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HOW SUPPORTIVE LEADERSHIP SHAPES TEACHER PERFORMANCE IN RURAL SCHOOLS: SEQUENTIAL MEDIATION THROUGH PROFESSIONAL DEVELOPMENT AND SELF-EFFICACY

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Abstract:

The main aim of this study is to examine the sequential mediation of teachers' professional development and teacher self-efficacy on the relationship between supportive leadership and teacher performance. The study was conducted among schoolteachers in rural areas in Wenzhou, China. Quota sampling technique was employed. A total of 424 self-administered questionnaires were collected from the rural teachers. The results indicated that supportive leadership is positively related to teacher professional development and teacher performance. Teacher professional development is positively related to teacher self-efficacy. A positive relationship was found between teacher self-efficacy and teacher performance as well. Moreover, the relationship between supportive leadership and teacher performance is mediated by teacher professional development and teacher self-efficacy. The findings highlight the importance of cultivating supportive leadership among school principals in rural contexts, as it can foster teachers' professional development through targeted programs and initiatives that enhance self-efficacy and, in turn, improve teachers' performance. This study contributes to the existing body of knowledge, particularly in educational leadership literature, by highlighting the critical role of principal-led professional development in enhancing teacher self-efficacy and performance. It further adds to the literature by extending the leadership-performance model, providing empirical evidence that

supports the serial mediation effect of professional development and self-efficacy.

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Keyword:

China, Professional Development, Self-Efficacy, Supportive Leadership, Rural Schools, Teacher Performance



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Introduction

After years of efforts, China's rural teacher workforce has undergone tremendous changes (Liu et al., 2022). The Chinese government has taken multiple measures to support rural education, reflecting its commitment to improving and promoting educational development in rural areas. These measures include investing in rural schools to improve their infrastructure, recruiting and training excellent education personnel to enhance the professional ability of rural teachers, promoting the integration of rural education with industry, and introducing high-quality resources to support rural education development (Zhao et al., 2024; Klar et al., 2025). Some important initiatives include the implementation of rural school security projects, the rural special post teacher program, and remote education and training for rural teachers (Rude and Miller, 2018).

Nonetheless, rural education in China is still a major concern due to its poor performance, quality, low development, and unsatisfactory outcomes. Research indicates that despite the gradual reduction of urban-rural disparities, rural education continues to face a series of unique challenges (Hung, 2019). Li et al. (2020) contended that there are negative impacts on the performance of rural teachers due to uneven distribution of educational resources and insufficient training opportunities. Additionally, Li (2020) found that rural teachers confront significant challenges in addressing student diversity and coping with a lack of teaching resources, which directly influences their educational effectiveness.

Due to the relative scarcity of educational resources in rural areas, teachers' professional capabilities and teaching methods often become the key factors determining students' learning outcomes (Jiang and Yip, 2024). Gao et al. (2025) revealed that the overall belief in the teaching ability of rural teachers (teacher self-efficacy) was generally low, which, to some extent, hinders the improvement of rural education quality. Rural teachers often face more demanding

working conditions and lower income levels than urban teachers. This affects the rural teachers' work enthusiasm and morale, compromising their belief in their teaching competence, further exacerbating the decline in rural education quality (Dlamini et al., 2023; Li et al., 2024).

Emerging research also suggests that school leadership may be a crucial lever for addressing the unique challenges faced by rural education systems (Grissom et al., 2021). Effective leadership behaviors, characterized by providing individualized consideration, intellectual stimulation, and a collaborative school climate, have been shown to positively impact teacher motivation, self-efficacy, and instructional effectiveness in various contexts (Grissom et al., 2021; Gümüş and Bellibaş, 2020). Lack of effective leadership in rural schools may derail the performance and effectiveness of rural teachers in numerous ways. According to Fairman et al. (2022), the absence of supportive leadership limits teachers' opportunities for professional development. This implies they may not have access to continuous training and development opportunities, directly impacting their professional growth and teaching standards. Secondly, rural teachers may face challenges with inadequate resource support. A lack of teaching materials, equipment, and technological support may limit their ability to innovate and enhance their teaching methods (Wang et al., 2024). Additionally, school principals who do not demonstrate a supportive leadership style may create a non-inclusive environment that inhibits teachers from participating in school decision-making, potentially reducing their engagement and sense of responsibility (Liu and Chan, 2018). Lastly, a school that lacks supportive leadership may result in a zero-feedback culture, whereby rural teachers may struggle to receive adequate feedback and guidance, which could leave them feeling isolated and hinder their ability to improve teaching practices, thus impairing their professional growth (Sun et al., 2014).

On the other hand, supportive leadership has been shown to have a positive impact on teacher performance and student outcomes. According to a recent study by Price (2015), teachers who perceive their principals as supportive are more likely to engage in instructional practices that promote student learning. Talebizadeh et al. (2021) emphasized the importance of principals fostering a culture of collaboration and trust within the school. When teachers feel valued and supported by their leadership, they are more likely to take risks, experiment with new teaching methods, and work collectively to address challenges (Talebizadeh et al., 2021).

However, the extent to which supportive leadership can mitigate the challenges in rural educational settings remains underexplored. As presented above, the majority of existing studies have extensively explored the adverse impacts of a lack of supportive leadership style in the school environment (Sun et al., 2014; Wang et al., 2024). Particularly, the studies showcase how a lack of supportive leadership contributes to poor teacher performance, low professional development, and low teacher self-efficacy (Sun et al., 2014; Wang et al., 2024). Nonetheless, the specific mechanisms through which supportive leadership influences rural teacher performance are not well understood. Limited research is available on the positive relationship between supportive leadership and the performance of rural teachers. Moreover, there is insufficient information on how intervening factors such as teacher professional development and teacher self-efficacy affect the positive impact of supportive leadership on teacher performance.

Identifying the intervening factors, such as teacher professional development, self-efficacy, collective efficacy, and job satisfaction, can shed light on the pathways by which principals' actions shape rural teacher and student outcomes (Balyer et al., 2017; Shen and Wu, 2025).

Addressing this research gap is crucial for developing evidence-based policies and practices to strengthen the capacity of rural school leaders and teachers. Enhancing our understanding of how supportive leadership can optimize the performance of rural educators is essential for promoting equitable access to high-quality education and improving learning outcomes for students in underserved rural communities (Price, 2015). Consequently, it is essential to prioritize and actively address these concerns to encourage rural teachers' professional development and enhance education quality.

Thus, the main aim of this study is to examine the sequential mediation of teachers' professional development and teacher self-efficacy on the relationship between supportive leadership and teacher performance. This study is expected to contribute to the emerging body of teacher performance literature by examining the mediating effect of teachers' professional development and teacher self-efficacy. Besides, this study explores how supportive leadership shapes the performance of teachers in rural areas.

Literature Review

Underpinning Theory

Social Exchange Theory (SET) dates back to the 1950s when George Homans formulated a framework based on basic economics and behaviorism (Ahmad et al., 2023; Cropanzano and Mitchell, 2005). SET explains supportive leadership, teacher performance, and teacher professional development based on the assumption that social interactions are transactional and individuals often aim to promote maximum rewards and limit costs (Cook et al., 2013). In the education field, SET addresses the teacher-principal relationship by implying that the social exchange process starts when the school principal treats teachers negatively or positively (Cropanzano et al., 2017). Based on the assumptions of SET (Blau, 1964), the principal's supportive leadership, which promotes teachers' commitment to professional development, would encourage teachers to reciprocate by devoting their efforts to greater job performance. Teachers' attitudes towards professional development and performance reflect the type of principal's leadership. A principal who portrays supportive leadership creates a beneficial environment that motivates teachers to explore professional development opportunities for higher performance.

Bandura (1986) introduced the social cognitive theory to conceptualize human behavior. The model considers humans as active agents who are influenced and can influence their environment (Bandura, 1986). Particularly, the theory postulates the reciprocal connections among environmental/social, behavioral, and personal factors by asserting that the variables influencing a person's sense of agency include progress self-evaluation, goals, outcome expectations, and self-efficacy (Schunk and DiBenedetto, 2023). Bandura (1997) hypothesized that self-efficacy expectations determine a person's instrumental actions, effort, and resilience. Self-efficacy influences a person's preparedness for action because self-related conditions are critical to the motivation process, implying that self-efficacy can impede or enhance motivation and directly affect one's behavior. Teachers with high self-efficacy are resilient, confident, and aggressive. They explore new learning opportunities that improve their teaching competence. Their belief in themselves lowers their stress, fear, and anxiety in the classroom, hence improving their effectiveness in delivering quality learning materials that support students' learning. Eventually, this could improve their teaching performance.

Integrating Social Exchange Theory and Social Cognitive Theory

Although Social Exchange Theory (SET) and Social Cognitive Theory (SCT) explain different aspects of teacher behavior, their integration provides a more complete explanation of how supportive leadership is translated into teacher performance. SET explains the relational origin of the process. When teachers perceive that principals value their contributions, provide assistance, facilitate access to resources, and support their professional growth, they are likely to reciprocate this favorable treatment through stronger participation in professional development and greater effort toward their work. However, SET alone does not fully explain the internal psychological process through which participation in professional development improves subsequent performance. SCT addresses this limitation by explaining how learning experiences shape efficacy beliefs and behavior. Professional development provides opportunities for mastery experiences, observation of effective practices, collaboration, feedback, and social persuasion, all of which can strengthen teachers' beliefs in their capability to perform demanding teaching tasks.

The theoretical integration therefore proposes an ordered mechanism in which supportive leadership first creates a favorable social and organizational exchange that encourages professional development; professional development then generates learning experiences that strengthen teacher self-efficacy; and stronger self-efficacy subsequently promotes teacher performance. Neither theory alone fully captures this sequence. SET explains why teachers respond to leadership support but provides a limited explanation of how development experiences alter teachers' beliefs in their own capabilities. Conversely, SCT explains the development and behavioural consequences of self-efficacy but gives less attention to the leader-teacher exchange conditions that enable teachers to access and participate in professional learning. By connecting these two perspectives, this study advances leadership-performance research from a direct-effect explanation toward a relational-developmental-cognitive process: supportive leadership provides the social stimulus, professional development represents the capability-building mechanism, self-efficacy represents the cognitive mechanism, and teacher performance represents the behavioural outcome.

Synthesis of the Literature and Rationale for the Sequential Mediators

Existing research generally agrees that supportive school leadership is associated with positive teacher outcomes. However, the evidence remains theoretically fragmented. One stream of research focuses on the direct effect of leadership on teacher performance, while another examines leadership in relation to professional development, motivation, efficacy, satisfaction, or engagement. Consequently, professional development and self-efficacy are frequently treated as separate outcomes or independent explanatory variables rather than as components of an ordered mechanism. This fragmentation leaves an important question unanswered: how does a supportive principal's behavior become translated into the capabilities and psychological resources required for stronger teacher performance?

The present study addresses this gap by positioning teacher professional development and teacher self-efficacy as theoretically ordered mediators. Professional development is placed first because it represents a learning and capability-building response that school leaders can directly enable through training opportunities, mentoring, collaboration, feedback, access to expertise, and support for experimentation. These experiences can then strengthen self-efficacy by providing teachers with mastery experiences, opportunities to observe effective practices,

constructive social persuasion, and evidence that they can successfully address instructional challenges. Self-efficacy is therefore positioned as a more proximal cognitive mechanism through which acquired knowledge and professional experiences are translated into persistent, adaptive, and effective teaching behavior.

This sequence also explains why the present study focuses on professional development and self-efficacy rather than alternative mediators. Job satisfaction, organizational commitment, and teacher engagement are important but primarily capture affective, attitudinal, or motivational responses to the work environment. Collective efficacy represents a shared group-level belief and therefore differs from the individual-level process examined in this study. In contrast, professional development and teacher self-efficacy jointly capture a distinctive capability-confidence pathway. This pathway is particularly relevant in rural schools, where restricted access to resources, specialist support, training, and professional feedback can make leadership-enabled development opportunities especially consequential for teachers' confidence and performance. Accordingly, the present study examines not merely whether supportive leadership improves performance, but how leadership support is sequentially converted into professional learning, stronger efficacy beliefs, and improved teacher performance.

Proposed Research Model

Following the above discussion on teacher performance, teacher self-efficacy, teacher professional development, and supportive leadership, which are underpinned by the social exchange theory and Bandura's social cognitive theory, the following research model is proposed (see Figure 1):

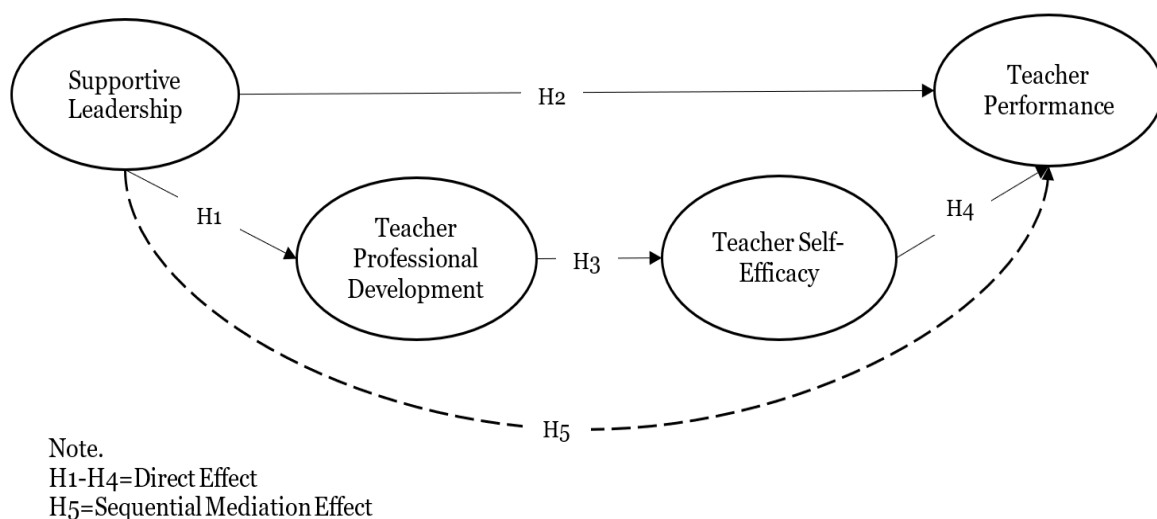


Figure 1. Proposed Research Model

Hypotheses Development

Supportive Leadership to Teacher Performance and Teacher Professional Development

Supportive leadership is characterized by leaders providing positive support, care, and guidance to subordinates to promote their personal and professional development (Gong et al., 2009; Liu et al., 2016). Xiang and Alias (2024) deduced that supportive leadership that focuses on helping teachers overcome the school obstacles increases teachers' ability to accomplish desired objectives. Principals who provide favorable teaching environments that accommodate teachers' interests promote positive work attitudes and increase teachers' job satisfaction levels, enabling them to commit to the schools' objectives (Parveen et al., 2022). Lee and Swaner (2023) teachers who felt that the principal supported them by fulfilling their needs for affiliation and performance demonstrated high motivation that translated to high performance based on punctuality, quantity of teaching, and quality of teaching.

School principals act as facilitators of teacher professional learning in centralized education systems (Abbaspour et al., 2024). Chalikias et al. (2020) highlighted the effect of leadership in the school environment on the effectiveness of teachers' professional development. Accordingly, the findings implied that supportive leadership is at the core of teachers' professional development because it emphasizes a supportive approach that ensures the principal creates relevant conditions that enable teachers to acquire new knowledge and skills corresponding to environmental demands (Chalikias et al., 2020). Supportive leadership also encourages teacher professional development by organizing professional development monitoring, educational activities, acquiring expertise support for teachers' training, and planning individual teacher research and reading tasks (Karacabey et al., 2021). Based on the above-mentioned discussion, the following hypotheses are proposed:

H1: Supportive leadership is positively related to teacher performance.

H2: Supportive leadership is positively related to teacher professional development.

Teacher Professional Development to Teacher Self-Efficacy

Bandura's Social Cognitive Model has been extensively explored in education literature, particularly concerning the antecedents of teacher self-efficacy. Barni et al. (2019) found that teacher self-efficacy creates openness to change, thus facilitating their teaching motivation. Seneviratne et al. (2019) examined the influence of teacher self-efficacy on professional development and discovered that professional development programs with mastery and vicarious experiences facilitated high teacher self-efficacy. Moreover, Hussain et al. (2022) noted that teachers with low self-efficacy often avoid challenging tasks, have low motivation to complete creative tasks, and lose confidence in their competence. In contrast, teachers with high self-efficacy are open to challenging activities and highly committed to them (Hussain et al., 2022).

Lumpe et al. (2014) asserted that traditional teacher professional development programs like single-session workshops failed to achieve their desired outcomes because they failed to incorporate teacher belief systems. Accordingly, effective teacher development programs must include teacher belief systems that enable teachers to develop positive attitudes and beliefs about their ability to achieve student learning and engagement goals. Li et al. (2022) found that

teachers with more experience and skills demonstrated higher efficacy than the less skilled and knowledgeable ones, indicating that professional development influenced teacher self-efficacy. Similarly, Yoo (2016) showed that teachers who enrolled in the online professional development program (online teacher education program) demonstrated increased self-efficacy characterized by improved belief in their ability to handle challenging tasks. Thus, the following hypothesis is proposed:

H3: Teacher professional development is positively related to teacher self-efficacy.

Teacher Self-Efficacy to Teacher Performance

Scholars contend that teacher self-efficacy influences teacher performance (Akman, 2021; Choong and Ng, 2024). Bandura (1977) argued that teachers acquire high self-efficacy through four aspects, including psychological and emotional states, verbal persuasion, vicarious experiences, and mastery experiences. Thus, teachers with high self-efficacy who cooperate in preparing for teaching, class, teaching reflection, and class evaluation develop verbal persuasion, vicarious experiences, and mastery experiences that enhance their teaching confidence to promote their ability to meet the required classroom and education needs (Bandura, 1977).

In a study exploring teacher self-efficacy in Italian high schools, Barni et al. (2019) revealed that teachers' beliefs in their ability to effectively plan, organize, and handle tasks, and deal with challenges in the teaching profession, influenced the academic outcomes, including students' motivation and achievements. Notably, the teachers with high beliefs in their competency effectively provided teaching and learning environments that support high student achievement. Andres (2020) also concluded that teachers with high self-efficacy demonstrate positive teacher instructional strategies and behaviors that contribute to high academic achievement. Highly self-efficacious teachers effectively use communication-oriented language approaches and share feedback on students' competence for improved student performance and development. They employ updated learning-centric strategies in classrooms to meet the students' learning needs (Wang et al., 2018). Therefore, the following hypothesis is proposed:

H4: Teacher self-efficacy is positively related to teacher performance.

Sequential Mediation of Teacher Professional Development and Teacher Self-Efficacy

Hsieh et al. (2024) found that school heads who were highly supportive of teachers in terms of community linkages, professional engagement, curriculum and planning, pedagogy, and content knowledge boosted teachers' self-efficacy which motivates them to be resilient and commit to specific tasks for student learning and engagement, resulting in high teacher performance. Thus, a principal's support through the above-mentioned strategies enhances teachers' motivation by cultivating positive beliefs that improve their performance. Supportive leadership creates a culture and environment of empowerment that increases teachers' belief in their ability to positively influence students' outcomes and the teaching-learning process (Zhang et al., 2025).

According to Kesuma et al. (2021), the leadership styles of school principals are essential in determining self-efficacy and work contentment among teachers. In other words, principal supportive leadership affects teachers' beliefs and attitudes about daily activities by creating environmental factors for job satisfaction and motivation, enabling teachers to commit to ensuring student engagement and learning for high performance. Thus, the sequential mediation hypothesis is proposed as follows:

H5: The relationship between supportive leadership and teacher performance is sequentially mediated by teacher professional development and teacher self-efficacy.

Research Methodology

Research Procedures and Samples

This study uses a cross-sectional design in which data were gathered and analyzed to test the proposed research model and hypotheses. Quantitative survey uses the deductive approach whereby the study emphasizes testing the proposed relationships developed using the positivist philosophy (Leavy, 2022). This study's population consisted of rural teachers located in Wenzhou, Zhejiang Province, China. Wenzhou consists of four districts, namely Dongtou, Ouhai, Longwan, and Lucheng (Wenzhou Government, 2024), with an approximate of 809 rural schools. As of 2023, Wenzhou had 61,900 school teachers working full-time (Wenzhou Government, 2024).

To ensure effective representation of rural teachers in China, the inclusion criteria for selecting the rural teachers for this study include 1) the teachers in rural schools have at least two years of teaching experience, 2) teachers are currently teaching in rural schools, and 3) teachers are open and willing to share their experience with the researcher for this study's purpose.

A quota sampling technique was used to ensure that rural teachers from the four districts of Wenzhou, namely Dongtou, Ouhai, Longwan, and Lucheng, were represented in the study. The quota allocation was used to avoid concentrating the sample in only the most accessible district and to obtain broader geographical representation across the study area. Within each district, research assistants approached teachers who met the study's inclusion criteria, and data collection continued until the required number of respondents had been obtained. Although this approach helped secure participation from all four districts, the selection of individual respondents was not based on random probability sampling.

Prior to the research fieldwork, ethical clearance was obtained and approved by the institution's ethics committee. A total of 500 questionnaires were distributed to teachers with the assistance of research assistants. However, only 424 respondents returned the questionnaire, which yielded an 85% response rate. Out of 424 respondents, there are 247 female teachers who make up the majority. The majority of the sample falls within the age range of 31 and 40 years ($n=225$, 53%). Most of them are bachelor holders ($n=359$, 85%) with more than seven years of teaching experience ($n=377$, 89%).

Research Instruments

A self-administered questionnaire method was adopted to collect the data from teachers who teach in rural schools in Wenzhou. All items that were used to measure the constructs were

adopted from existing empirical studies. A pre-test was conducted where the questionnaire was checked and commented on by three experts from China to ensure the content validity of the instrument. A pilot test was conducted with 30 respondents, and the reliability of all adopted measurement scales was confirmed, as the Cronbach's alpha values were all above 0.700.

Supportive leadership. The measure was a five-item scale developed by Indvik (1988). For this study, the items have been carefully modified and changed from the original leader-rated to the subordinate-rated item by changing the subject pronouns from "I" to "My principal." These items were measured using a seven-point Likert scale ranging from 1 for never to 7 for always. The sample item includes "My principal maintains a friendly working relationship with subordinates."

Teacher professional development. Evers et al. (2016) designed the Teacher Development Scale based on Kwakman's (2003) original survey instrument that measured teachers' professional development at work. This instrument consists of five categories, including keeping up to date, experimenting, reflecting, asking for feedback, and collaborating with colleagues with the aim of improving lessons, and collaborating with colleagues with the aim of improving school development. A five-point Likert scale was used to measure these items, ranging from 1 for strongly disagree to 5 for strongly agree. The sample item includes "Participating in a training course that focuses on subject matter pedagogy".

Teacher self-efficacy. The Schwarzer et al.'s (1999) efficacy scale was used to measure teacher self-efficacy. This scale contained 10 items with a five-point Likert scale ranging from 1 for strongly disagree to 5 for strongly agree. The study operationalizes teachers' beliefs in their ability to develop on-the-job skills, interact socially with students, parents, and colleagues, and manage stress at work. The sample item includes "When I try really hard, I am able to reach even the most difficult students".

Teacher performance. The in-role job performance scale developed by William and Anderson (1991) was used to measure teacher performance with a five-point Likert scale ranging from 1 for strongly disagree to 5 for strongly agree to indicate their level of agreement with every item in the job performance scale. Teacher performance is conceptualized based on the teacher's ability to meet students' learning needs. The sample item includes "I perform the tasks that are expected of me".

Data Analysis

A Partial Least Squares Structural Equation Modelling (PLS-SEM) path modelling method was employed using SmartPLS version 4 software. The PLS algorithm is a sequence of regressions in terms of weight vectors (Hair et al., 2021). It minimizes variables into smaller predictors, which helps in performing a regression analysis. PLS-SEM analysis in SmartPLS involves two techniques: the PLS algorithm and bootstrapping techniques (Henseler, 2017). These two techniques were conducted to confirm the measurement model and structural model.

Prior to the PLS-SEM analysis, SPSS software was used to analyze and compute common method bias scores, normality scores, and descriptive statistics (Choong et al., 2024). The data analysis section consisted of three sub-sections, which began with preliminary analysis, measurement model analysis, and structural model analysis.

Preliminary Analysis

Before assessing the measurement and structural models, common method variance was examined because all data were collected from the same respondents using a self-administered questionnaire at a single point in time. Harman's single-factor test was conducted using exploratory factor analysis in SPSS. The results showed that the first unrotated factor accounted for 31.45% of the total variance, which was below the recommended threshold of 50%. Therefore, common method variance was unlikely to pose a serious threat to the findings of this study.

Table 1 reveals the descriptive statistics of each variable. All means score have exceeded the mid-point of 3.0.

Table 1. Descriptive Statistics

	Mean	Standard Deviation
Supportive Leadership	3.72	0.49
Teacher Professional Development	4.00	0.68
Teacher Self-Efficacy	4.05	0.55
Teacher Performance	3.80	0.55

Measurement Model Analysis

A partial least squares (PLS) algorithm technique was used to examine the construct validity and reliability. Table 2 illustrates that none of the items' factor loadings fall less than 0.708 (Hair et al., 2021). Apart from this, the average variance extracted (AVE) for each construct exceeded the threshold value of 0.500 (Hair et al., 2021), ranging from 0.620 for teacher self-efficacy to 0.680 for teacher professional development. The composite reliability for each construct surpassed the minimum required score of 0.700 (Hair et al., 2021). Thus, we can affirm that the measurement model has sufficient construct validity and reliability.

Table 2. Convergent Validity Result

Constructs	Items	Loadings	AVE	CR	CA
Supportive Leadership	SL1	0.78	0.65	0.92	0.89
	SL2	0.82			
	SL3	0.85			
	SL4	0.93			
	SL5	0.74			
Teacher Professional Development	TPD1	0.85	0.68	0.93	0.91
	TPD2	0.95			
	TPD3	0.72			
	TPD4	0.84			
	TPD5	0.80			
	TPD6	0.75			
	TPD7	0.79			
	TPD8	0.82			
	TPD9	0.86			

	TPD10	0.73			
	TPD11	0.95			
	TPD12	0.98			
	TPD13	0.89			
	TPD14	0.75			
	TPD15	0.85			
	TPD16	0.86			
	TPD17	0.73			
	TPD18	0.84			
	TPD19	0.96			
	TPD20	0.82			
	TPD21	0.90			
	TPD22	0.84			
	TPD23	0.71			
	TPD24	0.80			
	TPD25	0.85			
Teacher Self-Efficacy	TSE1	0.80	0.62	0.90	0.87
	TSE2	0.75			
	TSE3	0.93			
	TSE4	0.84			
	TSE5	0.74			
	TSE6	0.78			
	TSE7	0.93			
	TSE8	0.84			
	TSE9	0.82			
	TSE10	0.86			
Teacher Performance	TP1	0.91	0.64	0.91	0.88
	TP2	0.85			
	TP3	0.76			
	TP4	0.94			
	TP5	0.82			
	TP6	0.95			
	TP7	0.84			

A Heterotrait-Monotrait (HTMT) criterion test was used to assess the discriminant validity of the measurement model. Based on Table 3, none of the HTMT correlation scores is greater than 0.500 (Henseler et al., 2015), ranging from 0.55 to 0.62. Therefore, the measurement model has achieved good discriminant validity.

Table 3. Heterotrait-Monotrait Criterion

No.	Construct	1	2	3	4
1	Supportive Leadership				
2	Teacher Professional Development	0.55			
3	Teacher Self-Efficacy	0.60	0.62		
4	Teacher Performance	0.58	0.59	0.61	

Structural Model Analysis

A bootstrapping technique was performed to examine the proposed hypotheses. The results showed that supportive leadership was positively related to teacher professional development ($\beta = 0.42$, $t = 6.17$, $p < 0.001$) and teacher performance ($\beta = 0.34$, $t = 5.21$, $p < 0.001$). Teacher professional development was positively related to teacher self-efficacy ($\beta = 0.46$, $t = 7.02$, $p < 0.001$), while teacher self-efficacy was positively related to teacher performance ($\beta = 0.29$, $t = 4.89$, $p < 0.001$). The sequential indirect effect of supportive leadership on teacher performance through teacher professional development and teacher self-efficacy was statistically significant ($\beta = 0.12$, $t = 3.98$, $p < 0.001$). Therefore, H5 was supported.

Regarding the explanatory power of the structural model, supportive leadership explained 42% of the variance in teacher professional development ($R^2 = 0.42$). The model also explained 35% of the variance in teacher self-efficacy ($R^2 = 0.35$) and 48% of the variance in teacher performance ($R^2 = 0.48$), indicating meaningful explanatory power for the endogenous constructs.

The effect sizes (f^2) of the structural relationships were also assessed. The provisional results showed that supportive leadership had a moderate effect on teacher professional development ($f^2 = 0.30$) and teacher performance ($f^2 = 0.22$). Teacher professional development had a moderate effect on teacher self-efficacy ($f^2 = 0.33$), while teacher self-efficacy had a moderate effect on teacher performance ($f^2 = 0.16$). Overall, these results suggest that the proposed structural relationships make meaningful contributions to explaining the variance in the respective endogenous constructs.

The predictive relevance of the model was further assessed using $Q^2_{predict}$. The provisional $Q^2_{predict}$ values were 0.25 for teacher professional development, 0.20 for teacher self-efficacy, and 0.31 for teacher performance. As all $Q^2_{predict}$ values were greater than zero, the model demonstrated acceptable predictive relevance for the endogenous constructs. In addition, the model produced a provisional SRMR value of 0.067, which was below the recommended threshold of 0.08, indicating an acceptable level of model fit. Taken together, the R^2 , f^2 , $Q^2_{predict}$, and SRMR results provide further support for the explanatory and predictive adequacy of the proposed structural model.

Table 4. Structural Model Results

H	Path	Beta	t-Statistics	p-Value	f^2	$Q^2_{predict}$	Results
H1	SL > TPD	0.42	6.17	<0.001	0.30	0.25	Supported
H2	SL > TP	0.34	5.21	<0.001	0.22	0.31	Supported
H3	TPD > TSE	0.46	7.02	<0.001	0.33	0.20	Supported
H4	TSE > TP	0.29	4.89	<0.001	0.16	0.31	Supported
	SL > TPD >				-	-	
H5	TSE > TP	0.12	3.98	<0.001			Supported

Note. SL=Supportive Leadership; TPD=Teacher Professional Development; TSE=Teacher Self-Efficacy; TP=Teacher Performance

Discussion

The study's findings confirmed that supportive leadership positively relates to teacher professional development. This finding aligns with past empirical studies emphasizing the critical role of school principals in fostering teacher growth through mentorship, training opportunities, and professional guidance (Mthanti and Msiza, 2023; He et al., 2024). Prior studies suggest that teachers working under supportive leadership exhibit greater engagement in professional learning programs and skill acquisition activities (Shurr et al., 2021). Similarly, Wang and Zhang (2021) emphasized that supportive principals promote teacher development by creating a learning-conducive environment, organizing professional development monitoring, and facilitating expertise-building programs.

The study found that supportive leadership positively influences teacher performance, suggesting that teachers who receive administrative support, recognition, and leadership guidance tend to perform better. This finding aligns with recent research by Grissom et al. (2021), who found that school leaders who provide emotional and professional support to teachers, including recognition and mentoring, contribute to increased teacher motivation and enhanced performance. Furthermore, Hadijah (2024) highlighted that principals who demonstrate supportive behaviors and foster a collaborative environment see improvements in both teacher morale and instructional effectiveness. These findings suggest that supportive leadership behaviors, such as providing clear guidance, offering recognition, and encouraging professional growth, are crucial in promoting teacher performance.

This study further uncovers that a strong positive relationship between teacher professional development and teacher self-efficacy, indicating that teachers who participate in structured, continuous professional development programs tend to develop higher confidence in their teaching abilities (Li et al., 2022; Yoo, 2016). This finding aligns with Social Cognitive Theory, which emphasizes that self-efficacy is built through mastery experiences, social persuasion, and vicarious learning. Mohamed et al. (2024) contended that teachers who receive specialized pedagogical training, attend professional workshops, and engage in reflective teaching practices develop stronger confidence in managing classroom challenges and improving student learning. Similarly, Koul et al. (2023) depicted that teachers' self-efficacy significantly improves when exposed to hands-on training, peer mentoring, and practice-based learning.

Our study further confirmed that teacher self-efficacy significantly influences teacher performance, meaning that teachers who believe in their ability to manage classrooms, engage students, and deliver lessons effectively tend to perform better professionally. This finding aligns with previous studies that establish self-efficacy as a major predictor of teacher effectiveness, motivation, and instructional (Barni et al., 2019; Akman, 2021; Andres, 2020). Teachers with high self-efficacy tend to exhibit greater perseverance in handling classroom challenges, higher adaptability in instructional methods, and more substantial commitment to student success (Shah, 2023). Kwon et al. (2019) further suggest that teachers with high confidence in their skills are more likely to experiment with innovative teaching strategies, integrate technology into the classroom, and seek continuous improvement through reflective practices (Andres, 2020).

Importantly, we found that teacher professional development and self-efficacy sequentially mediate the relationship between supportive leadership and teacher performance. This finding suggests that supportive leadership positively impacts teacher performance both directly and

indirectly. While supportive leadership directly enhances teacher performance (Xiang and Alias, 2024; Lee and Swaner, 2023), it also indirectly influences performance by fostering teachers' professional development and boosting their self-efficacy (Li et al., 2022). In this way, school leaders contribute to teacher effectiveness not only through their direct support but also by equipping teachers with the skills and confidence necessary to excel in their roles (Koul et al., 2023). Cece et al. (2022) highlights that principals who actively support teachers' professional engagement through structured training, curriculum mastery, and collaborative learning opportunities contribute significantly to their professional growth. When teachers receive continuous support from school leadership, they are more likely to participate in development programs, refine their instructional strategies, and engage in lifelong learning.

The findings should also be interpreted within the specific context of rural schools in China. In these settings, teachers may have fewer opportunities to access external professional training, specialist support, and teaching resources. As a result, the school principal may play a particularly important role in determining whether teachers receive time, encouragement, guidance, and access to professional learning opportunities. Supportive leadership may therefore have greater practical importance in rural schools because the principal can help compensate for some of the limitations in the wider professional environment. When teachers receive recognition, guidance, and assistance from school leaders, they may feel less professionally isolated and become more willing to participate in activities that improve their teaching knowledge and skills.

The relationship between professional development and teacher self-efficacy is also especially meaningful in the rural school context. Rural teachers may need to respond to diverse learning needs and classroom challenges while having more limited access to specialist expertise. Under such conditions, professional development can provide teachers with opportunities to learn new teaching strategies, observe successful practices, obtain constructive feedback, and exchange experience with colleagues. These experiences may strengthen teachers' beliefs that they are capable of managing difficult classroom situations and improving student learning. In addition, within a school environment where the principal occupies an important coordinating and supportive role, encouragement from school leaders may give professional learning greater legitimacy and motivate teachers to apply newly acquired knowledge in practice.

The significant sequential mediation effect provides an important contextual explanation of how supportive leadership contributes to rural teacher performance. The findings suggest that leadership support does not improve performance simply because teachers feel supported. Instead, supportive leadership appears to initiate a developmental process. Principals help create or facilitate professional learning opportunities; these experiences strengthen teachers' confidence in their own capabilities; and stronger self-efficacy helps teachers persist, adapt, and perform more effectively when facing instructional challenges. This process may be particularly important in rural Chinese schools, where school-level leadership, internal collaboration, and locally available professional support can become critical resources. The findings therefore show that supportive leadership contributes to teacher performance by converting institutional and relational support into professional capability and psychological confidence.

Theoretical Implications

This study contributes to the existing body of knowledge by validating and extending key theoretical frameworks, particularly Bandura's Social Cognitive Theory and Leadership Theories related to teacher development. It adds empirical support to the educational leadership literature, emphasizing the critical role of principal-led professional development in shaping teacher self-efficacy and performance.

The findings align with Bandura's Social Cognitive Theory, which emphasizes the importance of self-efficacy in influencing motivation, behavior, and performance. This study confirms that teacher self-efficacy plays a critical mediating role in enhancing teacher performance. Teachers with higher self-efficacy are more likely to be motivated, resilient, and effective in their teaching practices, which supports previous research suggesting that self-efficacy significantly impacts teacher outcomes (Alibakhshi et al., 2020).

Furthermore, this study extends Social Cognitive Theory (Bandura, 1986) by demonstrating that structured professional development programs significantly contribute to increasing teacher self-efficacy. This finding corroborates prior research, which indicates that effective professional development can build teachers' confidence in their instructional abilities (Boeve-de Pauw et al., 2022). The study also supports the argument that traditional professional development models, which lack continuous training components, are less likely to have a positive impact on teacher self-efficacy (Gümüş and Bellibaş, 2020).

Moreover, this study makes an important contribution to the literature by extending the leadership-performance model through empirical evidence supporting the serial mediation effect. It demonstrates that leadership indirectly improves teacher performance through structured professional development programs and self-efficacy-building interventions, rather than through leadership alone. This finding highlights the theoretical gap in understanding how leadership interacts with teacher development and self-efficacy to influence teacher performance, a relationship that has been less explored in prior research. The study underscores that leadership alone is insufficient to directly enhance teacher effectiveness; it must be accompanied by institutionalized professional development initiatives (Makuachukwu, 2023).

Practical Implications

The findings provide several practical recommendations for policymakers, educational authorities, and school administrators seeking to improve teacher performance in rural schools. These recommendations are directly supported by the empirical findings of this study. Supportive leadership was positively related to teacher professional development ($\beta = 0.42$, $p < 0.001$) and teacher performance ($\beta = 0.34$, $p < 0.001$). Teacher professional development was positively related to teacher self-efficacy ($\beta = 0.46$, $p < 0.001$), while teacher self-efficacy was positively related to teacher performance ($\beta = 0.29$, $p < 0.001$). Furthermore, the significant sequential mediation effect ($\beta = 0.12$, $p < 0.001$) indicates that supportive leadership can improve teacher performance by first facilitating professional development and subsequently strengthening teacher self-efficacy. Therefore, leadership support, professional development, and self-efficacy-building initiatives should not be implemented separately but should form part of an integrated teacher-development strategy.

At the policy and educational-authority level, greater attention should be given to improving access to professional learning in rural schools. Previous research has shown that rural teachers can face uneven distribution of educational resources and insufficient training opportunities, while the absence of supportive leadership may further restrict access to continuous professional development (Li et al., 2020; Fairman et al., 2022). Educational authorities should therefore require rural schools to prepare annual teacher development plans based on identified instructional needs. Dedicated funding should also be considered for training fees, digital learning access, travel costs, and substitute teaching arrangements so that teachers can participate in professional development without creating excessive additional workload. District and regional education authorities should establish cross-school professional learning networks that allow teachers from smaller or geographically isolated schools to share teaching resources and obtain support from experienced teachers and subject specialists. Flexible professional development methods, including online courses, peer-learning groups, and hybrid programmes, may further increase participation among rural teachers (Lavanya et al., 2024; Mohamed et al., 2024).

At the school level, the significant effects of supportive leadership on both professional development and teacher performance indicate that principals should play an active role in creating opportunities for teacher growth. This recommendation is consistent with previous evidence showing that leadership support, recognition, mentoring, and collaborative school environments can strengthen teacher motivation and performance (Grissom et al., 2021; Gümüş and Bellibaş, 2020). Principals should provide protected time for professional learning and conduct regular development-focused meetings rather than relying only on administrative performance monitoring. Each teacher should have an individual professional development plan that identifies specific teaching challenges, learning goals, appropriate training activities, and opportunities to apply new knowledge in the classroom. Schools should also establish structured peer-observation and coaching cycles in which teachers observe colleagues, test new teaching strategies, receive constructive feedback, and reflect on their progress. Such practice-based and collaborative learning can help teachers translate professional development into stronger teaching competence and confidence (Mohamed et al., 2024; Koul et al., 2023).

Educational authorities should also strengthen the supportive leadership capabilities of rural school principals. Principal development programmes should include practical training in mentoring, developmental feedback, teacher recognition, resource facilitation, professional learning design, and collaborative decision-making. This recommendation is supported by previous research showing that supportive leadership practices and collaborative school climates contribute to teacher development and instructional effectiveness (Grissom et al., 2021; Gümüş and Bellibaş, 2020). The evaluation of school leaders should therefore consider not only administrative compliance and student outcomes but also whether principals provide meaningful opportunities for teacher learning, professional growth, and participation in school improvement.

Finally, the positive relationship between professional development and teacher self-efficacy ($\beta = 0.46$, $p < 0.001$), together with the positive relationship between self-efficacy and teacher performance ($\beta = 0.29$, $p < 0.001$), provides evidence that rural schools should deliberately strengthen teachers' confidence in their professional capabilities. Previous studies similarly indicate that professional learning, experience, peer support, and successful practice can strengthen teacher self-efficacy (Li et al., 2022; Yoo, 2016; Shurr et al., 2021). Principals can introduce regular developmental feedback, mentoring for less experienced teachers,

recognition of professional progress, opportunities for teachers to demonstrate successful practices, and peer problem-solving groups. Peer coaching can help teachers exchange expertise and jointly address teaching challenges (Afshar and Doosti, 2022), while regular constructive feedback and reflection can strengthen professional competence and efficacy (Wei et al., 2024). These measures are particularly relevant in rural schools, where limited access to external specialist support may increase teachers' dependence on school-based professional and psychological resources.

Limitations and Future Research Recommendations

While this study makes significant theoretical and practical contributions to the understanding of supportive leadership, teacher professional development, self-efficacy, and teacher performance, it is essential to acknowledge its limitations. One key limitation of this study is its geographical scope, as the sample was limited to teachers at rural Chinese schools in Wenzhou. While this focus provides valuable insights into how supportive leadership influences teacher development and performance in rural educational settings, the findings may not be fully generalizable to urban schools or international contexts. Future studies should explore the role of supportive leadership in different educational settings, particularly in urban schools and cross-cultural contexts, given that leadership styles and professional development opportunities vary across regions and education systems.

Another limitation concerns the use of quota sampling. Although this sampling technique helped ensure the representation of rural teachers from the four districts included in the study, it may have introduced selection bias because the individual respondents within each quota were not selected randomly. Teachers who were more accessible or more willing to participate may differ systematically from those who did not participate, particularly in their perceptions of school leadership, professional development, self-efficacy, and performance. Therefore, the sample may not fully represent the wider population of rural teachers, and the findings should be generalized with caution. Future studies should consider using probability-based sampling methods, such as stratified random sampling or multistage cluster sampling, to reduce potential selection bias and improve the generalizability of the findings.

Another limitation is that all variables were measured using self-reported data obtained from the same respondents at a single point in time. Although the statistical assessment indicated that common method variance was unlikely to pose a serious threat to the findings, the use of a single data source may still introduce common method bias. In addition, respondents may have provided socially desirable answers, particularly when evaluating their own performance and self-efficacy. Therefore, the observed relationships should be interpreted with caution. Future studies should collect data from multiple sources, such as teachers, school principals, classroom observations, and administrative records. Researchers should also consider using time-separated or longitudinal data collection procedures to reduce potential common method and social desirability biases.

Another limitation is the study's cross-sectional research design, which captures data at a single point in time rather than across different phases of teachers' professional growth and leadership interactions. While the findings establish significant relationships between supportive leadership, teacher development, and performance, they do not account for long-term changes or potential fluctuations in these dynamics over time. Longitudinal studies are needed to track

how leadership support, professional development participation, and self-efficacy evolve throughout a teacher's career (Liu et al., 2021).

Conclusion

We used both social exchange theory and social cognitive theory to underpin the proposed model. Based on the statistical results, we confirmed that supportive leadership is positively related to teacher professional development and teacher performance. Similarly, we found that teacher professional development is positively related to teacher self-efficacy. Subsequently, teacher self-efficacy is positively related to teacher performance. Remarkably, our findings uncovered that the relationship between supportive leadership and teacher performance is sequentially mediated by teacher professional development and teacher self-efficacy. These empirical results provide several useful implications for stakeholders, both theoretically and practically.

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