

# The Influence of Collaboration Leadership on School Improvement with the Mediating Effect of Teacher Autonomy and Organizational Culture in Vocational High Schools of Zhengzhou City, China

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**Abstract:** Zhengzhou's vocational high schools, pivotal in aligning educational outcomes with job market demands, are central to China's economic and technological advancements. This study investigates the influence of collaborative leadership on school improvement, mediated by teacher autonomy and organizational culture, in these schools. Employing a quantitative approach, the research utilizes surveys and structural equation modeling to analyze data from 360 teachers across 25 vocational high schools. The findings reveal that collaborative leadership significantly enhances school improvement, with the mediating effect of teacher autonomy and organizational culture. The study underscores the importance of empowering teachers and fostering collaborative cultures to achieve sustained educational excellence. These insights offer valuable strategies for policymakers and educational leaders to enhance vocational education in dynamic and responsive ways.

**Keywords:** Collaboration Leadership, Teacher Autonomy, Organizational Culture, School Improvement

## 1. Introduction

Zhengzhou, a pivotal city in China's economic and educational landscape, stands at the forefront of vocational education. As Gao (2022) highlights, Zhengzhou's vocational high schools play a critical role in bridging educational outcomes with the demands of the local and national job markets. This city, central to China's rapid technological and economic advancements (Yang & Chen, 2020), is uniquely positioned to leverage its vocational institutions to cultivate a workforce equipped with the skills required by dynamic industries.

In this context, the concept of collaborative leadership emerges as a transformative approach in educational settings (Benmira & Agboola, 2021). In Zhengzhou, this leadership style transcends traditional hierarchical structures

by emphasizing the involvement of all stakeholders—teachers, administrators, students, and their families. This inclusive approach facilitates the amalgamation of diverse perspectives and expertise, fostering innovative and effective decision-making and educational practices (Hafeez & Akhtar, 2022).

Teacher autonomy is another significant factor influencing educational quality and effectiveness in Zhengzhou's vocational high schools (Tian, 2022). Empowering teachers with greater autonomy, encompassing curriculum design, professional development, and classroom management, encourages innovative teaching practices aligned with industry requirements (Xu et al., 2021). Such autonomy is crucial in an environment where traditional educational values intersect with modernization efforts.

Additionally, the organizational culture within Zhengzhou's vocational high schools is pivotal in nurturing creativity and collaboration. These institutions strive to balance continuity with innovation, adapting to new educational and industrial challenges while maintaining core values (Kalkan et al., 2020). This organizational culture not only shapes daily interactions and operational approaches but also supports the long-term strategic goals of educational improvement.

The overarching aim of these efforts is to drive school improvement—a multifaceted goal involving enhanced student achievement, teaching quality, and curricular innovation (Creemers et al., 2022). Given Zhengzhou's status as a leading hub for vocational education in China (Zhu & Shi, 2021), research focused on its vocational high schools offers valuable insights into educational practices and policies. These insights can inform strategies for optimizing vocational education to meet the evolving demands of the global economy, making Zhengzhou an exemplary case for examining the effects of collaborative leadership, teacher autonomy, and organizational culture on school improvement.

Despite the promising potential of collaborative leadership, its implementation in traditional school settings faces significant resistance. In Zhengzhou's vocational high schools, entrenched hierarchical structures present a substantial barrier to the adoption of collaborative practices (Huang et al., 2022). Senior staff and administrators accustomed to top-down approaches may perceive the sharing of power and decision-making as a threat to their authority (Yu, 2020). This resistance is often rooted in a fear of losing control or a belief in the inefficiency of collaborative methods (Yan, 2023).

For collaborative leadership to be effective, comprehensive training in skills such as effective communication, conflict resolution, and team management is essential (Fisher, 2021). However, professional development opportunities tailored to these needs are often insufficient in Zhengzhou's vocational high schools (Zhang, 2023). Without the necessary competencies, staff may struggle to engage in or facilitate collaborative processes, leading to ineffective teamwork and leadership (Mestry & Govindasamy, 2021).

The cultural context of Zhengzhou also influences the dynamics of collaboration. High power distance, a characteristic of Chinese culture, may inhibit open communication and the sharing of ideas among lower-ranked staff and teachers (Shengnan & Hallinger, 2021). This cultural norm can stifle the participative aspect of collaborative leadership, which is essential for fostering a creative and inclusive school environment.

Inconsistent application of collaborative leadership across different departments or levels within the same school further complicates its implementation (Liu & Watson, 2023). While some groups may embrace collaborative practices, others may continue operating under more authoritarian styles (Chen, 2020). This inconsistency can lead to confusion and conflict, undermining the overall effectiveness of collaborative leadership initiatives.

Teacher autonomy in Zhengzhou's vocational high schools is similarly constrained. The highly centralized educational system (Xia et al., 2023) restricts teachers' flexibility in curriculum design, resource allocation, and teaching methods (Yi et al., 2020). This rigidity can stifle creativity and hinder the implementation of effective pedagogical strategies, limiting the ability of teachers to tailor education to market demands. Furthermore, the emphasis on standardized test results often discourages innovative teaching methods, focusing narrowly on quantifiable outcomes (Ye, 2023).

Additionally, limited opportunities for professional development and career advancement (Zhang et al., 2021) further restrict teacher autonomy. Inadequate support for further education or specialized training prevents teachers from staying updated with the latest educational practices and industry standards (Ling et al., 2023), impacting their professional growth and job satisfaction.

Organizational culture within these schools, often characterized by respect for hierarchy and authority (Yang, 2020), can inhibit teachers from expressing innovative ideas or challenging the status quo (Huang & Teo, 2020). Resistance to change, a common issue in many educational institutions, further exacerbates this problem (Xia et al., 2023). Traditional practices are deeply entrenched, and there may be a reluctance to adopt new methodologies or integrate modern technological tools into the curriculum (Peng et al., 2023).

Effective communication, crucial for organizational success (Kalogiannidis, 2020), is often hindered by hierarchical structures that limit open dialogue between staff and administration (Tsang et al., 2021). This can result in misunderstandings and a lack of clarity on organizational goals and strategies (Liu & Chen, 2021), creating a disconnection between administrative aims and ground-level implementation.

The diversity of educational goals within vocational high schools, due to varied student backgrounds and aspirations, also poses challenges to creating a cohesive organizational culture (Deng et al., 2022). Without a unified approach, it becomes difficult to foster a supportive and collaborative environment, leading to conflicts and inefficiencies (Shengnan & Hallinger, 2021).

In summary, the problems within Zhengzhou's vocational high schools encompass issues related to collaborative leadership, teacher autonomy, organizational culture, and school improvement. Addressing these challenges requires investigating how collaborative leadership can transform these schools by promoting dynamic and inclusive educational environments. This study aims to explore whether teacher autonomy and organizational culture can mediate the relationship between collaborative leadership and school improvement, ultimately leading to better educational outcomes and aligning school operations with contemporary educational standards and industry requirements.

According to research background and identified problems, the study proposes the following objectives:

- 1) To examine the relationship between collaborative leadership and school improvement in vocational high schools of Zhengzhou city, China.
- 2) To explore the mediating effect of teach autonomy in the relationship between collaborative leadership and school improvement in vocational high schools of Zhengzhou city, China.
- 3) To explore the mediating effect of organizational culture in the relationship between collaborative leadership and school improvement in vocational high schools of Zhengzhou city, China.

## **2. Literature Review**

### **2.1 Collaborative Leadership and School Improvement**

The influence of collaborative leadership on school improvement is a focal point of research by Lingam & Lingam (2020), Grubbs (2021), and Visone (2021), with each scholar emphasizing its significance through different lenses. Lingam & Lingam (2020) highlight the nurturing environment collaborative leadership fosters for teacher development, facilitating open communication, shared decision-making, and mutual support essential for professional growth. This approach not only bolsters teacher competence and confidence but also enhances educational outcomes by meeting diverse student needs through improved teaching strategies. Grubbs (2021) extends this narrative by underscoring the role of collaborative leadership in personalizing learning experiences. By prioritizing the individual needs of students and promoting the innovation of teaching methods, collaborative leadership ensures higher student engagement and academic achievement, alongside emotional and social well-being. Meanwhile, Visone (2021) sheds light on the adept incorporation of evolving technological tools in education under collaborative leadership. This model's emphasis on shared decision-making and collective problem-solving facilitates the effective identification, adoption, and utilization

of technological resources, enriching the learning experience and preparing students for 21st-century demands. These studies illuminate the multifaceted benefits of collaborative leadership in schools, spanning from enhanced teacher development and personalized learning to effective technology use, thus underscoring a comprehensive approach to school improvement.

## **2.2 Collaborative Leadership and Teacher Autonomy**

Douglass (2019), Woods & Roberts (2019), and Appel (2020) underscored the pivotal role of collaborative leadership in enhancing teacher autonomy, though each emphasizes different dimensions of this dynamic. Douglass (2019) highlights the improvement in teachers' sense of autonomy through their involvement in decision-making and policy shaping, suggesting that such engagement fosters a sense of empowerment and respect, which in turn enhances job satisfaction and encourages innovative teaching practices. Woods & Roberts (2019) extend this perspective by stressing the significance of trust and mutual respect within collaborative leadership frameworks, arguing that these elements are crucial for teachers to feel capable and confident in their roles. This environment, they contend, not only promotes a sense of ownership and responsibility but also nurtures a supportive community that is conducive to the sharing of innovative practices and continuous professional growth. Appel (2020), meanwhile, focuses on the correlation between collaborative leadership and autonomy in professional development choices, positing that an environment that values teacher input and supports individual growth paths leads to greater teacher satisfaction and retention, as well as a culture of lifelong learning that ultimately benefits student outcomes. These perspectives suggest that while collaborative leadership invariably benefits teacher autonomy, the pathways through which it does so are varied and interdependent, each contributing to a holistic environment where teachers feel valued, empowered, and engaged in continuous learning and innovation.

## **2.3 Teacher Autonomy and School Improvement**

Teacher autonomy is increasingly viewed as a critical factor in the advancement of educational environments and the overall effectiveness of schools. Nordholm et al. (2022) emphasized the broad impact of teacher autonomy, noting that it fosters a positive, inclusive, and supportive learning atmosphere essential for student success. This autonomy allows teachers to adapt their teaching methods and curriculum to meet the diverse needs of their students, thereby enhancing educational responsiveness and inclusivity. Cihat & Abdulvehap (2022) extend this perspective by demonstrating that sustained teacher autonomy over extended periods plays a crucial role in the continuous improvement and innovation of schools, promoting a culture of professional growth and collaborative improvement among educators. In a similar vein, Manning (2022) links teacher autonomy with increased student motivation and engagement, arguing that teachers who exercise greater control over their instructional strategies tend to create more engaging learning environments that cater to varied student interests, thereby boosting academic performance and school dynamism. Evers et al. (2023) contribute to this discussion by focusing on the autonomy in assessment practices, pointing out that when teachers independently tailor assessments, these assessments better align with student needs and learning objectives, which in turn enhances both student outcomes and overall school improvement. These studies enrich the understanding of the multifaceted role of teacher autonomy, suggesting a complex interplay between educator independence, student achievement, and school improvement.

## **2.4 Collaborative Leadership and Organizational Culture**

Research across various studies consistently shows the positive impact of collaborative leadership on organizational culture in schools, as evidenced by the works of Aryani & Haryadi (2022), Cluett & Alves (2023), and Kibata & Nyakundi (2023). Aryani & Haryadi (2022) found that teacher autonomy under collaborative leadership frameworks led to enhanced operational efficiency and adaptability in schools, promoting innovative teaching and a

more personalized approach to student learning. This also translated into higher job satisfaction and lower staff turnover, stabilizing the educational environment. Cluett & Alves (2023) extended this understanding by demonstrating how active involvement in leadership processes increased professional collaboration and knowledge sharing among teachers. Their findings suggest that such involvement not only facilitates personal and professional growth among educators but also enriches student learning through a more diverse curriculum and the adoption of new teaching technologies. Meanwhile, Kibata & Nyakundi (2023) linked collaborative leadership to a broader culture of innovation in schools, noting improvements not just in teaching strategies but also in administrative processes. This approach fostered an environment conducive to risk-taking and experimentation, crucial for keeping pace with technological advancements and evolving educational demands. These insights illustrate the pivotal role of collaborative leadership in shaping dynamic, responsive, and nurturing educational environments, thereby confirming its significance as a cornerstone of modern educational management practices.

## **2.5 Organizational Culture and School Improvement**

Research on organizational culture within schools underscores its pivotal role in fostering school improvement (Tonich, 2021; Gruenert & Whitaker, 2021; Davis, 2021). Tonich (2021) argued that effective communication channels within schools are fundamental in creating a transparent and supportive environment that enhances problem-solving capabilities and stakeholder participation, which in turn cultivates a dynamic culture adept at continuous improvement. Similarly, Gruenert & Whitaker (2021) emphasized the significance of a collaborative culture, noting that it bolsters connections among staff and fosters a responsibility towards student success, thereby enhancing educational quality and teacher engagement in professional development. Both studies suggest that the way schools facilitate communication and collaboration plays a crucial role in their operational and academic advancement. However, Davis (2021) expanded on these concepts by examining the impact of inclusivity in school culture, illustrating that fostering an environment where every member feels valued regardless of background significantly contributes to a positive learning atmosphere and, consequently, school effectiveness. This inclusion leads to diverse perspectives that enrich teaching and learning experiences, further supporting the link between a nurturing educational environment and improved student outcomes. While these studies affirm the influence of a strong organizational culture on school improvement, Davis (2021) provides a broader view that incorporates inclusivity as a fundamental element of the school's ethos, thereby highlighting its role in enhancing both student engagement and achievement. Therefore, while Tonich (2021) and Gruenert & Whitaker (2021) focus more on communication and collaboration, Davis (2021) presents inclusivity as an equally crucial factor that complements and enhances the other elements of school culture, suggesting that a truly effective school improvement strategy must consider all aspects of organizational culture. These findings suggest a model where effective communication, collaboration, and inclusivity are all integral to fostering an organizational culture conducive to continuous school improvement.

## **3. Methodology**

### **3.1 Research Design**

Quantitative methods are essential for objectively measuring variables such as collaborative leadership, teacher autonomy, and organizational culture through surveys and scales. This approach facilitates handling large datasets, enabling generalization across Zhengzhou's vocational high schools. Statistical techniques, including structural equation modeling, will be used to assess the relationships and mediating effects. Quantitative methods ensure replicability and reliability, allowing other researchers to validate and compare findings across different contexts. Scholarly literature supports the significance of quantitative research in educational leadership studies, highlighting its role in testing theoretical models and contributing to policy development.

### **3.2 Research Population and Sample Size**

In 2023, Zhengzhou hosts 88 vocational high schools, from which a representative sample of 25 schools was selected. These schools reflect diverse specializations, offering a comprehensive basis for the study. The total number of teachers across these schools is 5,626. A sample size of 360 teachers was determined using the Raosoft online sample size calculator, ensuring a 95% confidence level with a 5% margin of error. This sample size balances statistical reliability and manageability, representing the diverse teaching staff comprehensively.

### **3.3 Sampling Framework**

A random sampling method was employed to select participants from the 5,626 teachers. A computer-generated random number sequence ensured each individual had an equal chance of selection, enhancing the generalizability of the findings. This method requires an accurate database to avoid selection bias. Despite potential limitations, such as not accounting for stratification within the population, random sampling provides a solid foundation for analyzing the impact of collaborative leadership on school improvement.

### **3.4 Instrument**

The primary research instrument is a questionnaire, divided into demographic variables and study-related items. The questionnaire includes Likert-scale questions to measure collaborative leadership, teacher autonomy, organizational culture, and school improvement across 14 dimensions. A rigorous development process, including literature review and expert consultations, ensures the questionnaire's validity and reliability. A pilot test with a small sample will refine the questionnaire before the main data collection.

### **3.5 Data Collection Procedure**

Data will be collected using the online survey platform Wenjuanxing (WJX), facilitating efficient distribution and collection. The survey will be translated into Mandarin and distributed via email to the selected schools. Ethical guidelines will be strictly followed, ensuring participant confidentiality and voluntary participation. The data collection phase will last one month, with reminders to encourage participation. Real-time monitoring of response rates will help ensure adequate data collection for robust analysis.

### **3.6 Data Analysis**

Descriptive analysis using SPSS will summarize the data, identifying general characteristics and anomalies. Reliability analysis using Cronbach's Alpha will ensure internal consistency of the scales. Confirmatory Factor Analysis (CFA) will validate the questionnaire's factor structure, and SEM Path Analysis will examine the direct and indirect relationships between the variables. These analyses will ensure thorough examination and contribute to the reliability and validity of the findings.

## **4. Findings and Discussion**

The study employs the SEM path analysis to check the relationships among the four latent variables of the study, which includes collaborative leadership (CL), teacher autonomy (TA), organizational culture (OC) and school improvement (SI). Table 1 presents the path coefficients between research variables analyzed in the study.

**Table 1:** Path coefficient among latent variables

	Path		Estimate	S.E.	C.R.	P-value	Std Path coefficient	Results
SI	<--- CL		0.625	0.060	10.417	***	0.521	Supported
TA	<--- CL		0.571	0.058	9.845	***	0.468	Supported
SI	<--- TA		0.516	0.057	9.053	***	0.409	Supported
OC	<--- CL		0.649	0.061	10.639	***	0.547	Supported
SI	<--- OC		0.676	0.064	10.562	***	0.573	Supported

Details of the findings on the mediation effects of teacher autonomy and organizational culture is presented in **Table 2.**

**Table 2:** Mediation analysis results

Standard effect	Path	Effect coefficient	95% confidence interval		S.E.	P-value	Results
			Lower	Upper			
Total effect	CL--->SI	0.712	0.663	0.761	0.025	***	Mediating effect
Direct effect	CL--->SI	0.521	0.476	0.566	0.023	***	
Indirect effect	CL---> TA--->SI	0.191	0.148	0.234	0.022	***	Mediating effect
Total effect	CL--->SI	0.834	0.783	0.885	0.026	***	
Direct effect	CL--->SI	0.521	0.476	0.566	0.023	***	
Indirect effect	CL---> OC--->SI	0.313	0.272	0.354	0.021	***	

Based on the above data on path coefficient and mediation analysis, the study acquired the following major findings

(1) Collaborative Leadership and School Improvement

The analysis reveals a significant positive influence of collaborative leadership on school improvement in Zhengzhou's vocational high schools. Collaborative leadership fosters a shared vision and collective responsibility among all stakeholders, including teachers, administrators, students, and parents. This inclusive approach to decision-making enhances the effectiveness of educational strategies and practices, leading to improved student outcomes and overall school performance. The study aligns with previous research by Lingam & Lingam (2020) and Grubbs (2021), which emphasized the role of collaborative environments in driving educational excellence. The findings suggest that schools adopting collaborative leadership are better positioned to meet the evolving demands of the job market and enhance their educational standards.

(2) Collaborative Leadership and Teacher Autonomy

The study also finds that collaborative leadership positively impacts teacher autonomy in Zhengzhou's vocational high schools. Teachers involved in collaborative decision-making processes feel more empowered and respected, which enhances their sense of professional autonomy. This empowerment allows teachers to exercise greater control over curriculum design, classroom management, and pedagogical approaches. These findings are consistent with Douglass (2019) and Woods & Roberts (2019), who highlighted the importance of involving teachers in leadership processes to boost their autonomy and job satisfaction. By fostering an environment of trust and mutual respect, collaborative leadership enables teachers to innovate and tailor their teaching methods to better align with industry needs and student interests.

(3) Teacher Autonomy and School Improvement

The positive influence of teacher autonomy on school improvement is strongly supported by the data. Schools where teachers have higher autonomy tend to exhibit better educational outcomes. Autonomy empowers teachers to adapt their teaching strategies to the unique needs of their students, fostering a more engaging and responsive learning environment. This finding echoes the work of Nordholm et al. (2022) and Manning (2022), who identified teacher

autonomy as a critical factor in enhancing educational quality and student motivation. In the context of vocational education, teacher autonomy is particularly important as it allows educators to integrate practical, industry-relevant skills into the curriculum, thereby improving student preparedness for the workforce.

#### (4) Collaborative Leadership and Organizational Culture

The study confirms that collaborative leadership positively influences organizational culture in vocational high schools. A culture of collaboration, fostered by inclusive leadership practices, promotes innovation, mutual support, and continuous professional development among staff. This aligns with the findings of Aryani & Haryadi (2022) and Cluett & Alves (2023), who underscored the importance of collaborative cultures in enhancing operational efficiency and educational outcomes. By encouraging open communication and shared responsibility, collaborative leadership helps create a supportive and dynamic organizational environment conducive to school improvement.

#### (5) Organizational Culture and School Improvement

Organizational culture is found to have a significant positive impact on school improvement. Schools with strong, collaborative cultures tend to perform better academically and operationally. Effective communication, inclusivity, and shared values within the school community contribute to a positive learning environment and enhance educational quality. This is consistent with the research of Tonich (2021) and Davis (2021), which highlighted the role of a supportive organizational culture in fostering continuous improvement and innovation. In Zhengzhou's vocational high schools, a collaborative culture enables the integration of modern educational practices and technological advancements, further driving school improvement.

#### (6) Teacher Autonomy as a Mediator

Teacher autonomy mediates the relationship between collaborative leadership and school improvement, as revealed by the study. Collaborative leadership enhances teacher autonomy, which in turn leads to improved school performance. This mediation effect underscores the importance of empowering teachers through inclusive leadership practices. By involving teachers in decision-making processes and granting them greater professional freedom, collaborative leadership indirectly contributes to school improvement. This finding supports the theoretical models proposed by Woods & Roberts (2019) and Appel (2020), emphasizing the interconnectedness of leadership practices, teacher autonomy, and educational outcomes.

#### (7) Organizational Culture as a Mediator

The study also finds that organizational culture mediates the relationship between collaborative leadership and school improvement. Collaborative leadership shapes a positive organizational culture, which subsequently drives school improvement. This mediation effect highlights the pivotal role of organizational culture in translating leadership practices into tangible educational outcomes. Schools that cultivate a collaborative and innovative culture are better equipped to implement effective teaching strategies and adapt to changing educational demands. This finding aligns with the research of Gruenert & Whitaker (2021) and Davis (2021), reinforcing the idea that a strong organizational culture is essential for sustained school improvement.

## 5. Conclusion

This study has explored the influence of collaborative leadership on school improvement in vocational high schools of Zhengzhou, China, with a particular focus on the mediating roles of teacher autonomy and organizational culture. The findings clearly indicate that collaborative leadership significantly enhances school improvement by fostering a shared vision and collective responsibility among all stakeholders, thereby improving educational strategies and outcomes. This leadership style positively impacts teacher autonomy by empowering educators, allowing them to exercise greater control over curriculum design, classroom management, and pedagogical approaches. Such empowerment aligns with the literature, suggesting that teachers involved in leadership processes are more innovative and satisfied with their jobs. Moreover, teacher autonomy itself is shown to be a crucial factor in school improvement,



as it enables educators to adapt their teaching methods to better meet student needs and industry demands, thereby enhancing student engagement and performance. The study also confirms that collaborative leadership fosters a positive organizational culture characterized by innovation, mutual support, and continuous professional development. This culture, in turn, significantly contributes to school improvement by creating a supportive and dynamic environment conducive to educational excellence. The mediating role of teacher autonomy is particularly noteworthy; collaborative leadership enhances teacher autonomy, which then leads to improved school performance. This underscores the importance of inclusive leadership practices that empower teachers and promote professional freedom. Similarly, organizational culture mediates the relationship between collaborative leadership and school improvement, highlighting how a collaborative and innovative culture can translate leadership practices into tangible educational outcomes. Schools with strong, collaborative cultures are better positioned to implement effective teaching strategies and adapt to changing educational demands. These findings are consistent with the broader body of literature, emphasizing the interconnectedness of leadership practices, teacher autonomy, organizational culture, and educational outcomes. The implications of this study are significant for policymakers and educational leaders in Zhengzhou and beyond. By adopting collaborative leadership styles, they can foster environments where teachers feel empowered and supported, ultimately driving school improvement. Additionally, enhancing teacher autonomy and cultivating a positive organizational culture are critical strategies for achieving sustained educational excellence. Future research could further explore these dynamics in different educational contexts and examine additional factors that may influence the relationship between leadership, autonomy, culture, and school improvement. Overall, this study highlights the transformative potential of collaborative leadership in vocational education and its critical role in preparing students for the demands of the modern workforce.

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