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Linking Instructional Leadership and School Support to Teacher Expertise: The Mediating Effect of Teachers' Professional Development Agency

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Abstract: The focus on developing teacher expertise makes teaching and learning more sustainable, as it is a way of working to create improvement in education. The objective of this study was to explore the direct or indirect impacts of principal instructional leadership and school support on teacher expertise and explore the mediating effect of teachers' professional development agency. A survey of 1123 teachers was conducted at 21 primary schools and 20 secondary schools in Hebei and Shanxi provinces of northern China. Structural equation modeling and bootstrapping were performed to test the relationships between variables. Results showed that teachers' professional development agency mediated the effects of principal instructional leadership and school support on teacher expertise. School support was a better predictor of teacher expertise than principal instructional leadership. Providing instructional conditions and leadership support were non-significantly related to teacher expertise. Colleague support and student support were the better predictors of teacher expertise than providing instructional guidance and monitoring. The findings indicate that the growth of teacher expertise depends on building their professional development agency. Teachers will have a strong sense of agency to sustain the teaching profession when principals establish a supportive school climate that emphasizes teaching and learning in their leadership practice and enables teachers to build positive relationships with colleagues and students. The study confirms the supportive factors that impact teacher expertise and provides useful implications for the daily practice of teachers, principals, and administrators.

Keywords: teacher expertise; principal instructional leadership; school support; professional development agency

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1. Introduction

Teacher expertise is important for the sustainable development of teaching professionals who face unpredictable and varied circumstances in instruction [1]. The acquisition of expertise is described as the "gold standard for becoming a professional" [2] and is characterized by a balance between efficiency and innovation [3]. Therefore, understanding how to nourish expertise is essential for teachers' ongoing professional renewal.

Teacher expertise is generally regarded as a knowledge-based, comprehensive competence in diverse and changing instructional circumstances, with components of innovation, motivation, enthusiasm, belief, and personality, among others [4–7]. The psychological perspective regards teacher expertise as a construct that encompasses motivational and dispositional dimensions [8]. However, social cognitive theory adopts an agentic perspective toward human development, adaptation, and change [9–12]. This agentic perspective views the development of teacher expertise as a self-regulatory process, which involves three elements: personal processes, behavioral performance, and environmental setting. From this point of view, expertise development always occurs in socio-cultural contexts and is accompanied by socio-emotional changes [13,14]. Furthermore, expertise development is

influenced by self-processes and environmental influences and requires both self-directed practice sessions and external support [15]. Therefore, identifying the mechanisms that promote teacher expertise for ongoing professional renewal may provide a deeper understanding of how the possible facilitators might influence and shape teacher expertise.

Leadership and supportive contexts have been widely recognized as relevant to the process of sustainable human growth and performance [16,17]. Although studies have demonstrated the positive effects of school leadership on teachers' beliefs, practices [18,19], and capacities [20,21], the existing literature lacks evidence linking principals' instructional leadership with teacher expertise. Additionally, organizational support has been taken as a precondition to the development of adaptive expertise [22]. While research strongly suggests that external support that comes from leaders and peers impacts employees' expertise development and enables them to obtain specialized knowledge and skills [23], the association between school support and teacher expertise remains unclear. Consequently, little research is available regarding whether and to what extent principals' instructional leadership and school support might influence teacher expertise.

As teacher expertise is contextually situated, developing teacher expertise may be culturally specific. Research based on the Chinese context normally takes expertise development as a personal and experiential journey and focuses on the developing stages of gaining expertise as a teacher, such as novice, advanced beginner, competent, proficient, and expert stages [24]. Each stage has a minimum threshold with fixed criteria. The five stages identify the necessity of going through stages to reach expertise in teaching. From this point, the development of expertise relies on the training of deliberate practice or the accumulation of experience. However, no evidence proves that the fixed criteria can differentiate between experts and novices or the merely proficient. Whether teachers' professional growth from novice to expert follows a linear or non-linear path is also unclear. Although experience and deliberate practice are critical components of developing expertise, more recent studies reveal that teachers' basic psychological needs and self-efficacy [25] and teachers' agency [26] are also significantly related to teacher expertise. Therefore, how a teacher attains expertise is worthy of further study across different contexts and cultures.

In accordance with the highlighted gap in the existing literature, this study sought to examine the direct and indirect links between principals' instructional leadership, school support, and teacher expertise. Drawing from a survey of teachers in China, we aimed to answer the following questions: (1) How do the dimensions of principals' instructional leadership and school support influence teacher expertise? (2) Does teachers' professional development agency mediate the effects of the dimensions of principals' instructional leadership and school support on knowledge structure and teaching ability? This study may contribute to the literature on teacher expertise in two ways. First, we explored how teacher expertise can be facilitated by the specific components of principals' instructional leadership and school support, thus depicting a clearer picture of which supportive factors are truly effective in enhancing teacher expertise. Second, by looking more deeply into the components of teacher expertise, we investigated the mechanisms of how each component of teacher expertise is facilitated in a supportive school climate. The findings from this study may also provide useful implications for school principals' and educational administrators' daily practice.

2. Theoretical Framework and Hypotheses

2.1. Teacher Expertise

Teacher expertise has evolved in conjunction with developments in the fields of Artificial Intelligence (AI), Cognitive Psychology, and Sociology [15]. In the mid-1960s, an expert system was developed as a type of AI program to solve complex problems by building cognitive information-processing models of human cognition to exhibit skilled performance. Thus, expertise was confined to cognitive capacity. Since the mid-1980s, the psychological perspective has posited that teacher expertise contains not only knowledge structure and cognitive skill, but also metacognitive skills and affective attributes [6,7]. The

sociological perspective, however, criticized that the study of expertise from a psychological perspective may not consider the contextual conditions. Because the development of expertise always occurs in socio-cultural contexts, and is accompanied by changes in interest, values, dedication, and identity. From this perspective, teacher expertise is influenced by both self-processes and environmental factors [13,14]. Social Cognitive Theory adopts an agentic perspective towards human development, adaptation, and change, and posits a multifaceted causal structure for human development, which involves three elements: personal processes, behavioral performance, and environmental setting [9–12]. Therefore, developing teacher expertise requires both external support and self-directed practice.

In the Chinese context, studies about teacher expertise emerged after the late 2000s, since the implementation of Quality Education. The existing studies analyze characteristics of expert teachers in terms of knowledge, ability, or personal traits, but little research focuses on the mechanisms of how to develop teacher expertise. Li and Kaiser [27] and Yang [28] characterized Chinese mathematics teachers' expertise with a prototype view of teacher expertise, such as a profound knowledge base, flexible teaching ability, and reflection on teaching. These characteristics concentrate on expert teachers' cognitive and metacognitive ability. Lian [29] and Zhou [30] analyzed expert teachers' personal traits, such as good self-consciousness, strong confidence, strong responsibility, strong achievement motivation, high emotional investment, and innovation. These personal traits to some extent reflect the "moral imperative" in Chinese culture to promote teachers' engagement in instruction.

In accordance with our previous studies [31–33], this study assumes that teacher expertise is the sum of teachers' personal characteristics that effectively solve teaching problems on the basis of personal knowledge, professional experience, reflection on practice, and innovative activities. The construct contains the three dimensions of knowledge structure, teaching ability, and professional agency.

2.2. Principal Instructional Leadership and Teacher Expertise

Principal instructional leadership has been conceptualized as both direct and indirect in the existing literature [34–36]. Direct instructional leadership focuses on the quality of teacher practice, including the quality of curriculum, teaching, and assessment, and the quality of teacher inquiry and teacher learning. Indirect instructional leadership creates instruction conditions by ensuring that school policies, routines, resources, and other management decisions support high-quality teacher learning and teaching [37]. It is widely accepted that school leadership effects are mostly indirect [18]. Most studies concentrate on leadership behaviors that create conditions and opportunities for teachers to improve their instruction. Thus, principal instructional leadership in this study is defined as leadership actions and behaviors that create conditions for teachers or students learning to improve instruction. It includes two dimensions: providing instructional guidance and monitoring (GM) and providing instructional conditions (IC).

The literature provides evidence that principal instructional leadership influences teachers' practices [38–40], emotions, beliefs, attitudes [19,41], and willingness to work together [42]. As an instructional leader, a principal has the potential to build teachers' capacities as autonomous learners and practitioners and to improve teachers' agency in their learning process [43]. They play a critical role in cultivating the expertise necessary for high-quality teaching when they emphasize teaching and learning [44]. Teachers also treat principals as sources of professional knowledge and expertise, with which they can take risks, experiment with new ideas and practices, and exercise creativity. Drawing on the theoretical discussions and empirical evidence, we proposed the following hypotheses:

Hypothesis 1a (H1a). *Providing instructional guidance and monitoring directly influences teacher expertise.*

Hypothesis 1b (H1b). *Providing instructional conditions directly influences teacher expertise.*

2.3. School Support and Teacher Expertise

Organizational support has been defined from two main perspectives: (1) the cognitive schema perspective, which views organizational climate as cognitive descriptions created by individuals in relation to their work environments, and (2) the shared perceptions perspective, which views organizational support as shared perceptions of members in relation to policies, applications, and operations [45]. Organizational support research concentrates on the shared perceptions among organizational members [46]. Specifically, an organization's innovation support is usually defined as the shared perceptions about the organization's work environment that encourages risk-taking behavior, allocates sufficient resources, and provides a challenging work environment for taking a creative approach at work [47]. A supportive climate is sociable, cohesive, relationships-oriented, and collaborative. Therefore, school support in this study is defined as teachers' perceived support from supervisors, peers, and students that encourages risk-taking behavior, allocates sufficient resources, and provides a challenging environment for innovation. It includes dimensions of leadership support (LP), colleague support (CP), and student support (SP).

Teacher expertise is characterized by adapting to instruction, efficiency, and innovation. The most mentioned characteristics of agentic teachers was entrepreneurship (i.e., 'being innovative') [48]. Innovation is generated in an interactive process in which employees can utilize new knowledge and skills to solve problems [49], and to introduce creative ideas, improve their efficiency, and create new knowledge [50]. Organizational support for innovation can shape the context to influence employees' perceptions of knowledge and innovation [51], and in turn to motivate employees to engage in the process of transforming knowledge into new products. Employees will continue to maintain their best performance when they receive high attention, care, and support from the organization [52,53]. Innovative support motivates employees to take the risks required to perform the challenging and creative activities in knowledge creation and sharing [54]. Thus, we proposed the following hypotheses:

Hypothesis 1c (H1c). *Leadership support directly influences teacher expertise.*

Hypothesis 1d (H1d). *Colleague support directly influences teacher expertise.*

Hypothesis 1e (H1e). *Student support directly influences teacher expertise.*

Hypotheses 1a–1e are depicted in Figure 1.

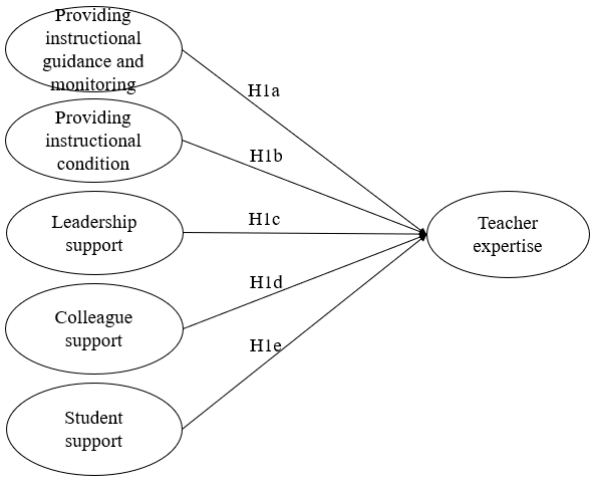


Figure 1. Hypothesized model 1 for the direct relationships among the dimensions of principal instructional leadership, school support, and teacher expertise.

2.4. The Mediating Role of Teachers' Professional Development Agency

The mediating role of teachers' professional development agency is premised on the notion that the development of teacher expertise requires a multifaceted causal structure, in which socio-structural influences operate through psychological mechanisms to produce behavioral effects [10]. Teachers' professional development agency refers to the affective and motivational components of teachers' professional development, including diligence and dedication, devotion, perseverance and conscientiousness, continuous learning and development, self-reflection and improvement, autonomy and innovation, and open-mindedness [30]. Agentic teachers not only achieve complicated tasks but also have the skills and will to strengthen their own capabilities for life-long learning and sustained professional growth [55]. Research on teacher agency shows that teachers' sense of agency is positively related to their professional learning [56] and a willingness to engage in school development [57,58]. Therefore, teacher agency is the driving force for acquiring the professional knowledge and skills necessary to improve the teaching profession more effectively and innovatively [15]. It denotes teachers' capacity and power to actively make choices, intentionally take actions, and strategically initiate changes [59] to direct their own working lives within structural limitations [60].

It has been proposed that school leaders play a key role in facilitating teacher agency at the school level and even beyond [61,62]. For example, principals can re-organize teachers' work, allocate resources to promote teachers' initiatives on pedagogical innovation, and restructure everyday work in classrooms and at school. Moreover, agency can be fostered in supportive and encouraging environments [63]. Supportive management and interpersonal relationships also foster feelings of psychological safety that increase willingness to engage fully in work [64]. Furthermore, cooperative, friendly, and collegial relationships, open communication, and free exchange of ideas may contribute to teachers' sense of agency. When employees perceive an atmosphere of continuous innovation, they are more inclined to work together and share knowledge [65]. Therefore, we assumed that the three dimensions of teacher expertise have hierarchical but not parallel relationships; we proposed the following hypothesis:

Hypothesis 2 (H2). *Teachers' professional development agency mediates the effects of the dimensions of principal instructional leadership and school support on teachers' knowledge structure and teaching ability*.

Hypothesis 2 is depicted in Figure 2.

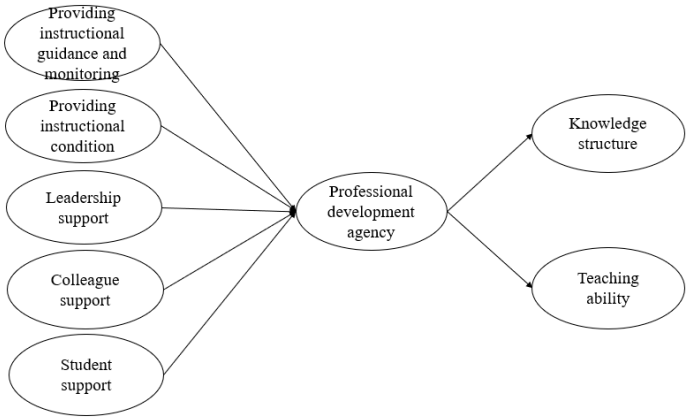


Figure 2. Hypothesized model 2 for the indirect relationships among the dimensions of principal instructional leadership, school support, and teacher expertise.

3. Methods

3.1. Participants

A stratified cluster sampling method was applied to collect the data for this study. The study was conducted during the implementation of educational reform in Hebei and Shanxi, two provinces in northern China. First, one school district in each province was randomly sampled. After choosing the two school districts, 21 primary and 20 secondary schools were randomly selected in these districts as the sample for this study. Of these schools, 28 schools were in urban regions, and 12 schools were in rural regions. Prior to the study, approval from the administrators of the participant schools was obtained. Second, all the teachers in the sample schools were invited to respond to a survey anonymously and voluntarily. A total of 1375 questionnaires were distributed to teachers. After eliminating more than 10% of respondents because of missing data, 1123 valid questionnaires were returned with an effective recovery rate of 81.73%. Table 1 represents the sample of teacher participants. The age range of the participant teachers was 23–42 (Mean = 35.60, SD = 7.94). Of these 1123 participant teachers, 85.9% (n = 965) were female, 14.1% (n = 158) were male; 18% (n = 202) of the teachers had 0–3 years of teaching experience, 23.5% (n = 264) had 4–10 years of teaching experience, 22.3% (n = 250) had 11–17 years of teaching experience, 22.7% (n = 255) had 18–25 years of teaching experience, and 9.9% (n = 111) had more than 26 years of teaching experience, while 3.6% (41) did not respond; 16.5% (n = 185) of the teachers had a junior college's degree, 73.9% (n = 830) had a bachelor's degree, 3.5% (n = 39) had a master's degree or above, and 6.1% (n = 69) did not respond; 351 (33.7%) had a middle-level title, 690 (66.3%) had a senior-level title or above.

Table 1. Demographic characteristics of the participants (N = 1123).

Category	Representation
Gender	Male: 158 (14.1%) Female: 965 (85.9%)
Teaching experience	$\leq$3: 202 (18%) 4–10: 264 (23.5%) 11–17: 250 (22.3%) 18–25: 255 (22.7%) $\geq$26: 111 (9.9%)
Educational level	Junior college: 185 (16.5%) Bachelor's degree: 830 (73.9%) Master's degree or above: 39 (3.5%)
Professional title	Middle level: 351 (33.7%) Senior level: 690 (66.3%)

3.2. Procedure

Ethics approval was obtained from the Ethics Committee at Beijing Normal University. First, primary and secondary schools from Hebei and Shanxi provinces, which are medium economic development regions in China, were invited to participate. They had already obtained the necessary permissions from their principals and the relevant administrative departments. Teachers in the two regions participated voluntarily. Second, well-trained postgraduate students distributed the questionnaires to the participants and explained the purpose of the study. Third, under the condition of strict anonymity, the participants completed the survey face to face. The researchers gathered, screened, and analyzed all the responses.

3.3. Measures

Responses were measured using a five-point Likert-type scale ranging from 1 ("Extremely rarely") to 5 ("Extremely often").

3.3.1. Teacher Expertise

Drawing on the Scale of Occupational Expertise [23,66] and the Generalized Expertise Measure [67], the present study used a self-appraisal scale of teacher expertise developed in our previous study [32]. The Teacher Expertise Scale had 19 items comprising three subscales: knowledge structure (4 items, e.g., "have extensive complementary knowledge for teaching"), teaching ability (9 items, e.g., "have timely, appropriate and accurate interaction, communication and feedback with students in class"), and professional development agency (6 items, e.g., "evaluate student outcomes and development with a developmental perspective"). Cronbach's Alpha for the Teacher Expertise Scale was 0.96, and for the subscales it was as follows: knowledge structure, 0.87; teaching ability, 0.90; professional development agency, 0.81; composite reliability (CR) = 0.953. We performed confirmatory factor analysis (CFA) to validate the survey results. As a result, three first-order factors fell within an acceptable range (χ^2 = 541.894, df = 117, χ^2/df = 4.632, GFI = 0.952, CFI = 0.977, RMSEA = 0.057, $p < 0.01$).

3.3.2. Principal Instructional Leadership

This scale built on principals' instructional leadership actions defined and proposed by Sergiovanni [68] and Ovando and Ramirez [69]. The modified Principal Instructional Leadership Scale had two dimensions—providing instructional guidance and monitoring and providing instructional conditions. The scale comprised 6 items. Cronbach's Alpha for the overall scale of principal instructional leadership was 0.83, and for the subscales it was as follows: providing instructional guidance and monitoring, 0.84; providing instructional conditions, 0.80; CR = 0.929. Fit indexes of CFA for two first-order factors fell within an acceptable range (χ^2 = 33.146, df = 6, χ^2/df = 5.524, GFI = 0.990, CFI = 0.991, RMSEA = 0.064, $p < 0.01$).

3.3.3. School Support

On the basis of KEYS, a widely used and previously validated scale [70] that assesses the work environment for creativity, we measured school support using three modified subscales: leadership support, colleague support, and student support. The scale comprised 11 items: leadership support (four items, e.g., "school leaders encourage teachers to propose new ideas and explore new methods"), colleague support (four items, e.g., "when I have new ideas, my colleagues will express their opinions"), and student support (three items, e.g., "when I try something new, my students respond actively"). Cronbach's Alpha for the overall scale of school support was 0.93, and for the subscales it was as follows: leadership support 0.93; colleague support 0.89; student support 0.85; CR = 0.951. Fit indexes of CFA for three first-order factors fell within an acceptable range (χ^2 = 194.122, df = 30, χ^2/df = 6.471, GFI = 0.969, CFI = 0.983, RMSEA = 0.070, $p < 0.01$).

3.4. Data Analysis

Relationships between research variables and hypotheses were analyzed through structural equation modeling (SEM) using AMOS 22 software. SEM is an effective tool to examine the relationship between multiple variables and to demonstrate the fit of the measurement model. In accordance with SEM analysis, we reported the ratio of the chi-square to the degree of freedom (χ^2/df), RMSEA, SRMR, and CFI fit indices for the measurement model's goodness of fit. Additionally, the bootstrapping method was used to calculate the direct, indirect, and total effects of the variables in the measurement model. The bootstrapping method is used to estimate the direct and indirect effects of the exogenous variable on the endogenous variable [71].

4. Results

4.1. Discriminant Validity and Common Method Variance Analysis

When evaluating the discriminant validity of a CFA model, the average variance extracted (AVE) index value of the scale should be above 0.5 so that the factor constructs

have good convergent validity, and the AVE value of the two factors should be higher than the square of the correlation coefficient (r^2) between the two factors (Hair). As shown in Table 2, the square roots of AVE were higher than the correlations in most cases, indicating that the dimensions of instructional leadership, school support, and teacher expertise were differentiated variables in this study.

Table 2. Comparison of Measurement Models.

Model	χ^2	df	$\Delta\chi^2$	χ^2/df	GFI	CFI	RMSEA
1. Eight-factor	3496.179	566	1971.363	6.177	0.835	0.911	0.068
2. Six-factor	7081.762	591	3585.583 **	11.983	0.701	0.802	0.099
3. Five-factor	7313.794	591	3817.615 **	12.375	0.701	0.795	0.101
4. Three-factor	8928.014	594	5431.835 **	15.030	0.647	0.746	0.112
5. One-factor	13,089.114	594	9592.935 **	22.036	0.469	0.619	0.137

Notes. 1. Eight-factor model: GM, IC, LS, CS, SS, KS, TA, PDA; Six-factor: GM, IC, LS, CS, SS, TE; Five-factor: IL, SS, KS, TA, PDA; Three-factor: IL, ScS, TE. 2. KS = knowledge structure; TA = teaching ability; PDA = professional development agency; GM = providing instructional guidance and monitoring; IC = providing instructional conditions; IL = instructional leadership; LS = leadership support; CS = colleague support; SS = student support; ScS = school support; TE = teacher expertise. ** $p < 0.01$.

Moreover, to further test the discriminant validity of the measurement model, CFA was run using AMOS 22.0. There were eight factors and 34 items. Table 2 presents the CFA results. Model 1 was a hypothesized eight-factor model with each item loaded onto its corresponding latent variables. Model 2 was a six-factor model in which knowledge structure, teaching ability, and professional development agency were combined into teacher expertise. Model 3 was a five-factor model in which providing instructional guidance and monitoring and providing instructional conditions were combined into principal instructional leadership and leadership support, and colleague support and student support were combined into school support. Model 4 was a three-factor model in which knowledge structure, teaching ability, and professional development agency were combined into teacher expertise. Model 5 was a one-factor model with all items were loaded onto a single latent variable. The fit indices supported the hypothesized eight-factor model, which fit the data better than the six-factor ($\Delta\chi^2/df = 3585.583/25$, $p < 0.01$), five-factor ($\Delta\chi^2/df = 3817.615/25$, $p < 0.01$), or one-factor ($\Delta\chi^2/df = 9592.935/28$, $p < 0.01$) models. None of the alternative models fit the data as well as the hypothesized model, suggesting that discriminant validity was confirmed. Additionally, because teacher expertise was measured with a self-descriptive scale, Common Method Variance (CMV) was assessed by adding a CMV factor into the eight-factor model. Compared with the original model ($\chi^2 = 3496.179$, df = 566, $\chi^2/df = 6.177$, GFI = 0.835, CFI = 0.911, RMSEA = 0.068), the fit of the model with a CMV factor improved only to a small extent ($\chi^2 = 3266.616$, df = 530, $\chi^2/df = 6.163$, GFI = 0.844, CFI = 0.922, RMSEA = 0.064), indicating that CMV did not have a significant effect in this study.

4.2. Descriptive Statistics and Correlations among Variables

Table 3 presents descriptive statistics and intercorrelations among all study variables. It shows that the study variables all had acceptable internal consistency reliability (0.80 or higher). All expected correlations were positively related to each other. Teachers rated their teaching ability highest, followed by their professional development agency and knowledge structure. Teachers chose leadership support, colleague support, and student support as the most important factors influencing teacher expertise. Providing instructional guidance and monitoring, and providing instructional conditions were reported as moderately influential factors. The three subscales of the teacher expertise scale were significantly related to each other. Furthermore, the teacher expertise scale and its subscales were statistically significantly related to the subscales of school support and principal instructional leadership, especially the subscales of colleague support and student support. The strongest correlation was found between knowledge structure and teaching ability ($r = 0.779$, $p < 0.01$), followed by professional development agency and teaching ability

(r = 0.744, $p < 0.01$), and professional development agency and knowledge structure (r = 0.666, $p < 0.01$). These zero-order correlations provided preliminary support for our hypotheses. However, these associations are bivariate, and it was necessary to conduct multivariate analyses to control for shared variance among predictors and among outcomes.

Table 3. Descriptive Statistics and Correlation Matrix.

	M	SD	1	2	3	4	5	6	7	8	9
1. LS	4.14	0.799	(0.93) *0.826*								
2. CS	4.09	0.719	0.65 8 **	(0.89) *0.777*							
3. SS	4.15	0.669	0.618 **	0.633 **	(0.85) *0.793*						
4. GM	3.78	0.803	0.548 **	0.420 **	0.427 **	(0.84) *0.848*					
5. IC	3.36	0.896	0.520 **	0.427 **	0.351 **	0.485 **	(0.80) *0.808*				
6. KS	3.97	0.651	0.398 **	0.495 **	0.492 **	0.366 **	0.398 **	(0.87) *0.721*			
7. TA	4.17	0.6389	0.459 **	0.573 **	0.581 **	0.363 **	0.329 **	0.779 **	(0.90) *0.721*		
8. PDA	4.14	0.626	0.457 **	0.563 **	0.581 **	0.410 **	0.332 **	0.666 **	0.744 **	(0.81) *0.720*	
9. TE	4.13	0.586	0.487 **	0.605 **	0.615 **	0.414 **	0.378 **	0.868 **	0.955 **	0.882 **	(0.96) *0.721*

Notes. 1. N = 1123; ** $p < 0.01$ Coefficient alpha reliabilities are on the diagonal in parentheses. The square roots of AVE are on the diagonal in italic. 2. LS = leadership support; CS = colleague support; SS = student support; GM = providing instructional guidance and monitoring; IC = providing instructional conditions; KS = knowledge structure; TA = teaching ability; PDA = professional development agency; TE = teacher expertise.

4.3. Direct Relationships among the Dimensions of Principal Instructional Leadership, School Support, and Teacher Expertise

In the first step, SEM was performed to estimate the direct relationships among the dimensions of principal instructional leadership, school support, and teacher expertise. Path analysis indicated that the paths from leadership support and providing instructional conditions to teacher expertise were nonsignificant ($p = 0.03 > 0.01$; $p = 0.122 > 0.01$). The coefficients of the paths from providing instructional guidance and monitoring, colleague support, and student support to teacher expertise were positive and statistically significant ($p < 0.001$). Thus, we deleted the two paths from the model. As shown in Table 4, the modification indices of Model 1 exhibited an acceptable fit ($\chi^2 = 2220.609$, df = 360, $\chi^2/df = 6.168$, GFI = 0.873 CFI = 0.928, RMSEA = 0.068, SRMR = 0.110).

Table 4. Model Fit of Structural Equation Model 1.

Model	Structure	χ^2	df	χ^2/df	GFI	CFI	RMSEA	SRMR
Hypothesized model		4377.863	373	11.737	0.744	0.845	0.098	0.113
Modified model		2220.609	360	6.168	0.873	0.928	0.068	0.110

Notes. 1. dot line = nonsignificant; solid line = significant. 2. GM = providing instructional guidance, and monitoring; IC = providing instructional conditions; LS = leadership support; CS = colleague support; SS = student support; TE = teacher expertise; dot line = nonsignificant link; solid line = significant link.

Figure 3 presents the standardized parameter estimates for the hypothesized Model 1. H1a, H1d, and H1e were supported, but H1b and H1c were unsupported. The coefficients of the paths from providing instructional guidance and monitoring, colleague support, and student support to teaching expertise ($\beta_{GM\text{-}TE} = 0.15$, $p < 0.01$; $\beta_{CS\text{-}TE} = 0.36$, $p < 0.01$; $\beta_{SS\text{-}TE} = 0.36$, $p < 0.01$) were positive and statistically significant. The correlations were stronger between colleague support, student support, and teacher expertise.

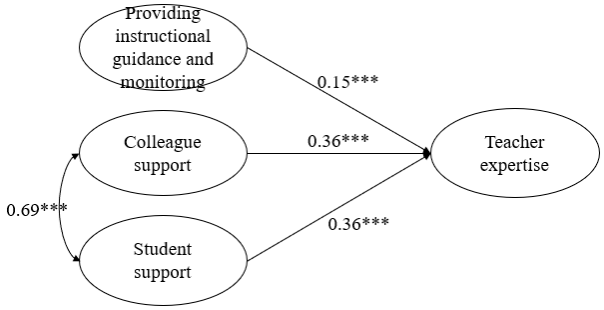
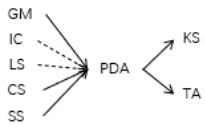


Figure 3. Results of Hypothesized Structural Equation Model 1 (*** $p < 0.01$).

4.4. The Mediating Effect of Teachers' Professional Development Agency

In the second step, SEM and a bootstrapping procedure (a bootstrap sample of 1000 was specified) were conducted to test the mediating effect of teachers' professional development agency. The bootstrap method yields the most accurate confidence intervals (CI) for indirect effects [72]. As shown in Table 5, the modification indices of Model 2 exhibited an acceptable fit (χ^2 =1486.398, df =340, χ^2/df = 4.372, GFI = 0.915 CFI = 0.956, RMSEA = 0.055, SRMR = 0.100). The model fit of Model 2 was better than that of Model 1, which indicates the mediating effect of teachers' professional development agency.

Table 5. Model Fit of Structural Equation Model 2.

Model	Structure	χ^2	df	χ^2/df	GFI	CFI	RMSEA	SRMR
Hypothesized model		3045.774	371	8.210	0.828	0.897	0.080	0.114
Modified model		1486.398	340	4.372	0.915	0.956	0.055	0.100

Notes. 1. dot line = nonsignificant; solid line = significant. 2. KS = knowledge structure; TA = teaching ability; PDA = professional development agency; GM = providing instructional guidance and monitoring; IC = providing instructional conditions; LS = leadership support; CS = colleague support; SS = student support.

Figure 4 presents the standardized parameter estimates for the hypothesized Model 2; H2 was supported. The path coefficients from professional development agency to knowledge structure ($\beta_{PDA\text{-}KS} = 0.78$, $p < 0.01$) and teacher ability ($\beta_{PDA\text{-}TA} = 0.86$, $p < 0.01$) were positive and statistically significant. The coefficients of the paths from providing instructional guidance and monitoring, colleague support, and student support to professional development agency were positive and statistically significant. ($\beta_{GM\text{-}PDA} = 0.17$, $p < 0.001$; $\beta_{CS\text{-}PDA} = 0.40$, $p < 0.001$; $\beta_{SS\text{-}PDA} = 0.37$, $p < 0.01$).

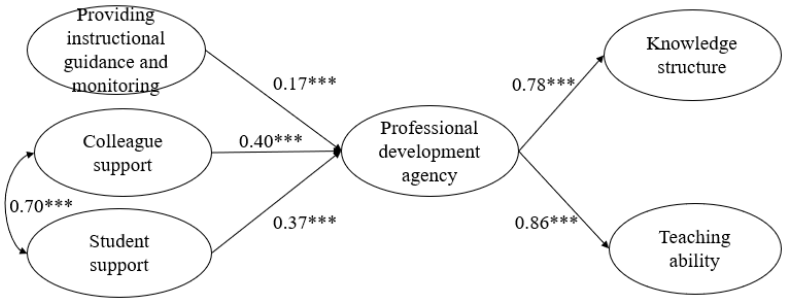


Figure 4. Results of the Hypothesized Structural Equation Model 2 (*** $p < 0.01$).

Table 6 presents the bootstrapping results, which confirmed the mediating role of teachers' professional development agency in teacher expertise. Providing instructional guidance and monitoring exhibited statistically significant indirect effects on both knowledge structure and teaching ability ($\beta_{GM\text{-}KS} = 0.14$, SE = 0.03, 95% CI = 0.09–0.19, $p = 0.001 < 0.01$; $\beta_{GM\text{-}TA} = 0.15$, SE = 0.03, 95% CI = 0.09–0.21, $p = 0.001 < 0.01$). Colleague support exhibited statistically significant indirect effects on both knowledge structure and teaching ability ($\beta_{CS\text{-}KS} = 0.31$, SE = 0.04, 95% CI = 0.09–0.19, $p = 0.003 < 0.01$; $\beta_{CS\text{-}TA} = 0.34$, SE = 0.05, 95% CI = 0.24–0.42, $p = 0.003 < 0.01$). The direct effects were nonsignificant. Student support had statistically significant indirect effects on both knowledge structure and teaching ability ($\beta_{SS\text{-}KS} = 0.29$, SE = 0.04, 95% CI = 0.22–0.37, $p = 0.001 < 0.01$; $\beta_{SS\text{-}TA} = 0.32$, SE = 0.04, 95% CI = 0.24–0.40, $p = 0.001 < 0.01$). The direct effects were nonsignificant. Therefore, H2 was supported.

Table 6. Bootstrapped Confidence Intervals for the Total and Specific Indirect Effects.

Total and Indirect Effects	β	SE	*p*	Bootstrapping BC 95% CI Lower/Upper
GM → KS	0.136 **	0.027	0.001	0.087/0.192
CS → KS	0.311 **	0.041	0.003	0.224/0.387
SS → KS	0.288 **	0.038	0.001	0.219/0.365
GM →TA	0.148 **	0.030	0.001	0.094/0.210
CS → TA	0.340 **	0.045	0.003	0.244/0.422
SS → TA	0.315 **	0.042	0.001	0.237/0.397

Notes. 1. N = 1123; ** $p < 0.01$, two-tailed; BC = bias-corrected; CI = confidence interval. 2. GM = providing instructional guidance and monitoring; KS = knowledge structure; CS = colleague support; SS = student support; TA = teaching ability.

5. Discussion

This study sought to examine the impact of principal instructional leadership and school support on teacher expertise, as well as the mediating effect of teachers' professional development agency. SEM was performed on a dataset of 1123 teachers from 21 primary schools and 20 secondary schools in China.

5.1. The Direct Relationships among Principal Instructional Leadership, School Support, and Teacher Expertise

The results of the present study indicate that school support is a better predictor of teacher expertise than principal instructional leadership.

Regarding the association between principal instructional leadership and teacher expertise, our results showed that providing instructional guidance and monitoring was positively related to teacher expertise, but providing instructional conditions was non-significantly related to teacher expertise. This illustrates that a principal's engagement in instruction is closely related to improvements in classroom teaching and learning. However, providing instructional conditions is a broader dimension and plays a management function, which is more distantly related to teaching and learning. Our results are consistent

with those of research on effective schools. Leaders in high-performing schools are deeply involved in instruction and devote abundant time to strengthening teaching and learning in and across classrooms [73,74]. Therefore, a principal's engagement in instruction plays a key role in facilitating teacher expertise through support and encouragement [61,62,75].

Regarding the association between school support and teacher expertise, our results showed that colleague support and student support were the best predictors of teacher expertise. However, leadership support was non-significantly related to teacher expertise. This indicates that an environment that supports creating collaboration, peer coaching, inquiry, collegial study groups, and reflective discussions among teachers was more effective for promoting teacher expertise. These results are consistent with research that shows innovative organization climates enable individuals to behave in more creative and innovative ways [76,77]. While leadership plays an important role in organizational climates through inspiring and supporting teachers' professional development, it is more administration-centered than learning-centered in the Chinese context. "Administration-centered" leadership aims to implement national policy, improve physical conditions, and provide spiritual support. This kind of leadership offers advantages for forming goals, imposing control and stressing on teachers' development, but is not advantageous for monitoring teachers' learning process, communicating with teachers, and motivating teachers [78]. However, "learning-centered leadership" aims to build a school vision, coordinate classroom management, promote teachers' professional growth, and establish a supportive school culture. Principals should try to create, support, and improve their school's professional learning community, which then contributes to the professional development associated with inquiry, collective responsibility, and knowledge co-construction, and enables teachers to take risks and attain higher performance levels.

5.2. The Mediating Effect of Teachers' Professional Development Agency

In the present study, teachers' professional development agency mediated the effects of principal instructional leadership and school support on teachers' knowledge structure and teaching ability. School factors influence teacher expertise through teachers' agency [79]. Indeed, teachers' knowledge acquisition and teaching ability depend on the stimulation of their professional development agency. As teachers' "power" to actively make choices, intentionally take actions, and strategically initiate changes [60], their agency can help them more effectively and innovatively acquire both knowledge and skills [15]. Agentic teachers who actively engage in resource seeking can exert influence on their professional skills [80]. The findings are consistent with previous research that suggests instructional leadership enhances teacher agency [81]. Teacher agency is closely linked to teacher capacity to learn [43].

The findings illustrate that teachers feel a strong sense of agency about improving teaching and learning when principals build a school culture in which teacher learning is nurtured and teachers are provided with resources to craft their teaching and to build positive relationships with colleagues and students. This is consistent with the research of Hallinger et al. [81], which suggests that teacher agency plays a mediating role in the relationship between principals' learning-centered leadership and teachers' professional development. When school principals emphasize teaching and learning in their leadership practice, teacher agency provides teachers with a sense of confidence to meet challenges [82]. Such support from principals, colleagues, and students is important for a teacher to become an expert who takes initiative and responsibility.

Our findings suggest, moreover, that teachers' professional development agency is not an individual teacher's fixed disposition but is rather constructed situationally in temporary contexts [55,82,83]. Teachers' professional development agency and the school context in which they work are mutually constitutive and highly interdependent [84–87]. Therefore, a multifaceted causal structure is needed for developing expertise. Unlike the psychological perspective, which emphasizes the individual prerequisites of expertise through developing self-efficacy, the multi-faceted perspective of social cognitive theory

focuses on the individual-environment interactive prerequisites of expertise and develops teacher expertise through building agency.

6. Conclusions, Limitations, and Implications

This study sought to examine the direct and indirect links between principals' instructional leadership, school support, and teacher expertise. First, the results indicate that the growth of a teacher's expertise depends on the stimulation of their professional development agency. Second, principal instructional leadership, school support, and teachers' professional development agency are significant factors that influence teacher expertise. The effect is indirect through developing a sense of agency by engaging in professional development.

However, this study has several limitations. First, while our findings provide evidence for positive associations between principal instructional leadership, school support, and teacher expertise, the cross-sectional nature of the data cannot imply causality because it only captured the associations at a single point in time. Future, longitudinal research that keeps track of changes in teacher expertise over time could better inform any causal links between instructional leadership, school support, and teacher expertise. Second, the data for teacher expertise comprised only self-reported measures. Thus, the quality of the data depended on how participants reported the recalled events. That is, teachers' descriptions of expert teachers' characteristics may have been affected by telescoping recall, selective memory, and exaggeration. Furthermore, the measures of principal instructional leadership and school support were modified from scales created in a Western context; future studies using different population samples across various countries are needed to further validate the survey. Third, this study analyzed factors only at the school level; however, factors at micro, meso, and macro levels of educational systems may all play a role in shaping teacher expertise. Future research could use multilevel models in the data analysis that represent a hierarchical structure, which, potentially will provide more in-depth knowledge about the influences that foster the development of teacher expertise.

Despite these limitations, the findings have theoretical and practical implications. First, this study takes the previous scholarly efforts to elaborate the factors that influence teacher expertise one step further by illustrating that instructional leadership and school support can foster teacher expertise by supporting teacher agency. Teachers' professional development agency is embedded in the active interplay between teachers and their various learning contexts. We recommend additional research on the link between contextual factors and teacher expertise. Second, this study has considerable practical implications for teachers, principals, and administrators. For teachers, they should endeavor to understand the complexity and non-routine nature of teacher expertise, and with that knowledge conduct self-assessments through metacognitive reflection. In diverse and changing instructional circumstances, the acquisition of teacher expertise is the key feature of expert teachers. Teachers must learn how to overcome routine expertise and inject new knowledge and skills into their teaching practice. For principals, as the development of teacher expertise depends on the stimulation of professional development agency, principals should create supportive learning and innovation climates to encourage teachers' capacity for agency and innovation (e.g., create a professional learning community). Moreover, novice teachers, particularly, require support to avoid attrition in the profession. Principals must improve their professional expertise to engage in classroom instruction and to create innovative climates that enable teachers' ongoing professional renewal. For administrators, given the complex construct of teacher expertise, the traditional administrative practices that have contributed to the development of teachers' routine expertise perhaps has a nonsignificant effect on teacher expertise. The primary aim, however, is to continue exploring the enabling factors that can stimulate teachers' professional development agency and thereby sustain and update the teaching profession.

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