Beijing-Tianjin-Hebei region. *Journal of Cleaner Production, 228*, 319-330.

Zhu, J., & Shao, Y. (2025). Challenges and strategies of institutionalizing organizational innovation in higher vocational education institutions located in less-advantaged regions. *Education Science, 41*(6), 70-77.

Zhu, W., Li, B., & Han, Z. (2021). Synergistic analysis of the resilience and efficiency of China's marine economy and the role of resilience policy. *Marine Policy, 132*, 104703.