

A Study on School–Enterprise Collaborative Education Mechanisms from the Dual–Subject Governance Perspective

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Abstract

This article aimed to (1) identify the key characteristics of successful dual–subject cooperation between vocational colleges and enterprises; (2) explore the main obstacles that hinder such cooperation; and (3) evaluate the explanatory power of the proposed mechanism model for assessing the effectiveness of this collaboration. The research employed a mixed–methods approach, with 20 key informants including administrators, enterprise managers, faculty members, and industry mentors interviewed in five vocational schools and their cooperative enterprises in the western, eastern, and southwestern regions of Sichuan Province. Additionally, 286 participants from 15 vocational schools and enterprises took part in a quantitative survey. Data were collected using semi–structured interviews (qualitative phase) and a structured questionnaire based on the Likert scale (quantitative phase). The analysis utilized descriptive statistics, content analysis, exploratory factor analysis, and structural equation modeling. The findings revealed that 1) mutual trust, shared goals, and collaboratively developed curricula were essential for effective school–enterprise cooperation, fostering alignment between schools and enterprises; 2) governance logic differences, poor communication, and unequal benefit distribution were significant obstacles that led to uneven participation and unclear roles; and 3) the proposed dual–subject mechanism model effectively explained the collaborative efficacy, emphasizing institutional reciprocity, dynamic co–governance, and policy frameworks in sustaining successful collaboration. The results suggest that effective school–enterprise collaboration requires trust, agreement, and jointly built systems, supported by policies and active management to resolve participation discrepancies.

Keywords: Dual–subject perspective; Vocational education; School–enterprise cooperation; Collaborative education mechanism; Talent cultivation

Introduction

The Chinese vocational education system is undergoing significant reforms, with school–enterprise cooperation becoming increasingly crucial in improving the quality of technical and skilled talent training. National policies, such as the Implementation Plan for the Reform of Vocational Education and the Opinions of the State Council on Promoting the Deep Integration of Industry and Education, emphasize the importance of treating enterprises as equal partners in education. These policies aim to support the creation of a comprehensive, cooperative mechanism between vocational education schools and businesses, thereby driving the transformation of vocational education in China.

Despite the policy emphasis, challenges persist in the practical implementation of these reforms. One notable issue is the lack of symmetry between schools and enterprises, where traditional school–dominated models often result in businesses taking a passive role, leading to a disconnect between educational objectives and industry needs. In conventional school–enterprise cooperation, the roles of both parties are often seen as complementary but unequal. This narrow perspective limits the role of enterprises, reducing them to mere suppliers of training resources or employment pathways, rather than recognizing them as co–creators in the talent cultivation system.

To address these theoretical and practical gaps, this study introduces the concept of "dual–subject governance." This approach treats schools and businesses as equal co–governors of vocational training, emphasizing their shared responsibility, mutual consideration, and collaborative efforts in curriculum design and aligning benefits at every stage of education. Such a model is crucial to fostering a balanced, sustainable partnership that can meet the evolving needs of vocational education.

While existing research on collaborative education, such as partnership education, integrated education, and industry–education platforms, has contributed valuable insights, it often overlooks the structural and institutional prerequisites necessary for genuine collaboration. Achieving effective dual–subject governance in practice remains challenging, and there is a lack of references on how to ensure a balanced distribution of authority, the creation of value, and the long–term sustainability of these collaborations.

This research aims to bridge this gap by constructing a theoretical framework for dual-subject cooperation, drawing on theories of subjectivity, institutional co-construction, and collaborative governance. More importantly, the study seeks to empirically explore how school-enterprise cooperation can be optimized to meet the transformation needs of vocational education. Understanding and addressing these issues is critical for the future success of vocational education reform in China and can provide valuable insights for similar initiatives globally.

Research Objectives

1. Check on the current state of school-enterprise cooperation through studying the construction of structural dynamics and difficulties in Chinese vocational schools to find the major obstacles to equal and mutually engaging cooperation partnerships.

2. To create a conceptual framework based on subjectivity theory combined with collaborative governance theory, and then to define the interactive roles of schools and enterprises, as well as the concepts of dynamic cooperation, mutual responsibility, and shared governance.

3. Use stakeholder analysis to empirically validate the proposed framework, and assess trust-building processes, governance architectures, and benefit-sharing structures, then make strategic suggestions for improving cooperation.

Literature Review

Pursuing the high-quality development of the education sector in China has taken the integration of industry and education to a strategic level. Haisheng et al. (2016), as well as Hardy and Liu (2022), have written about how this has led to increased scholarly focus on school-enterprise collaboration models. Among all kinds of theoretical perspectives, the dual-subject perspective, which stresses the co-partnership and co-responsibility between schools and enterprises, is one that is widely accepted. While there is an abundant amount of literature already published, there are gaps that are recognized particularly on the aspect of scalable governance structure, flexible co-governance process and comprehensive theory to include the entire partnership.

1. Domestic Research on Collaborative Education Models

A lot of studies in China have explored localized school-enterprise collaboration educational models: For example, Sun (2018) proposed a “3+1” two-subject teaching model for New

Engineering discipline, mainly discussing co-created curriculum and shared teacher in vehicle engineering. In the same manner, Wang and Wu (2018) pointed out the need for industry practices to be aligned with educational processes in private universities so as to improve student employability. However, it is often seen that a shortcoming of these types of studies is that they put enterprises in a supporting position rather than an equal position in the environment of education.

2. Developing the dual subject perspective in vocational education

Their article in 2021 Chen and Peng introduced a “dual subject in the whole process” model, stressing the relevance of institutional design as well as ideological alignment. Though efforts to do this do increase the knowledge about cooperative mechanisms, there is rarely a commonly accepted theory. Yu et al. (2024) illustrated more complicated models as “Dual–subject–Triple–integration–Quadruple–connectivity” integrating subject and multi–evaluation. Zhang (2021) at the same time as structural flaws were pointed out in areas like Culinary Arts which highlights that there needs to be structure for the power balance, rewards, responsibilities, to come into play for this to happen.

3. International perspective on school–enterprise cooperation

International perspective has extended the discussion. In Li (2022), collaboration was present in computer and machinery; dual mentorships and project–based learning were effective. Katsioudi and Kostareli (2021) were in favor of a "sandwich" model in regards to maritime studies, stating that the partnership was for more than just sharing the same value. In terms of methodology, Hu and Panyadee (2024) introduced a more advanced method for multi–criteria decision making to analyze the sustainability and structural effectiveness of collaborative education models.

4. Research gaps and directions

Even if there are some such works, there are still many important ones. Cheng, Cheng and Feng (2024) and Liang et al. (2025) mentioned that there is no comprehensive theory that takes into account the dynamic and co–governance characteristic of the school – enterprise relationship. Second, much of the existing work is very practical, with few solid empirical studies. Kaur et al. (2018), Downe–Wamboldt (1992), mentioned a preponderance of descriptive case analyses with less studies using more advanced statistics such as Exploratory Factor Analysis (Beavers et al., 2013) or Structural Equation Modeling (Bielby & Hauser, 1977; Kyriazos, 2018)

tests. Thirdly, Shen et al. (2022); Xinmiao (2024), argue that it doesn't explore enough key operations like fair benefit distribution and trust building in dual-people mode.

5. This Study's Contribution

This research will try to close those gaps by building and proving a theoretical model for school-enterprise co-operative learning based on dual-subject concept. It is enriching the already existing knowledge through the theory on subjectivization, co-construction of institutions and joint governance combined into one. This study is mixed, we have studied about how to institutionalise more effective, sustainable and balanced collaboration.

Conceptual Framework

The conceptual framework of this study lies on a union of subjectivity theory, collaborative governance and institutional co-construction. Purpose of the framework is to describe how school-enterprise collaborative education works when they both exist in parallel and interact with each other. This is also referred to as dual-subject approach, in which schools and enterprises are treated as equal participants in the process of nurturing talents together. Every entity is expected to assume different roles, tasks and different forms of instituting logics.

At the core is the dual-subject theory, breaking away from the old setup where education was led by schools giving out knowledge and companies just provide training ground; instead, this theory claims that there is agency, autonomy and institutional legitimacy of schools and enterprises: they work together to formulate education goals, instruct on the curriculum, develop training materials, and assess the results. Subjectivity is not merely a theoretical identity in this model, it is a functional construct that manifests in shared decision making, mutual accountability and intersubjective trust in this model.

The second pillar, collaborative governance theories horizontal integration, many actors and consent-based rules. That is to say the cooperation must go beyond just transactional partnerships and become more of an institutionalized co-governance. It needs the ability to negotiate authority, participation and process legitimacy. Governance structures must allow for open lines of communication, flexible coordination and dynamic resolution of any conflict.

Third is the institutional co-construction phase. This consists of the two entities jointly creating and adapting common norms, policies, and operational standards. Both seen like joint committees and shared curricula, along with more intangible but just as present aspects like alignment of cultural values, organizational routines, long-term strategic goals. The institutional co-

creation guarantees that the cooperation is maintained, so it is embedded in the logic of the systemic of education and industry players as opposed to project or temporary co-operation.

Five Key Dimensions

Building on this triad of conceptions, the framework isolates five main elements which form the efficacy of dual-subject collaborative education mechanisms:

Goal Alignment

Definition: To what extent do schools and enterprises share common goals for cultivating people.

Practical Indicator: Rate of common goals in the curriculum and development plan
Responsibility Distribution

Definition: Schools and enterprises are clear about the assignments, decision-making authority, and operational tasks.

Practical Indicator: Formal agreement on the rights and responsibilities, decision-making authority, and work of both parties.

Resource Integration

Definition: Pooling and pooling and joint use of human, technological, and infrastructural resources.

Practical Indicator: Number of joint resources/shared facilities/faculty exchange programs/collaborative technology platforms

Trust and Communication

Definition: School – enterprise partner interaction, feedback, and relational capital.

Practical Indicator: Communication session frequency, Communication session quality, Joint feedback meeting frequency

Evaluation and Feedback

Definition: Shared evaluation standards, continuous improvement standards, and mutual accountability standards have been set up.

Practical Indicator: Performances reviews are recurrent, a loop exists, there are standards for outputs depending on what has been established.

Dynamic, Interactive System

Dual-subject participates in school-enterprise cooperation form a dynamic and interactive system together and the strength of school-enterprise cooperation relies on the systemic coherence and system institutionalized. For this framework, we rely on all aspects of the model to

be included into the big picture of working together, so nothing is left out as being underdeveloped or irrelevant.

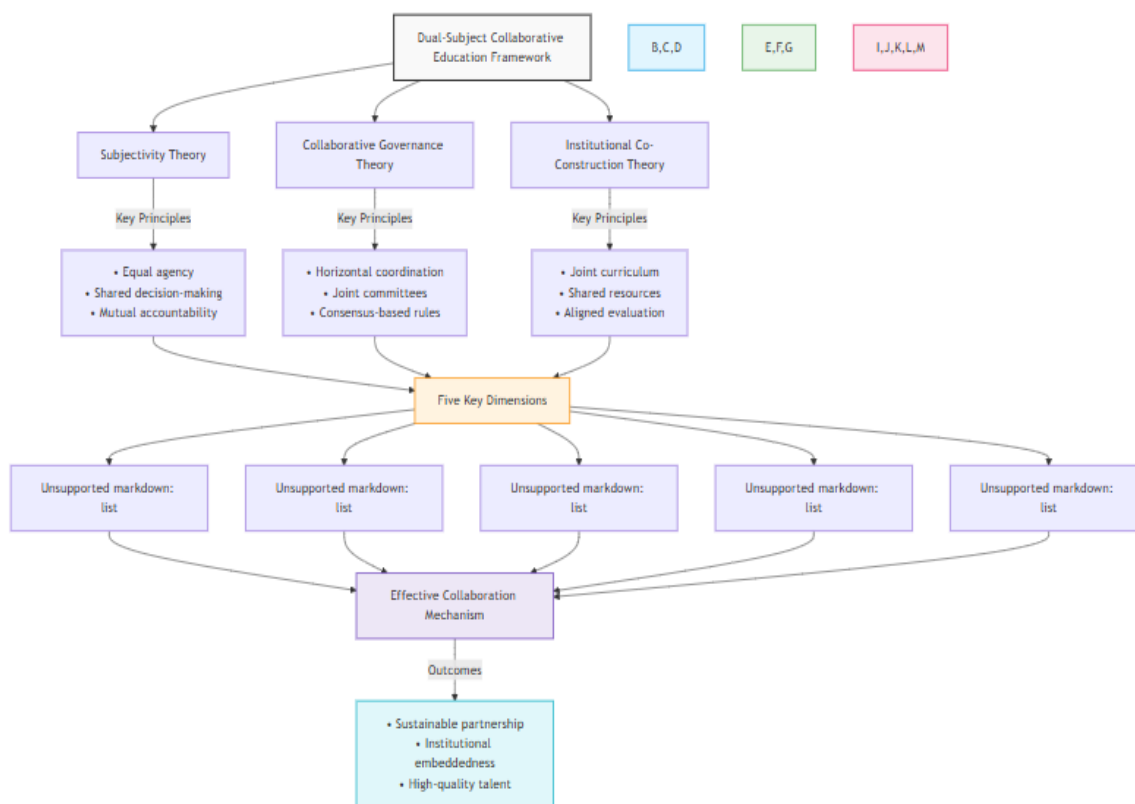


Figure 1 Conceptual Framework

Research Methodology

This study adopts a meticulous mixed-methods approach that integrates both qualitative and quantitative techniques to provide a comprehensive understanding of the research problem. By combining the rich, contextual insights from qualitative data with the statistical rigor of quantitative analysis, the study aims to fully explore the perspectives of individuals and institutions, and to empirically examine the theoretical constructs outlined in the conceptual framework.

Research Design

The research follows a two-phase design: a qualitative exploratory phase followed by a quantitative explanatory phase. The qualitative phase is aimed at gaining an in-depth understanding of how schools and enterprises perceive, form, and manage their cooperation. These initial insights will serve as a foundation for the quantitative phase, which will test the

relationships between key variables, refine the theoretical model, and assess the generalizability of the findings.

Data Collection Methods

The qualitative phase involved 20 stakeholders, including administrative staff, enterprise managers, faculty members, and industry mentors, from five vocational schools located in Eastern and Southwestern China. These participants, along with representatives from their corresponding enterprises, took part in 20 semi-structured interviews. The interviews focused on areas such as goal compatibility, role clarification, and governance strategies. Grounded theory was employed to analyze the data, allowing for the inductive development of categories and relationships that informed the framework and guided the design of the quantitative phase.

In the quantitative phase, a structured questionnaire was developed based on the insights from the qualitative phase and the conceptual framework. The survey included items on trust, role clarity, curriculum co-construction, and performance evaluation, utilizing a Likert scale for measurement. To ensure accuracy and relevance, the questionnaire was revised multiple times after reviewing the themes from the qualitative interviews. The survey was distributed to over 300 respondents from vocational colleges and enterprises, yielding 286 valid responses after data cleaning. Stratified purposive sampling and snowball sampling techniques were used to ensure diversity in terms of geographic region, field of study, and type of institution.

Data Analysis Techniques

Qualitative data were analyzed using NVivo 12 software for coding and thematic analysis. Open coding, axial coding, and selective coding were employed to identify the main categories aligned with the dual-subject perspective, and to understand how key variables were interrelated. For the quantitative data, SPSS 26 and AMOS 24 were used for analysis. Descriptive statistics were first applied to provide an overview of the data trends, followed by Exploratory Factor Analysis (EFA) to assess the construct validity of the survey items. Structural Equation Modeling (SEM) was then used to test hypotheses related to aspects such as goal alignment, communication effectiveness, and collaboration quality. The final model was evaluated using fit indices to ensure good model fit, with the results indicating acceptable reliability and structural soundness.

Validity and Reliability

To ensure the reliability and credibility of the study, data triangulation was conducted between the different data sources and collection methods. This approach ensured that the qualitative and quantitative results were consistent and complementary. The instrument design

was strengthened through expert consultation, and a pilot study was conducted with 30 participants to refine the survey items and clarify the constructs. Cronbach's alpha for all key constructs exceeded 0.80, indicating strong internal consistency.

Ethical Considerations

Informed consent was obtained from all participants, ensuring that they were fully aware of the research objectives and that their participation was voluntary. The anonymity of all participants was maintained throughout the data collection and analysis process. The research protocol was reviewed and approved by the ethics committee of the leading institution.

Limitations

While the study employed a rigorous methodology, there are some limitations to consider. The research was geographically limited to vocational institutions in Eastern and Southwestern China, which may not be fully representative of other regions. Additionally, the use of mixed-methods provides a rich set of data, but there is potential for bias in the self-reported data collected from participants in both phases of the research. This could reflect participants' perceptions and feelings rather than objective realities, which may influence the results.

Research Results

The analysis of the empirical data led to several important findings regarding how schools and businesses collaborate in vocational education, especially in the context of two different subject areas. These findings support the theoretical assumptions and reveal the underlying structural and relational factors that either enable or hinder effective cooperation. The results also provide empirical validation for the proposed dual-subject conceptual framework.

Validation of Key Construct Dimensions

To address the first objective of examining the current state of school-enterprise cooperation and identifying the major obstacles to equal and mutually engaging cooperation partnerships, the results validated the conceptual framework. Through Exploratory Factor Analysis (EFA), five latent variables were identified as robust dimensions for school-enterprise collaboration. These dimensions include goal alignment, role clarity, trust and communication, resource integration, and evaluation feedback. All factor loadings were above 0.70, and the cumulative variance explained was 78.4%, indicating good construct validity. The Confirmatory Factor Analysis (CFA) showed a good fit for the model ($CFI = 0.934$, $RMSEA = 0.045$), confirming that the conceptual model was structurally sound.

Table 1 Construct Dimensions and EFA Results

Construct	Factor Loading Range	Explained Variance (%)
Goal Alignment	0.72–0.85	18.3
Role Clarity	0.74–0.88	16.7
Trust & Communication	0.71–0.86	15.2
Resource Integration	0.70–0.83	13.9
Evaluation Feedback	0.73–0.89	14.3

These results confirm that the main constructs for effective collaboration are well-defined and valid. However, issues such as lack of symmetry in roles and uneven communication remain significant obstacles, as enterprises are often relegated to a passive role.

Role Symmetry and Collaborative Effects

The second research objective focused on creating a conceptual framework based on subjectivity theory and collaborative governance theory, defining the interactive roles of schools and enterprises. The results from qualitative interviews and Structural Equation Modeling (SEM) analysis showed that mutual acceptance of subject roles is critical for effective collaboration. Explicitly expressed roles and responsibilities result in higher curricular coherence and joint decision-making. On the contrary, when enterprises adopt a passive role, collaboration is weakened.

Table 2 Role Clarity and Collaborative Effects

Path	Standardized Coefficient (β)	p-value
Role Clarity → Curricular Coherence	0.62	<0.001
Role Clarity → Joint Decision-Making	0.59	<0.001
Passive Role → Low Collaboration	-0.48	<0.01

These findings validate the theoretical assumption that role symmetry is not inherently structural but needs to be created through negotiated governance. Schools and enterprises must mutually accept and negotiate their roles for collaboration to be effective.

Trust as a Mediating Mechanism

The third objective was to empirically validate the proposed framework by assessing trust-building processes, governance structures, and benefit-sharing mechanisms. The SEM analysis revealed that trust plays a significant mediating role between goal alignment and collaborative

performance. The results show that trust is crucial for maintaining long-term cooperation. Companies that engage in continuous communication, joint planning sessions, and transparent feedback mechanisms experience better outcomes in sustaining collaboration.

Table 3 Trust as a Mediating Mechanism

Path	Standardized Coefficient (β)	p-value
Goal Alignment $\rightarrow$ Trust	0.55	<0.001
Trust $\rightarrow$ Effectiveness	0.61	<0.001
Goal Alignment $\rightarrow$ Effectiveness (Direct)	0.33	<0.01
Goal Alignment $\rightarrow$ Effectiveness (Indirect via Trust)	0.41	<0.001

This confirms that trust is not merely an auxiliary factor but a central element in fostering effective collaboration. It emphasizes the importance of relational governance, particularly when formal institutional guarantees are not yet fully established.

Resource Contributions and Incentive Compatibility

The analysis of resource contributions revealed significant asymmetries between schools and enterprises. Schools primarily invest in infrastructure and academic staff, while enterprises tend to contribute selectively, often focusing on short-term recruitment benefits. This disparity is linked to weak engagement in joint activities, such as co-curricular programs and joint evaluations, highlighting the need for better incentive alignment to promote deeper integration.

Table 4 Comparative Resource Contributions

Resource Type	School Contribution (%)	Enterprise Contribution (%)
Infrastructure	80	20
Faculty Expertise	75	25
Financial Support	60	40
Equipment	70	30
Curriculum Input	90	10

The lack of an incentive compatibility mechanism, especially in non-state-owned enterprises, is a significant barrier to the deeper integration of school-enterprise collaboration. Without mutual incentives, enterprises may only invest when short-term benefits are clear, thus hindering long-term cooperation.

Feedback Mechanisms and Governance Innovation

The study found that institutions with strong feedback mechanisms, such as student assessments, company satisfaction surveys, and cooperative governance panels, showed greater adaptability and better collaboration outcomes. These institutions were more likely to institutionalize practices such as curriculum updates, cross-training of staff, and sharing intellectual property rights, which are essential for sustained collaboration.

Table 5 Feedback Mechanisms and Innovation

Institution Type	Avg. Frequency of Curriculum Updates (Per year)	Presence of Joint Committee (%)	Shared IP Rights (%)
High Feedback Usage	2.4	85	70
Medium Feedback Usage	1.3	50	45
Low Feedback Usage	0.6	20	10

These findings suggest that frequent feedback loops contribute to more effective governance structures and improve the long-term sustainability of collaboration by ensuring that both parties are constantly aligning their practices and goals.

Disciplinary and Regional Variations

The analysis also revealed substantial variations in collaboration effectiveness across different disciplines and regions. Technical fields like engineering, automobile technology, and culinary arts showed more mature and successful collaboration, possibly due to clearer industry standards and stronger ties to the industry. In contrast, creative fields like animation and digital media faced more challenges in defining roles, leading to inconsistent engagement levels. Regionally, eastern China outperformed western regions, owing to stronger industrial bases and more favorable policy environments in the east.

In summary, the empirical results strongly support the proposed dual-subject conceptual framework, showing that school-enterprise cooperation is interactive, systemic, and negotiated. The findings highlight that effective collaboration requires mutual trust, role clarity, and shared responsibility, with the governance structures adapting to the dynamic needs of both schools and enterprises. These insights provide a solid foundation for improving school-enterprise partnerships in vocational education and offer valuable lessons for similar models globally.

Discussions

The results of this study provide evidence for revising school–enterprise cooperation education from the perspective of dual–subject governance. The verification of key aspects such as goal alignment, role definition, trust and interaction, resource integration, and assessment feedback on these five points not only reflects the soundness of the conceptual framework but also emphasizes the systemic interdependence needed for good teamwork. This section explains the significance of the results, relates them to existing works, and shows the practical and theoretical contributions.

Role Clarity and Acknowledgment

Role clarity and mutual recognition are major forces for successful collaboration, revealing the limitations of traditional models that place enterprises as side–line partners. Our data indicate that the collaborative structure becomes more equalized and durable when enterprise stakeholders are actively involved in curriculum formation and management processes. This extends the evidence that dual–subject participation is not just something we should do but something essential to getting an institutionally cooperative project off the ground. The study breaks down the concept of "industry participation," suggesting that mere involvement in the company is not enough; the job and position must align as well. This aligns with the existing literature (e.g., Hu & Panyadee, 2024), which stresses the importance of deeper involvement from industry, encompassing the entire process from curriculum design to implementation.

Trust as a Strategic Resource

Trust is crucial for the long–term cooperation between schools and enterprises. Our research indicates that being overly formal or simply adhering to rules does not work well when schools and enterprises try to collaborate, as the importance of good relationships is paramount. While institutions may formalize their partnership agreements, the data shows that trust is built over time through continuous dialogue, shared decision–making, and mutual evaluations. This finding adds theoretical knowledge to collaborative governance theory by emphasizing that trust is not merely an appendage, but rather a strategy to link structural elements to outcomes. Specifically, our results show that trust regulates the relationship between goal alignment and collaborative effectiveness, meaning that without relationship building, goal alignment alone may lead to failure in the implementation process. This nuance is often overlooked in prescriptive policy documents.

Resource Mobilization Asymmetry

A recurring issue in our data is the lack of symmetry in resource mobilization, which reveals a consistent structural limitation within vocational education environments. Schools tend to bear the costs of infrastructure and academic labor, while enterprises follow a cost-reduction logic, especially when short-term gains are not immediately visible. This issue makes it difficult to turn the dual-subject ideal into reality. Based on our findings, if the incentive structure is not reconfigured such as through tax benefits for collaboration, joint intellectual property rights, and performance-linked funding effective collaboration will be difficult to achieve. This finding adds to the literature on institutional co-creation, reminding us of the need for fair and better two-sided investment.

Evaluation and Feedback Mechanisms

Evaluation and feedback mechanisms are crucial for governance changes because they ensure that what is happening between groups is both effective now and will continue to evolve. Institutions that conducted regular curriculum revisions, formed joint committees, and shared their results (such as IP rights) performed very well. This aligns with Hu and Panyadee's (2024) call for using feedback in performance evaluations, strengthening the notion that co-governance needs to be flexible and data-driven, not bound by rigid rules and episodic evaluations. To succeed in the long term, it is essential to iterate and improve as a team.

Disciplinary and Regional Variations

Additionally, our study found discrepancies in dual-subject cooperation based on disciplines and regions. Disciplines with clear occupational standards, such as automotive technology and culinary arts, and industries with a strong industrial ecosystem, demonstrated more mature collaboration models. These contextual factors require schools to cooperate with businesses in different ways. Regarding national policy frameworks that provide common principles, this study implies that methods need to be tailored to institutional capacities, disciplinary characteristics, and regional industry profiles. This is crucial for making the dual-subject model work effectively in different locations.

Wider Significance and Application in Other Countries

Dual-subject governance is important not only in China but also internationally. Its core ideas of shared responsibility, being collectively answerable, and jointly managing affairs can be adapted to improve school-business collaborations in other countries, especially those undergoing vocational training reforms. For instance, in countries like Germany and Sweden, where there is a

strong industry–academia linkage, this model can be used to enhance the roles of both education providers and enterprises in producing a skilled workforce. However, applying this model depends on how each country's institutions and culture function. Governance structure, trust building, and policy incentives will need to be adjusted. Future work might explore whether this model is applicable to education systems in countries with somewhat similar or vastly different economies and cultures.

This study advances our knowledge of school–enterprise collaborative education by showing that dual–subject collaboration represents both a theoretical realignment and a governance upgrade. The research demonstrates that institutional commitment, structural alignment, cultural matching, and long–term interaction are essential for successful collaboration. Future research should expand on dual–subject models to study how they affect students over time, company innovation capabilities, and alignment to the job market. Furthermore, exploring the model's use in other national contexts will help provide a clearer understanding of its global significance and its adaptability in different regions.

New Knowledge from Research

Based on the findings and theoretical implications of this research, a series of practical recommendations have been provided to enhance the effectiveness and sustainability of school–enterprise collaborative education within the dual–subject governance system. These recommendations focus on both institutional and relational aspects of collaboration, aiming to establish a more robust co–governed educational system. Specifically, formalizing dual–subject governance structures is essential for ensuring that enterprises are active participants in major educational decisions, such as curriculum design and talent measurement. Trust–building through open communication and continuous feedback is fundamental for fostering long–term collaboration. Additionally, policy tools that align corporate incentives with educational objectives, such as tax incentives and outcome–driven funding, can motivate enterprises to invest further in training and curriculum development. Creating shared resource platforms, especially in resource–scarce regions, will improve access and efficiency. Furthermore, customizing collaboration models to suit different regions and disciplines will allow for more flexible and context–specific implementations. Finally, educational institutions must focus on internal capacity–building to equip themselves for managing dual–subject collaboration effectively. By prioritizing these actions, particularly the formalization of governance structures and the cultivation of trust–based relationships, we can

create a foundation for successful long-term vocational education transformation. These steps, supported by adaptable policies, will drive structural innovation, relational trust, and ultimately, the sustainable development of school–enterprise cooperation.

Conclusion

This study explores school–enterprise collaboration from the dual–subject perspective, emphasizing goal alignment, trust, and resource integration. Balanced governance and mutual participation are essential for long-term success. This approach enhances vocational training and aligns education with industry needs.

Suggestions

To promote school–enterprise cooperation under the dual–subject framework, policymakers should establish national guidelines that declare equal partnership status and introduce tax incentives and flexible accreditation systems to encourage deeper enterprise involvement. Operationally, joint governance boards, open communication, and integrated resource–sharing platforms should be created, supported by dynamic co–assessment systems to enhance collaboration. Culturally, schools and enterprises need to align their value systems through collaborative projects, with key vocational areas serving as trial grounds for new cooperation models. Future research can explore cross–regional comparisons on socioeconomic impacts, long–term studies on graduate employability, and innovations like AI–based platforms to improve partnership coordination. This model requires the cooperation of policy, institutions, and culture, ultimately benefiting education–industry links, talent quality, and long–term partnerships.

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