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The Impact of Active Coping with Negative Public Opinion on Learning Power of Pre-service Primary School Teachers: The Mediating Role of Perceived Social Support

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Research Article

Keywords: active coping with negative public opinion, perceived social support, learning power, pre-service primary school teachers, mediating role

Posted Date: October 25th, 2025

DOI: https://doi.org/10.21203/rs.3.rs-7618832/v1

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Additional Declarations: No competing interests reported.

Abstract

Background Recent years have witnessed increasing negative public discourse targeting primary school teachers, which has adversely affected pre-service teachers' career commitment and impeded the development of their learning competence.

Methods To investigate the mechanism through which active coping with negative public opinion influences learning power among pre-service primary school teachers, this study employed a stratified random sampling method to survey 1,083 participants from six universities in Shandong Province between April and June 2025. Data were collected using a self-developed questionnaire and analyzed via SPSS 26.0 for descriptive, correlational, and regression analyses, with mediation effects tested using the PROCESS macro.

Results The results indicated that both active coping with negative public opinion and perceived social support significantly and positively predicted learning power. Moreover, perceived social support played a partial mediating role—active coping enhanced learning power indirectly by strengthening perceived social support.

Conclusion This study provides empirical evidence clarifying the intrinsic pathways influencing pre-service teachers' professional growth and offers practical insights for optimizing teacher training programs.

1 Introduction

In the contemporary educational architecture, the stability of primary school teachers' career development has become a critical determinant of the effective implementation of national education strategies. As the core source of the talent pipeline for basic education, the quality of pre-service primary school teacher training directly shapes the overall caliber of the future teaching workforce [1].

Learning competence, as the core capacity for individuals' continuous learning and development, is a pivotal factor in achieving lifelong growth[2]. The primary school years represent a critical period for students' cognitive development and personality formation [3], which places higher demands on the learning competence of primary school teachers. Consequently, the cultivation and enhancement of learning competence among pre-service primary school teachers possess the following distinctive characteristics:

First is professional uniqueness, which requires pre-service primary school teachers to develop "generalist" teaching capabilities[4, 5]. Research indicates that the professional core competencies of excellent primary school teachers can improve student academic performance by 28%-35% [5, 6]. Second is developmental criticality, meaning the professional identity and teaching capabilities formed during the pre-service stage tend to have a more enduring impact. Longitudinal studies have found a significant positive correlation between the quality of pre-service teacher training and career stability

during the first five years [7]. Third is contextual challenge ability. Against the backdrop of the national "Double Reduction" policy in education, primary school teachers are facing pressures and challenges related to role transformation [8]. Survey results show that 76.3% of pre-service teachers experience adaptation anxiety regarding the new policy requirements. Notably, the recent frequent emergence of negative public opinion in the educational field, such as parent-school disputes and the potential replacement of teachers by artificial intelligence, has further exacerbated career anxiety among pre-service primary school teachers, posing serious challenges to the enhancement and development of their learning competence [9, 10].

Currently, the education field is witnessing diversified and fragmented dissemination of negative public opinions targeting primary school teachers, which also significantly impacts the professional identity and learning engagement of pre-service primary school teachers [11]. The influence of negative public opinion primarily manifests in three typical forms: First, questioning of professional value, such as claims that "teaching is an easy job," debates over the "reasonableness of extended winter and summer vacations," and controversies regarding "salary and compensation." Second, controversies surrounding educational reforms, including "implementation challenges of the Double Reduction policy" and the "tension between quality-oriented education and exam-oriented education." Third, amplification of individual incidents, such as the spread of "isolated cases of professional ethics violations" and the "viral dissemination of teaching accidents."

From the perspective of Cognitive Load Theory, it has been confirmed that negative public opinions significantly increase the cognitive load of pre-service teachers, leading to consequences such as reduced working memory capacity [12, 13] Through fMRI technology, neuroscientists found that after exposure to negative public opinions, the activation level of the prefrontal cortex in participants decreased by 32%, and this is significantly correlated with reduced executive function [14].

Research from the lens of Social Identity Theory shows that for pre-service teachers continuously exposed to negative public opinions, their professional identity declined by 41% within six months, with a significant "cumulative effect" observed [15]. This impact is more pronounced among heavy social media users [9]. Empirical data indicates that 65.8% of pre-service teachers reported having experienced doubts about their career choice due to negative public opinions, among whom 24.3% showed reduced learning motivation and decreased use of learning strategies [16].

Social Cognitive Theory points out that the external environment influences behavioral performance through individual cognitive factors [17]. As an important psychological resource, perceived social support can buffer the negative impacts of negative public opinions, such as stress and depression [18, 19]. It mitigates external pressure through three mechanisms: emotional support alleviates anxiety [20, 21], informational support enhances coping efficacy [22], and evaluative support restructures professional cognition [23]. Drawing further on Lazarus's findings [24], an individual’s subjective perception of support is a better predictor of adaptive outcomes than objective support. This explains the significant differences in individual learning performance under the same public opinion

environment. Brissette et al. [25] argue that compared with objective social support, perceived social support covers more comprehensive content and holds greater significance for an individual's physical and mental health. It enables individuals to actively cope with stressful events and release negative emotions.

To summarize, existing research on the relationship between pre-service primary school teachers' learning capacity and negative public opinions has been supported by a wealth of empirical studies. However, these studies tend to examine various variables in a parallel manner, focusing on their combined impacts, while failing to systematically explore the internal relationships between the variables. Furthermore, our literature search and analysis reveal that no existing studies have delved into the role of perceived social support in pre-service primary school teachers' learning capacity and their proactive coping with negative public opinions.

Therefore, this study aims to explore the mediating mechanism through which perceived social support influences learning capacity. Based on previous research findings, it proposes the following research hypotheses—thus providing a theoretical basis for enhancing the learning capacity of pre-service primary education teachers, offering scientific guidance for the practice of educational public opinion management, and supplying a scientific foundation for the training of pre-service primary school teachers.

Hypothesis I: Proactive coping with negative public opinions significantly and positively predicts the learning capacity of pre-service primary school teachers.

Hypothesis II: Proactive coping with negative public opinions is significantly and positively correlated with perceived social support among pre-service primary school teachers.

Hypothesis III: Perceived social support plays a mediating role between proactive coping with negative public opinions and the learning capacity of college students (pre-service primary school teachers).

2 Methods

2.1 Participants

From April to June 2025, this study adopted a stratified random cluster sampling method. First, colleges and universities in Shandong Province that offer undergraduate programs in Primary Education were stratified into three geographical layers: eastern, central, and western regions of the province. Two institutions were selected from each layer as survey sites, and all undergraduate students majoring in Primary Education at these six institutions were included as survey participants.

The survey implementation followed the following procedures: We first established close collaborative relationships with the six selected institutions. From each institution, we designated investigators to serve as our liaisons. These investigators underwent rigorous screening and training to ensure they had

a clear understanding of the research objectives, questionnaire content, and distribution procedures. Subsequently, the investigators coordinated with program directors (for the Primary Education major) and student affairs directors at each institution. During these meetings, they explained the significance and objectives of the study, the content of the questionnaire, and key notes for completion. Finally, the program directors and student affairs directors organized students to complete the questionnaire survey. This ensured that every student received the questionnaire in a timely manner, fully understood the meaning, objectives, and requirements of the survey, and provided informed consent prior to participation.

In total, 1,146 undergraduates were surveyed, and 1,129 questionnaires were collected, yielding a response rate of 98.52%. After excluding 46 invalid questionnaires (e.g., incomplete responses, contradictory answers), 1,083 valid questionnaires were retained, resulting in a validity rate of 95.93%.

This study was conducted in accordance with the Declaration of Helsinki and approved by the Ethics Committee of Weifang Medical University (Approval No. 2021YX130; note: Weifang Medical University was renamed Shandong Second Medical University in December 2023). All participants were informed of the research purpose and content of the study and provided informed consent online prior to participation.

2.2 Instrument

2.2.1 Pre-service Primary School Teachers’ Learning Capacity Scale

Based on expert consultation and previous related studies [26–29], the Pre-service Primary School Teachers' Learning Power questionnaire was developed. It comprises four primary dimensions: Personal Traits, Professional Competence, Fundamental Abilities, and Thinking Characteristics; 21 secondary dimensions: Self-Control, Impact Effect, Trust and Respect, Psychological Adaptation, Flexibility, Achievement Orientation, Scientific Foresight, Professional Ethics, Service Awareness, Professional Responsibility, Career Planning, Teamwork, Basic Knowledge and Skills, Applied Knowledge and Skills, Execution Ability, Communication Skills, Learning Capacity, Decision-Making Ability, Networking Skills, Critical and Innovative Thinking, and Information Integration and Management; and 52 tertiary indicators. The questionnaire employs a Likert 5-point scoring system, with scores ranging from 1 to 5 representing "Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree," respectively. The total score ranges from 52 to 260, with higher scores indicating stronger learning power. In this study, the scale demonstrated a Cronbach’s α coefficient of 0.883, indicating good reliability. The KMO value was 0.987, suggesting excellent construct validity.

2.2.1 Perceived Social Support Scale

This study used the Chinese version of the Perceived Social Support Scale, originally developed by Zimet et al. [30] and later revised by Jiang [31]. It contains 12 items, covering 3 dimensions: perceived family

support, perceived friend support, and perceived support from significant others. A Likert 7-point scale was used, with a total score ranging from 12 to 84. A higher score reflects a stronger perception of social support in daily life. Validation results showed that the Cronbach's α coefficient was 0.921 and the KMO value was 0.932, confirming good reliability and validity of the scale.

2.2.3 Proactive Coping with Negative Public Opinions Measure

Two items were used to assess proactive coping with negative public opinions:"Current home-school dispute incidents have not had a significant impact on me";"I often persuade my classmates to view negative public opinions such as home-school disputes in a positive and proactive manner". A Likert 5-point scale was applied, with scores from 1 to 5 representing "Strongly Disagree, Disagree, Neutral, Agree, Strongly Agree". The total score ranges from 2 to 10, and a higher score indicates a stronger ability to proactively cope with negative public opinions.

2.3 Analyses

SPSS 26.0 was used to conduct descriptive statistics, correlation analysis, and regression analysis, while the PROCESS macro program was employed to perform the mediation effect test.

3 Results

3.1 Common Method Bias Test

Harman's single-factor test was conducted to assess common method bias. The results showed that the variance explained by the first factor was 29.57%, which is lower than the critical value of 40%. This indicates that common method bias in this study is not severe.

3.2 Descriptive Analysis of Pre-service Primary School Teachers' Learning Capacity

The total mean score of pre-service primary school teachers' learning power was 200.30 ± 25.641, which is significantly higher than the theoretical mean of 156, indicating a moderately high level of learning competence.

At the level of first-tier dimensions, certain disparities were observed among the four dimensions. Professional competence performed the strongest overall, followed by personal traits, then fundamental abilities, while thinking characteristics scored relatively lower. Details are presented in Table 1 and Fig. 1.

Regarding the second-tier dimensions, under the first-tier dimension of personal traits, the means of the six second-tier dimensions ranged between 3.69 and 3.96. Among these, trust and respect scored the highest (mean = 3.96), indicating the strongest performance, while impact effect scored the lowest (mean = 3.69), reflecting a relative weakness. Other dimensions—psychological adaptation (mean =

3.91), flexibility (mean = 3.90), achievement orientation (mean = 3.86), and self-control (mean = 3.74)—all remained at a moderately high level. Notably, the standard deviations across these second-tier dimensions ranged from 0.539 to 0.676, indicating limited score variability and relatively concentrated data. Achievement orientation had the smallest standard deviation (0.539), suggesting the highest consistency, while self-control had the largest (0.676), indicating slightly greater score dispersion.

Under the first-tier dimension of professional competence, the means of the eight second-tier dimensions ranged from 3.79 to 4.11, reflecting a generally strong performance. Professional ethics had the highest mean [4.11], making it the strongest performing indicator in this dimension, while scientific foresight and applied knowledge and skills both had the lowest mean (3.79), though still at a moderate level. Other dimensions—service awareness (mean = 3.98), teamwork (mean = 3.97), professional responsibility (mean = 3.96), basic knowledge and skills (mean = 3.87), and career planning (mean = 3.82)—also performed well. The standard deviations ranged from 0.525 to 0.747. Professional responsibility had the smallest standard deviation (0.525), indicating highly concentrated scores, while career planning had the largest (0.747), reflecting relatively noticeable score variations.

Within the fundamental abilities dimension, the five second-tier dimensions all had means of 3.80 or higher. Execution ability, communication skills, decision-making ability, and networking skills shared the same mean (3.85), while learning capacity scored slightly lower (mean = 3.80). Overall performance was balanced with minor differences among indicators. Standard deviations ranged from 0.527 to 0.610, indicating generally low variability. Decision-making ability and networking skills had the smallest standard deviations (0.527), suggesting high score consistency, while learning capacity had the largest (0.610), indicating slightly greater fluctuation.

For the thinking characteristics dimension, the two second-tier dimensions showed that information integration and management had a slightly higher mean (3.88) than critical and innovative thinking (3.84). Overall, this dimension performed somewhat weaker compared to the other first-tier dimensions. The standard deviation for information integration and management (0.590) was slightly larger than that for critical and innovative thinking (0.552), though both exhibited limited variability and relatively concentrated scores.

Table 1
Scores on Each Dimension of Pre-service Primary School Teachers' Learning Power

First-level Dimensions	Second-level Dimensions	Mean	SD
Personal Traits	Self-Control	3.74	0.676
	Impact Effect	3.69	0.629
	Trust and Respect	3.96	0.655
	Psychological Adaptation	3.91	0.571
	Flexibility	3.90	0.569
	Achievement Orientation	3.86	0.539
Professional Competence	Scientific Foresight	3.79	0.571
	Professional Ethics	4.11	0.573
	Service Awareness	3.98	0.554
	Professional Responsibility	3.96	0.525
	Career Planning	3.82	0.747
	Teamwork	3.97	0.543
	Basic Knowledge and Skills	3.87	0.617
	Applied Knowledge and Skills	3.79	0.603
Fundamental Abilities	Execution Ability	3.85	0.576
	Communication Skills	3.85	0.575
	Learning Capacity	3.80	0.610
	Decision-Making Ability	3.85	0.527
	Networking Skills	3.85	0.527
Thinking Characteristics	Critical and Innovative Thinking	3.84	0.552
	Information Integration and Management	3.88	0.590

3.3 Descriptive Statistics and Correlation Analysis of Variables among Pre-service Primary School Teachers

The total mean score of perceived social support among pre-service primary school teachers was 64.33 ± 11.286, significantly higher than the theoretical mean of 50.4, indicating a moderately high level of perceived social support.

The total mean score of active coping with negative public opinion was 7.28 ± 1.368, also exceeding the theoretical mean of 6, suggesting a moderately high ability to actively respond to negative public opinion.

Correlation analysis revealed significant positive relationships among the variables: active coping with negative public opinion was positively correlated with learning power ($r = 0.355$, $p < 0.05$) and with perceived social support ($r = 0.084$, $p < 0.05$). Perceived social support was also positively correlated with learning power ($r = 0.575$, $p < 0.05$). The strength and significance of these relationships support further analysis of the variables.

Table 2
Descriptive Statistics and Correlation Analysis of Variables among Pre-service Primary School Teachers

Variable	**Mean**	**SD**	**1.Active Coping with Negative Public Opinion**	**2.Perceived Social Support**	**3.Learning Power**
1. Active Coping with Negative Public Opinion	7.28	1.368	1		
2. Perceived Social Support	64.33	11.286	0.084*	1	
3. Learning Power	200.30	25.641	0.355*	0.575*	1
Note: *p < 0.05					

3.4 Analysis of Factors Influencing Pre-service Primary School Teachers' Learning Power

Using pre-service primary school teachers' learning power as the dependent variable, a univariate analysis was conducted. The results indicated that learning power scores were significantly associated with gender, age, grade, place of residence, type of school, academic performance, experience as a student leader, father’s education level, mother’s education level, father’s occupation, mother’s occupation, and economic status. Details are presented in Table 3.

Table 3
Results of Univariate Analysis on Factors Influencing Pre-service Primary School Teachers' Learning Power

Variables	Learning Power	
	Statistic	P
Gender	-3.618	< 0.001
Age	0.122	< 0.001
Grade	50.803	< 0.001
Place of residence	3.637	< 0.001
Type of school	4.304	< 0.001
Academic performance	19.094	< 0.001
Experience as a student leader	4.388	< 0.001
Father’s education level	93.190	< 0.001
Mother’s education level	57.040	< 0.001
Father’s occupation	2.291	0.025
Mother’s occupation	6.194	< 0.001
Economic status	32.303	< 0.001
Only child status	0.754	0.452

Furthermore, based on the correlation analysis among variables and the univariate analysis of influencing factors on pre-service primary school teachers' learning power, a multivariate logistic regression analysis was conducted. The results revealed that active coping with negative public opinion, perceived social support, gender, age, grade, type of school, experience as a student leader, father’s education level, mother’s education level, father’s occupation, and mother’s occupation were identified as significant influencing factors of learning power. Details are presented in Table 4.

Table 4
Results of Multivariate Analysis on Factors Influencing Pre-service Primary School Teachers' Learning Power

Variables	B	SE	β	t	P	Confidence Interval	
						Lower Limit	Upper Limit
Constant	149.518	19.029	-	7.857	< 0.001	112.179	186.857
Active coping with negative public opinion	5.421	0.413	0.289	13.134	< 0.001	4.611	6.231
Perceived social support	1.394	0.054	0.614	25.674	< 0.001	1.288	1.501
Gender	9.127	2.162	0.102	4.222	< 0.001	4.885	13.369
Age	-2.187	0.812	-0.132	-2.693	0.007	-3.780	-0.593
Grade	3.508	0.998	0.171	3.515	< 0.001	1.549	5.466
Place of residence	1.064	1.322	0.020	0.805	0.421	-1.530	3.659
Type of school	-12.845	1.219	-0.235	-10.534	< 0.001	-15.238	-10.452
Academic performance	-0.277	0.877	-0.007	-0.315	0.752	-1.998	1.445
Experience as a student leader	-10.573	1.235	-0.200	-8.560	< 0.001	-12.997	-8.150
Father’s education level	4.861	2.290	0.067	2.122	0.034	0.367	9.355
Mother’s education level	-9.148	2.002	-0.145	-4.569	< 0.001	-13.076	-5.220
Father’s occupation	12.397	2.698	0.121	4.595	< 0.001	7.103	17.691
Mother’s occupation	-22.353	3.438	-0.156	-6.501	< 0.001	-29.100	-15.606
Economic status	1.343	1.232	0.028	1.090	0.276	-1.074	3.760

3.5 Mediation Effect Analysis

To further examine the mediating role of perceived social support in the relationship between active coping with negative public opinion and learning power, a mediation analysis was conducted using Hayes' [32] PROCESS macro, based on the significant correlations among these variables. The results

are presented in Table 5 and Fig. 2. Active coping with negative public opinion significantly positively predicted learning power (β = 0.33, p < 0.001) and significantly positively predicted perceived social support (β = 0.44, p < 0.001). Perceived social support, in turn, significantly positively predicted learning power (β = 0.33, p < 0.001). The mediation analysis revealed that the indirect effect of perceived social support was 0.870, accounting for 13.07% of the total effect. Bootstrap results indicated that the 95% confidence interval for this mediation effect was (0.209, 1.617), excluding zero, which confirms that the mediation effect was statistically significant.

Table 5
Test of the Mediating Role of Perceived Social Support between Active Coping with Negative Public Opinion and Learning Power

Path	**β**	**SE**	**t**	**95%CI**
Active coping with negative public opinion → Learning power	5.785	0.434	13.331*	(4.934, 6.637)
Active coping with negative public opinion → Perceived social support	0.697	0.250	2.788*	(0.207, 1.188)
Perceived social support → Learning power	1.248	0.053	23.729*	(1.145, 1.351)
Indirect effect	0.870	0.353		(0.209, 1.617)
Note: *p < 0.05				

4 Discussion

As a crucial reserve force in the compulsory education teaching system, pre-service primary school teachers play a significant role in promoting the well-ordered development of basic education. This study, focusing on pre-service primary school teachers, systematically examined the impact mechanism of active coping with negative public opinion on their learning power, with particular emphasis on revealing the mediating role of perceived social support in this relationship.

4.1 Uneven Development Across Dimensions of Pre-Service Primary Teachers' Learning Power

The results indicate that the mean scores of second-tier dimensions under each first-tier dimension of pre-service primary teachers' learning power were generally above 3.69, exceeding the theoretical mean value of 3, reflecting an overall favorable performance. Among these, professional competence demonstrated the most prominent advantage, while thinking characteristics remained relatively underdeveloped. The small standard deviations across all second-tier dimensions suggest limited score fluctuations, indicating good data stability and consistency in performance across indicators.

However, the scores across the dimensions of learning power were uneven. The highest mean score (professional ethics) exceeded the lowest (impact effect) by 11.38%. Therefore, in the process of fostering learning power, comprehensive development of all indicators should be emphasized to prevent a "broken window effect" [33], which could lead to conflicts between vertical coherence and horizontal transferability of development indicators, thereby hindering the improvement of learning power.

First, building on the strength in professional competence, learning objectives and direction should be anchored. For example, using career planning as a guide to clarify learning priorities, and aligning learning goals with professional values such as responsibility and service awareness to strengthen the connection between "service awareness" and learning content. Second, focusing on personal traits and basic abilities, the management of the learning process should be enhanced. This includes improving self-control and learning concentration, and leveraging advantages in "psychological adaptation" to employ positive psychological cues [34] (e.g., "accumulation of phased achievements") to adjust one's state when encountering learning bottlenecks, thereby avoiding attrition. Third, addressing the shortcomings in thinking characteristics, the depth and innovativeness of learning should be deepened. This involves strengthening critical thinking to avoid passive acceptance and fostering dialectical analysis skills; integrating knowledge across domains to stimulate innovative thinking and establish a personal knowledge system, thereby identifying new application scenarios during integration and enhancing knowledge transferability.

Finally, continuous feedback and iteration should be implemented to form a closed-loop learning process. This includes conducting regular reviews and timely adjusting learning content, as well as utilizing external evaluations to effectively address weaknesses in dimensions such as "basic knowledge and skills" and "applied knowledge and skills."

4.2 The Enhancement of Learning Power in Pre-service Primary Teachers Results from the Interaction of Multiple Factors

The improvement of pre-service primary teachers' learning power is characterized by plurality and variability [35], arising from the combined effects of individual characteristics (e.g., age, gender), institutional factors (e.g., type of school), role-related features (e.g., experience as a student leader), and family background (e.g., parental occupations, mother's education level, household economic status). Core influencing variables include social support, school environment, family background (parental occupation and education), individual roles (student leadership), and demographic attributes (grade level, age, gender). Among these, perceived social support emerged as the most influential factor. Conversely, factors traditionally regarded as pivotal—such as place of residence, academic performance, and economic conditions—did not demonstrate significant effects. These findings provide clear intervention directions for targeted enhancement of pre-service teachers' learning power. Efforts should focus on reinforcing positive factors (e.g., social support, progression through grade levels) and mitigating negative influences (e.g., role conflict, family pressure). A collaborative approach involving schools, families, and society is essential to constructing a tailored developmental system.

Specifically, perceived social support and active coping with negative public opinion are identified as core facilitating factors of learning power. Relevant studies indicate that the more individuals perceive social support (such as family encouragement, school assistance, and peer collaboration), the stronger their sense of responsibility, identity, and self-worth becomes [36]. This enhances psychological capital conducive to individual competition and motivation [37], thereby strengthening learning power. Active coping with negative public opinion reflects an individual's proactive attitude toward adverse events, indirectly stimulating motivation for learning. Based on these findings, the following approaches are recommended to foster learning power:

First, strengthen the social support system to solidify the foundation of learning power. For example: Establish a dual support mechanism involving both mentors and peers, pairing pre-service teachers with professional mentors who provide regular guidance on learning planning. Increase emotional support through various activities such as interactive lectures. Collaborate with primary schools and compulsory education institutions to offer practical support, enhancing pre-service teachers' professional identity and learning motivation. Second, promote the positive transformation of emotional pressure caused by negative public opinion. This can be achieved by: Offering courses on "Public Opinion Response and Emotional Management" to help students rationally and positively perceive negative social events and comments. Guiding students to convert pressure into motivation for improving professional competencies.

Grade level was identified as a positive influencing factor, indicating that as professional knowledge deepens and practical experience accumulates, learning power gradually strengthens. In contrast, age was found to be a negative factor, suggesting that older pre-service teachers may experience a decline in learning adaptability and concentration, thereby reducing learning power. Therefore, educational authorities should design stage-specific learning power development programs: for lower grades, focus on "cultivating learning habits"; for higher grades, emphasize "deep learning capabilities". For older students, offer "personalized learning pathways" that incorporate their prior experience into practice-oriented courses to mitigate age-related adaptive pressure.

Father's occupation, father's education level, and female gender were positive predictors. A stable father's occupation and higher educational attainment can provide more learning resources or role models, indirectly enhancing learning power by fostering a supportive family learning environment. Hence, encouraging fathers to engage in their children's educational planning and leveraging highly educated fathers as mentors [38] can effectively improve learning outcomes. Additionally, female students demonstrated stronger learning power, likely due to greater learning engagement and meticulousness. Implementing "gender-complementary learning" through mixed-gender study groups could facilitate mutual skill development.

School type and serving as a student leader were negative factors, possibly related to disparities in school resources, teaching quality, and learning environments. It is essential to optimize school conditions and resource allocation, increasing support to under-resourced schools—for instance, by

standardizing curricula and establishing partnerships with high-performing schools for resource sharing (e.g., initiatives like China's "MOOCs Westward Program"). These measures can enhance the practicality of learning power development. The negative impact of student leadership may stem from time conflicts; thus, improving role management strategies is necessary to prevent administrative duties from encroaching on learning time.

Notably, mother's occupation was a negative factor, contrasting sharply with the positive role of father's occupation. This may be attributed to high occupational demands reducing maternal availability or increasing stress, which adversely affects children's learning. Higher maternal education might correlate with stricter parenting styles and elevated expectations, potentially increasing learning anxiety [38]. This phenomenon may also reflect traditional maternal roles within the family in certain social contexts. Therefore, tailored approaches are needed: offering family education workshops to help mothers adjust parenting approaches (e.g., reducing overprotection and avoiding transference of occupational stress) and providing additional academic support to students whose mothers have high-intensity jobs.

4.3 Perceived Social Support Plays a Partial Mediating Role Between Active Coping with Negative Public Opinion and Learning Power

The study found that active coping with negative public opinion significantly and positively predicts learning power among pre-service primary school teachers, supporting Hypothesis I. This is consistent with cognitive stress theory, which suggests that negative public opinion, as a stressor, may lead to self-doubt and professional anxiety among teachers, thereby undermining their motivation and capacity for learning. In particular, amplified coverage of individual incidents in public discourse may shake teachers' professional confidence and affect their engagement in specialized learning.

Perceived social support significantly and positively predicted learning power and played a partial mediating role between active coping with negative public opinion and learning power. The mediation effect accounted for 13.07% of the total effect, with a 95% confidence interval of (0.209, 1.617), supporting Hypothesis II and Hypothesis III. This finding offers a new perspective for understanding the "paradox of public opinion pressure" in teacher professional development—that is, the internal mechanism underlying significant differences in individual learning power within the same environment of public opinion. This aligns with previous research [39–41]. Studies on the social support buffering model reveal that support from family, friends, and colleagues can help individuals cope with stress and maintain a positive psychological state. When pre-service teachers perceive sufficient social support, they are better able to regulate negative emotions and buffer stress [42], resist the impact of negative public opinion, and sustain their learning enthusiasm and capacity development.

Based on these results, relevant educational departments should strengthen positive publicity and foster a social atmosphere that respects teachers and values education, thereby reducing the spread of misinformation and negative discourse. Teacher training institutions should establish a multi-level social support system, including mentorship, peer assistance, and psychological counseling, to enhance pre-service teachers' perception of social support. Furthermore, resilience training should be incorporated

into the educational curriculum to help pre-service teachers develop positive stress-coping mechanisms [43, 44], thereby effectively promoting the steady improvement of learning power.

Limitations and Future Directions

First, the sample data in this study were collected from only six higher education institutions in Shandong Province, which may entail certain issues of regional homogeneity. Furthermore, the measurement of public opinion coping relied predominantly on static cross-sectional data, which failed to capture the dynamic influence of the “public opinion lifecycle”—such as not thoroughly accounting for the attenuation curve of hotspot events. Therefore, in subsequent research, we will continue to refine the sampling strategy by expanding both the geographic regions and higher education institutions included. In terms of dynamic monitoring, we will appropriately incorporate public opinion big data analysis technologies to achieve real-time quantification of active coping with public opinion, thereby advancing teacher development research toward greater precision and interdisciplinary integration.

Declarations

Conflicts of Interest

The authors declare no conflicts of interest.

Ethical Approval

The study involving human participants was reviewed and approved by the Ethics Committee of Weifang Medical University (Weifang Medical University was renamed Shandong Second Medical University in December 2023). Consent that was obtained from all of the participants was informed.

Funding

The authors declare that they received financial support for the research, authorship, and publication of this article. This study was funded by the China Association of Higher Education (Grant No. 23PG0411), the Medical Education Research Center (Grant No. YJKT202126), the Education and Teaching Research Project of Weifang Medical University (now known as Shandong Second Medical University) (Grant No. 2023YJS009), and the Shandong Education Planning Project (Grant No. 2023ZC168).

Author Contribution

M.L. conceived the study, developed the methodology, and supervised the research. H.A. performed the investigation, conducted formal analysis, and wrote the original draft. Both authors contributed to data interpretation, reviewed, and approved the final manuscript.

Data Availability

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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Figures

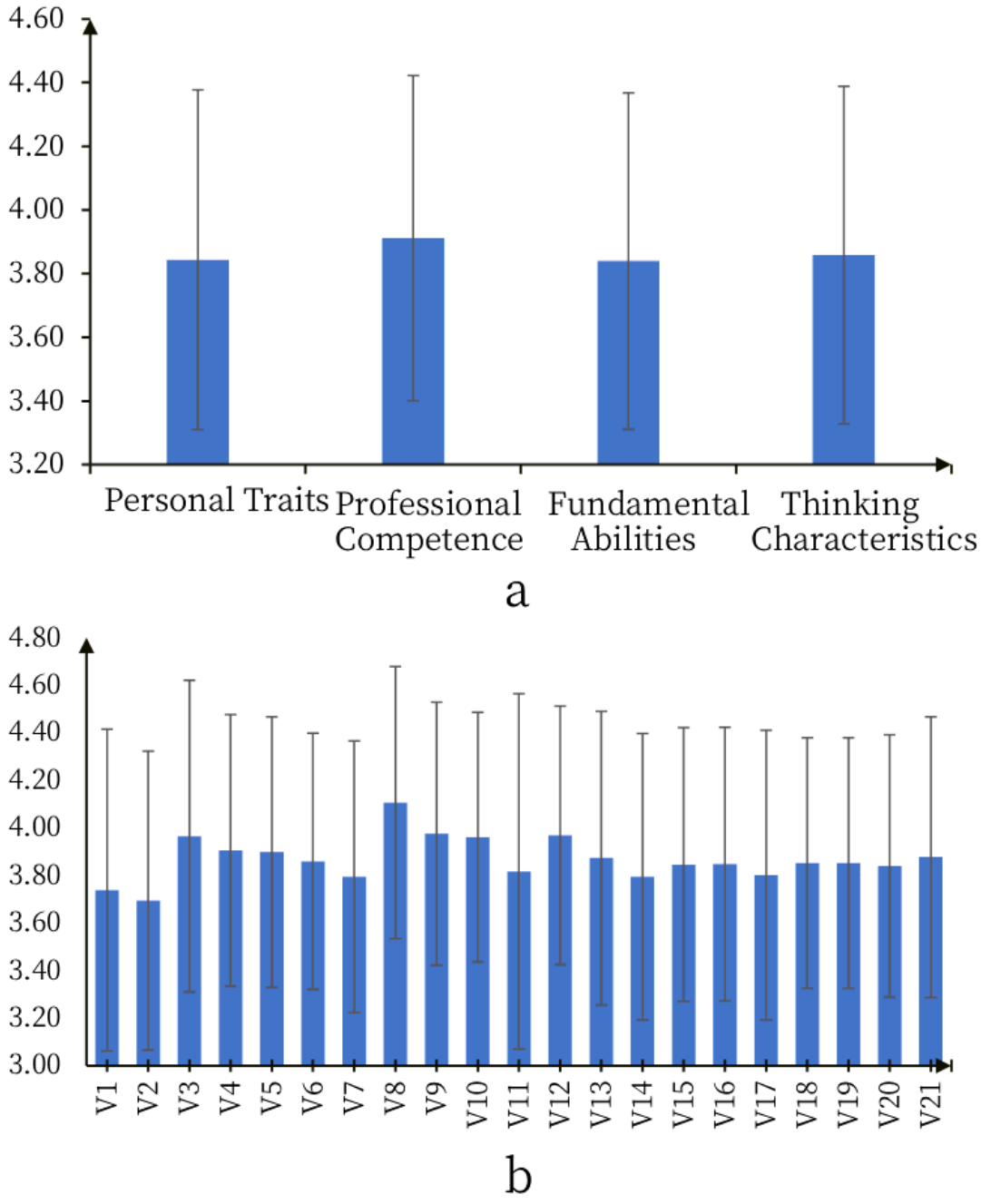


Figure 1

Score Distribution Across Dimensions of Pre-service Primary School Teachers' Learning Power. (a) First-level Dimensions (b)Second-level Dimensions

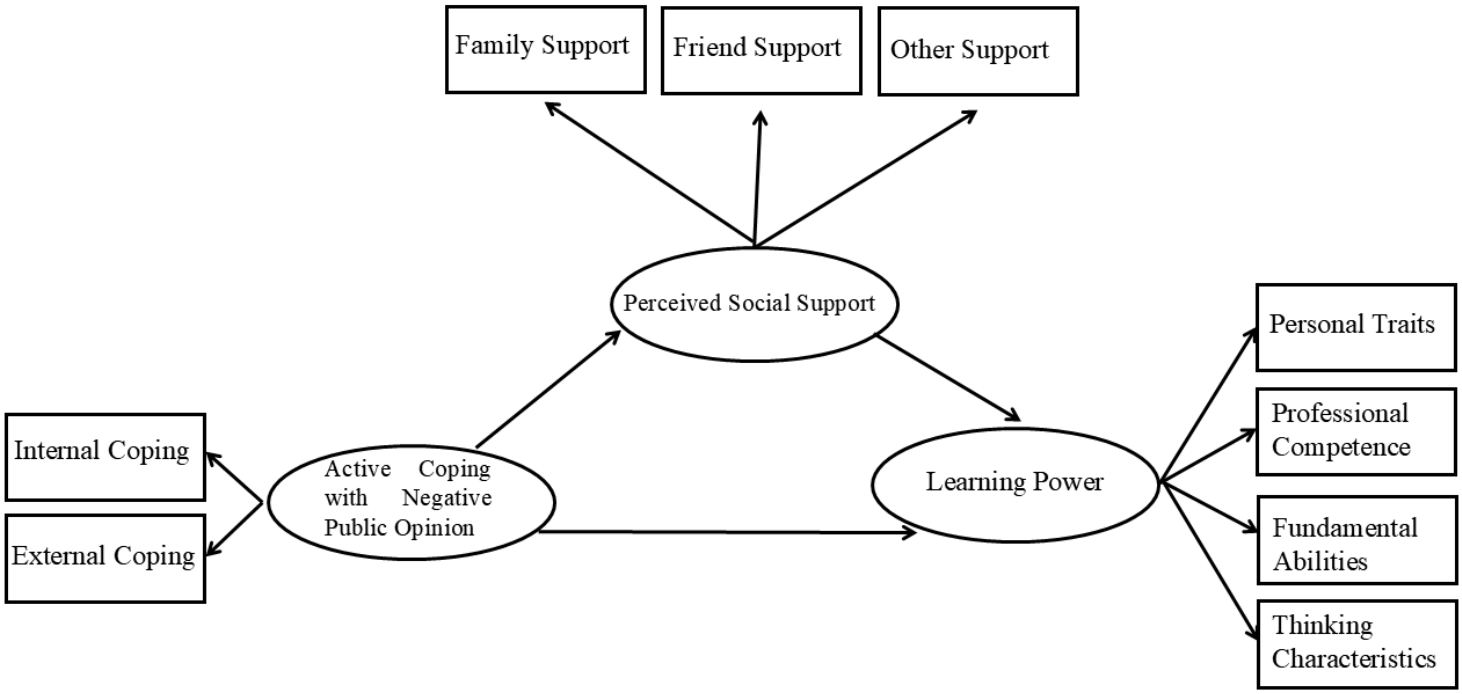


Figure 2

Mediation Model of Pre-service Primary School Teachers