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Stress management factors affecting the effectiveness for physical teachers' performance of secondary school in Changsha city

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Abstract: Amid intensified educational reforms in China, secondary school PE teachers face rising workloads and stress, affecting teaching effectiveness. This study investigated stress management factors, performance effectiveness, and their relationship among 474 secondary school PE teachers in Changsha using a mixed-methods design. The increasing attention to stress management in education has highlighted its impact on teacher performance effectiveness, especially for physical education teachers in high-stress contexts. Quantitative analysis showed a moderate overall stress management level (M = 3.43/5), with strengths in cognitive evaluation (M = 3.58) and emotional state stability (M = 3.47), but lower scores in plan implementation (M = 3.33) and problem identification (M = 3.41). Regression analysis identified cognitive evaluation ($\beta = 0.27$, $p < 0.001$) and plan implementation ($\beta = 0.18$, $p < 0.001$) as significant predictors, explaining 63% of the variance in performance effectiveness. The integration of stress management into professional development and school policies can create a supportive culture that enhances teacher effectiveness and student outcomes. Qualitative interviews highlighted challenges such as heavy administrative workloads, limited institutional support, and variability in emotional regulation skills, indicating the need for targeted support. The study recommends localized stress management systems, continuous professional development focusing on practical stress management and emotional regulation, and performance evaluation frameworks incorporating stress management indicators. These measures align with China's education modernization policies, aiming to integrate stress management into efforts to enhance PE teaching effectiveness and teacher well-being in Changsha's secondary schools.

Keywords: *Performance effectiveness, Physical education teachers, Stress management.*

1. Introduction

In the contemporary educational landscape, the increasing focus on educational reform and student well-being in China has highlighted stress management among physical education teachers as a crucial factor for enhancing teaching effectiveness. Stress management, encompassing strategies such as problem-solving, positive mindset, support-seeking, and emotional regulation, has gained significant traction in recent years due to its role in improving teachers' performance and reducing burnout [1]. This modality leverages personal coping mechanisms and institutional support systems to create a healthier, more productive teaching environment. However, the effective implementation of stress management strategies necessitates robust academic administration frameworks. Despite its potential, stress management faces challenges such as heavy workloads, inadequate support systems, and inconsistent policy implementation. These issues highlight the need for comprehensive administrative strategies that can optimize resource allocation, enhance professional development, and ensure equitable support for teachers to improve their performance and support student development through physical education [2].

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2. Research Objectives

1. To study the stress management factors of secondary school PE teachers in Changsha City.

2. To study the effectiveness level of physical education teachers' performance in Changsha City.

3. To study the relationship between physical stress management factors and teacher performance effectiveness in secondary schools in Changsha City.

4. To explore the stress management factors affecting the performance of physical education teachers in secondary schools in Changsha City.

5.To provide guidance for developing the effectiveness of physical education teachers' performance in secondary schools in Changsha City.

3. Scope of the Research

The research area covers 58 public junior secondary schools in Changsha City, Hunan Province, during 2024. Changsha, the capital of Hunan Province, is a key educational and cultural hub in China. Variables include factors affecting stress management and performance effectiveness of PE teachers. The study population consists of approximately 1,289 physical education teachers, with a sample of 474 teachers. Semi-structured interviews target experienced PE teachers and school administrators in Changsha, focusing on their insights into stress management and teaching effectiveness.

4. Literature Review

The increasing attention to stress management in education has highlighted its impact on teacher performance effectiveness, especially for physical education teachers in high-stress contexts. Effective stress management strategies, including problem-solving, positive mindset, support-seeking, and emotional regulation, have shown significant positive correlations with teacher performance effectiveness, while avoidance and procrastination negatively affect outcomes. This aligns with previous research indicating that effective stress management enhances teachers' coping ability and well-being, leading to improved teaching outcomes [3, 4]. Additionally, leadership and supportive school environments play a crucial role in facilitating stress management practices, supporting emotional stability, and fostering proactive coping strategies [3, 5].

Research has also emphasized the role of systematic and adaptive coping strategies in improving teacher performance and reducing burnout. Moreover, the integration of stress management into professional development and school policies can create a supportive culture that enhances teacher effectiveness and student outcomes [6, 7]. The literature collectively underscores that stress management, resource allocation, supportive leadership, and effective coping strategies are pivotal in shaping teacher performance effectiveness in high-demand educational environments. These factors not only directly influence teachers' performance and well-being but also indirectly enhance student outcomes through improved instructional quality and teacher resilience.

4.1. Conceptual Framework

According to the literature review and interview feedback, the researchers found that stress management factors cover eight dimensions: timeliness of problem identification, relevance of solutions, plan implementation, cognitive evaluation, emotional state stability, resilience in teaching difficulties, supported frequency, and diverse support actions. The performance effectiveness of PE teachers covers four dimensions: teaching preparation effectiveness, teaching implementation effectiveness, teaching reflection effectiveness, and teaching development effectiveness.

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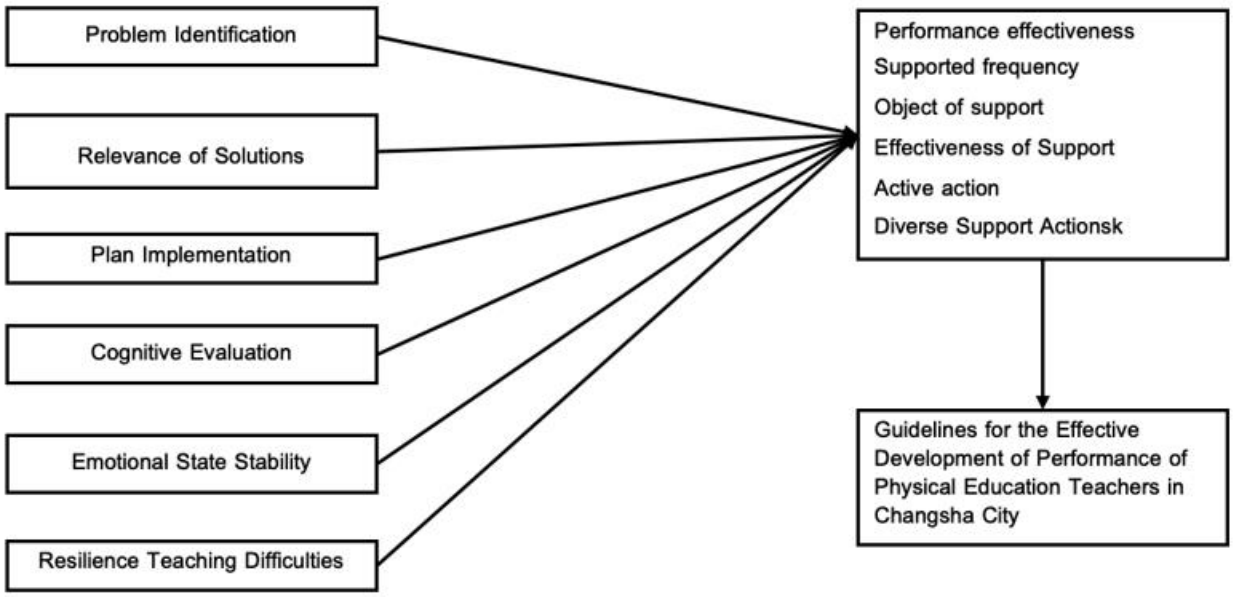

Figure 1.
Conceptual framework.

5. Methodology

5.1. Population and Sample

(1) Population used in the research

The population used in this research consisted of physical education (PE) teachers in public junior secondary schools in Changsha City, Hunan Province. As of March 2024, there are a total of 58 public junior secondary schools in Changsha City.

(2) The sample used in the research

The sample group used included PE teachers from public junior secondary schools in Changsha City. The researcher determined the sample size using the Krejcie and Morgan [8] sample size table to ensure representativeness and statistical validity.

(3) Research respondents

The researcher assigned 3–4 respondents per school, consisting of PE teachers with varying seniority, for a total of 474 respondents. The selection was conducted using stratified random sampling to ensure coverage across gender, age, education level, and years of teaching.

(4) Key informants in the focus group

The interview samples for this study include 9 educational administrators and teachers.

5.2. Research Tools

The research tools used in this study included a self-developed questionnaire and semi-structured interviews. The questionnaire was designed based on literature reviews and expert consultations, aiming to collect quantitative data on the stress management factors affecting the performance effectiveness of physical education teachers in secondary schools in Changsha City. It covered aspects such as Problem Identification, Relevance of Solutions, Plan Implementation, Cognitive Evaluation, Emotional State Stability, Resilience in Teaching Difficulties, Supported Frequency, Object of Support,

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Effectiveness of Support, Active Action, and Diverse Support Actions. The semi-structured interviews were used to gather qualitative insights, allowing for a deeper understanding of the factors influencing stress management and performance effectiveness among PE teachers. Both tools underwent rigorous development processes, including pre-testing and expert validation, to ensure their reliability and validity for achieving the research objectives.

5.3. Data Collection

The data for this research was collected through a mixed-methods approach, combining both quantitative and qualitative methods. The primary data collection involved semi-structured interviews with secondary school physical education teachers and sports administrators in Changsha City, using an interview outline developed and validated by experts. The secondary data collection method was a questionnaire survey targeting physical education teachers in public secondary schools in Changsha City in 2024. The sample group consisted of 474 respondents selected using stratified sampling to ensure diversity in gender, age, educational background, and teaching experience. The questionnaire covered key aspects such as stress management factors and performance effectiveness, designed to measure factors influencing stress management and its impact on PE teacher performance. Both the interview and questionnaire data were analyzed to provide comprehensive insights into stress management factors affecting the performance effectiveness of physical education teachers in secondary schools in Changsha City.

5.4. Data Analysis

The data analysis process in this research employed a mixed-methods approach to investigate the stress management factors affecting the performance effectiveness of physical education teachers in secondary schools in Changsha City. Quantitative data were analyzed using descriptive statistics, Pearson correlation analysis, and stepwise regression to identify significant relationships and predictive variables. Qualitative data obtained through semi-structured interviews with PE teachers and administrators were coded and thematically analyzed to enrich the quantitative findings with contextual insights. The analysis aimed to assess the reliability and validity of the research instruments, examine the direct and indirect effects of stress management factors on teacher performance effectiveness, and test the proposed hypotheses. This comprehensive analytical approach ensured a thorough understanding of the factors influencing PE teachers' performance effectiveness and provided a robust foundation for drawing evidence-based conclusions and recommendations.

6. Results

This section systematically analyzed the demographic characteristics of 500 physical education teachers and administrators at Changsha High School, and a total of 474 valid questionnaires were collected, with a recovery rate of 94.8%. The aim was to explore the impact of these characteristics on stress management and work performance. Table 1 shows the distribution of respondents in terms of gender, age, educational background, and work experience, providing a basic understanding of the sample.

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Table 1.
Demographic Characteristics of Respondents

Questions	Options	Quantity	Percentage (%)
Gender	Male	300	63.30
	Female	174	36.70
Age	Under 25 years old	50	10.50
	25–29 years old	100	21.10
	30–39 years old	200	42.20
	40–49 years old	100	21.10
	Above 49 years old	24	5.10
Highest education	Bachelor's degree	300	63.30
	Master's degree	150	31.60
	Doctoral degree	20	4.20
	Postdoctoral appointment	4	0.90
Work experience	Under 5 years	50	10.50
	5–10 years	150	31.60
	11–15 years	150	31.60
	16–20 years	80	16.90
	Above 20 years	44	9.30

Table 1 the gender distribution indicates that male teachers constitute 63.3% of the sample, while female teachers account for 36.7%, reflecting a significant male dominance. This distribution may relate to traditional perceptions of physical education requiring higher physical stamina and historical occupational role expectations. In terms of age, the 30–39 age group represents the largest proportion (42.2%), forming the core of the teaching staff and balancing professional experience with vitality. The 25–29 and 40–49 age groups each account for 21.1%, serving as supporting echelons, while teachers above 49 years old represent only 5.1%, potentially indicating their concentration in administrative or advisory roles.

Table 2.
The Degree of Impact of Stress Management Factors on Performance Effectiveness.

Dimensions	Mean (M)	Standard Deviation (S.D.)	Interpretation	Ranking
Problem Identification	3.41	0.68	Moderate	3
Relevance of Solutions	3.38	0.69	Moderate	4
Pan Implementation	3.33	0.75	Moderate	5
Cognitive Evaluation	3.58	0.69	Moderate	1
Emotional State Stability	3.47	0.73	Moderate	2
Resilience Teaching Difficulties	3.41	0.76	Moderate	3
Overall	3.43	0.71	Moderate	–

Table 2 shows that stress management among secondary school PE teachers in Changsha City were at a moderate level (M = 3.43, SD = 0.71). Among the dimensions, cognitive evaluation scored the highest (M = 3.58, SD = 0.69), followed by emotional state stability (M = 3.47, SD = 0.73). Problem identification and resilience in teaching difficulties shared the same mean score (M = 3.41), ranking third, while relevance of solutions ranked fourth (M = 3.38, SD = 0.69), and plan implementation ranked lowest among the dimensions (M = 3.33, SD = 0.75). These findings suggest that while PE teachers demonstrate moderate levels across stress management factors, there is variability in the

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emphasis placed on cognitive processing and emotional stability compared to the implementation and solution relevance aspects of stress management.

Table 3.
Performance effectiveness.

Dimensions	Mean (M)	Standard Deviation (S.D.)	Interpretation	Ranking
Supported frequency	3.47	0.72	Moderate	3
Object of support	3.19	0.83	Moderate	5
Effectiveness of Support	3.54	0.70	Moderate	1
Active action	3.38	0.75	Moderate	4
Diverse Support Actions	3.51	0.69	Moderate	2
Overall	3.41	0.38	Moderate	-

Table 3 indicates that with an overall mean of 3.41 (S.D. = 0.38). Among the dimensions, Effectiveness of Support ranked highest (M = 3.54, S.D. = 0.70), followed by Diverse Support Actions and Supported Frequency. Object of Support received the lowest mean score (M = 3.19, S.D. = 0.83), suggesting it as a relative area for improvement. The findings highlight a generally positive but moderate perception of support effectiveness and diversity, while indicating opportunities to strengthen clarity regarding the object of support and the promotion of active action among participants.

Table 4.
Pearson Correlation Coefficient between Stress Management Factors and Performance Effectiveness.

Variables	X1	X2	X3	X4	X5	X6	Ytot	Relationship Level
X1	1.000						0.68	HIGH
X2	0.427***	1.000					0.72	HIGH
X3	0.378***	0.332***	1.000				0.55	HIGH
X4	0.521***	0.518***	0.447***	1.000			0.49	MODERATE
X5	0.436***	0.448***	0.385***	0.447***	1.000		0.66	HIGH
X6	0.472***	0.483***	0.409***	0.518***	0.483***	1.000	0.60	HIGH

Note: ***< 0.001.

Table 4 presents the Pearson correlation coefficients examining the relationships between academic administration factors (X1–X6) and learning outcomes (Ytot). All correlations with Ytot are statistically significant ($p<0.001$ $p<0.001$).Among the factors, Relevance of Solutions (X2) shows the highest correlation with learning outcomes (r = 0.72, HIGH), followed by Problem Identification (X1, r = 0.68, HIGH) and Emotional State Stability (X5, r = 0.66, HIGH), indicating these factors are strongly associated with improved learning outcomes. Resilience in Teaching Difficulties (X6) and Plan Implementation (X3) also demonstrate high correlations (r = 0.60 and 0.55, respectively), underscoring their relevance in supporting student learning. Cognitive Evaluation (X4) shows a moderate correlation with learning outcomes (r = 0.49), suggesting a meaningful but relatively lower direct association compared to other factors.

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Table 5.
Stepwise Regression Model for Stress Management.

Model	Predictors	R^2	Adjusted R^2	p-Value
1	X5	0.462	0.460	<0.001
2	X5, X3	0.578	0.575	<0.001
3	X5, X3, X1	0.635	0.631	<0.001
4	X5, X3, X1, X2	0.689	0.684	<0.001
5	X5, X3, X1, X2, X4	0.723	0.717	<0.001
6	X5, X3, X1, X2, X4, X6	0.751	0.744	<0.001
7	All variables	0.650	0.640	<0.001

Table 5 presents the results of stepwise regression analyses examining the predictive power of academic administration factors on learning outcomes. All models are statistically significant at $p<0.001$ $p<0.001$. In Model 1, Emotional State Stability (X5) alone explains 46.2% of the variance in learning outcomes ($R^2 = 0.462$), indicating it as a strong individual predictor. Adding Plan Implementation (X3) in Model 2 increases the explained variance to 57.8% ($R^2 = 0.578$) demonstrating its significant additional contribution. Model 3 includes Problem Identification (X1), further increasing the explained variance to 63.5% ($R^2 = 0.635$). With the addition of Relevance of Solutions (X2) in Model 4, the model's predictive power rises to 68.9% ($R^2 = 0.689$). Model 5 adds Cognitive Evaluation (X4), raising the explained variance to 72.3% ($R^2 = 0.723$), highlighting its meaningful contribution. Including Resilience in Teaching Difficulties (X6) in Model 6 results in the highest explained variance of 75.1% ($R^2 = 0.751$), underscoring its importance in predicting learning outcomes. Interestingly, when all variables are included simultaneously in Model 7, the explained variance decreases to 65.0% ($R^2 = 0.650$), suggesting potential multicollinearity or overlapping effects among predictors.

Expert interviews identified key disparities in PE stress management and support systems. Rural schools face persistent equipment shortages and space constraints, limiting practical skill instruction and increasing teacher workload. Experts noted that proactive support seeking—such as inter-school equipment swaps and rapid consultation with policy experts—significantly improves problem resolution efficiency, with cases reporting 80% faster curriculum alignment and 90% increases in team collaboration through structured cross-school networks.

Faculty interviews highlighted that formal stress management training remains insufficient, with many teachers relying on ad-hoc strategies. While emotional resilience and proactive problem identification are present, consistent plan implementation is hindered by systemic limitations such as unclear policies and resource gaps. Teachers who employed bi-weekly evaluations, stakeholder engagement (e.g., parent-teacher meetings), and adaptive plans reported higher persistence and reduced attrition in programs, exemplified by an 85% sustained participation rate in a 12-week swimming program. The need for integrated formative assessment systems was emphasized, as current reliance on summative evaluations limits responsive teaching adjustments. Teachers recommended embedding AI-based progress tracking and collaborative peer evaluations to enhance real-time feedback and motivation.

6.1. Reflection

The reflection on this research underscores the nuanced relationship between stress management factors and the performance effectiveness of secondary school PE teachers in Changsha City, while also highlighting methodological rigor and contextual limitations. Utilizing a mixed-methods approach, this

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study integrated quantitative data from structured questionnaires administered to PE teachers (n=474) and qualitative insights from expert interviews, enabling a comprehensive understanding of stress management within educational practice.

The quantitative findings revealed moderate overall levels of stress management factors (M=3.43, SD=0.71), with cognitive evaluation (M=3.58) and emotional state stability (M=3.47) ranking highest, suggesting that teachers prioritize cognitive appraisal and emotional regulation in managing professional challenges. Conversely, plan implementation (M=3.33) and relevance of solutions (M=3.38) scored lower, indicating areas where teachers may face practical difficulties in translating coping strategies into effective action plans. Performance effectiveness was also assessed at a moderate level, indicating that while teachers actively engage in managing stress, these efforts are variably translated into tangible performance outcomes.

Methodologically, the research achieved high reliability of measurement tools and utilized stepwise regression to analyze the predictive capacity of stress management dimensions on performance effectiveness, ensuring robust analytical grounding. However, reliance on self-reported measures may introduce subjectivity and social desirability bias, potentially affecting the perceived levels of stress management and performance effectiveness.

Contextually, the findings are deeply rooted in the evolving educational landscape of China, where education reforms and heightened expectations have increased the workload and psychological pressure on PE teachers. The study's insights emphasize the need for structured professional development, supportive school environments, and clear performance evaluation guidelines to mitigate stress and enhance teachers' functional effectiveness.

Overall, this research contributes empirical evidence to the field of educational administration and teacher well-being, emphasizing that comprehensive stress management not only supports teachers' mental health but is also integral to improving educational outcomes in secondary school physical education contexts.

6.2. Consistent

The consistency of the research instruments and findings in this study was examined using reliability analysis and cross-validation with qualitative data to ensure methodological rigor. The quantitative instrument, the Stress Management and Performance Effectiveness Questionnaire of PE Teachers in Changsha, demonstrated high internal consistency, with Cronbach's alpha values for all dimensions exceeding 0.80, indicating strong reliability across constructs such as problem identification, relevance of solutions, plan implementation, cognitive evaluation, emotional state stability, and resilience in teaching difficulties.

Descriptive statistical analysis revealed that all dimensions of stress management among PE teachers in Changsha were at a moderate level (M = 3.43, SD = 0.71). Cognitive evaluation scored the highest (M = 3.58, SD = 0.69), followed by emotional state stability (M = 3.47, SD = 0.73), indicating consistent perceptions among teachers regarding their cognitive processing and emotional regulation when managing stress. Lower scores in plan implementation (M = 3.33, SD = 0.75) and relevance of solutions (M = 3.38, SD = 0.69) suggest areas requiring further development in practical application and solution alignment under stress conditions.

Triangulation with qualitative data from semi-structured interviews with PE teachers and administrators provided contextual validation of the quantitative results, reinforcing the moderate level

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of stress management across the dimensions while highlighting practical challenges in implementing planned coping strategies within constrained school environments. This alignment between quantitative and qualitative findings confirms the consistency and credibility of the research data, providing a robust foundation for further analysis of the relationship between stress management factors and performance effectiveness among secondary school PE teachers in Changsha.

The study's objectives were met through a comprehensive analysis: (1) Stress management among PE teachers in Changsha secondary schools operated at a moderate level, with Problem Identification and Emotional Regulation as relative strengths; (2) Teaching performance effectiveness was moderate, with Classroom Atmosphere and Problem-Solving showing stronger outcomes; (3) Strong positive correlations existed between stress management strategies and teaching performance, particularly for Problem-Solving, Positive Mindset, and Support-Seeking behaviors; (4) Cognitive Evaluation, Emotional State Stability, and Proactive Support-Seeking were identified as key influencers of teaching effectiveness; and (5) A multidimensional improvement guideline was developed, emphasizing targeted professional development, systematic support structures, and context-sensitive evaluation frameworks.

Practically, these findings call for systemic reforms. First, schools should implement structured multi-method problem identification systems, including real-time feedback and observation data, to capture and address stressors proactively. Second, professional development programs should prioritize stress management and problem-solving skills, incorporating incentives like professional recognition and career progression to encourage participation. Third, institutional policies should reduce administrative burdens while promoting collaborative networks, ensuring that PE teachers can access interdisciplinary and community-based support systems.

Theoretical contributions include validating the relevance of the transactional stress theory and self-efficacy frameworks within the PE teaching context. The study extends existing literature by emphasizing the multidimensional nature of stress management—cognitive, emotional, and behavioral—in enhancing instructional effectiveness, and highlights the need for discipline-specific, contextually sensitive models to address PE teachers' unique challenges.

Future research should address limitations by expanding samples to include rural and private schools, employing longitudinal designs to capture the dynamics between stress management and teaching effectiveness over time, and examining the role of policy reforms and institutional culture in shaping stress experiences and coping behaviors among PE teachers. Additionally, testing the effectiveness of the proposed improvement guidelines through action research cycles could refine best practices for policy and school-level implementation.

7. Conclusion

The study employed a mixed-methods approach to comprehensively examine stress management factors affecting the performance effectiveness of secondary school PE teachers in Changsha City. Quantitative findings indicated that overall stress management among teachers was at a moderate level ($M = 3.43$, $SD = 0.71$), with cognitive evaluation ($M = 3.58$) and emotional state stability ($M = 3.47$) ranking highest, while plan implementation ($M = 3.33$) and relevance of solutions ($M = 3.38$) were comparatively lower. Stepwise regression and correlation analyses confirmed that cognitive evaluation and emotional stability were significant predictors of teacher performance effectiveness, aligning with previous findings on the role of intrinsic cognition and self-regulation in performance contexts.

Qualitative analysis of interview data provides contextualism insights, revealing that teachers often faced high workloads, ambiguous administrative demands, and student management challenges,

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influencing their emotional stability and problem-solving approaches. Participants emphasized the need for systematic professional development, peer support structures, and clearer evaluation guidelines to enhance resilience and adaptive performance strategies.

The integration of these quantitative and qualitative findings underscores the critical role of targeted stress management interventions in improving PE teacher performance within high-pressure educational environments. Recommendations include the development of structured support systems, implementation of professional development programs focusing on cognitive and emotional regulation skills, and the establishment of clear performance evaluation mechanisms tailored to the unique challenges of PE teaching. These initiatives are essential for fostering teacher well-being and enhancing educational outcomes for students, thereby contributing to sustainable educational development in Changsha's secondary schools.

8. Recommendation

To address stress management challenges and optimize teaching performance among secondary PE teachers in Changsha, comprehensive strategies should focus on structured stress identification, targeted professional development, policy alignment, and multidimensional support systems. Establish school-based monitoring mechanisms to systematically identify and track stressors, utilizing real-time feedback tools and reflective self-assessments to enable early intervention and personalized support.

Revamp faculty capabilities through tiered training programs: basic-level workshops on stress awareness and self-regulation techniques, intermediate-level training on proactive problem-solving and resilience strategies, and advanced-level development on cognitive restructuring and emotional state stabilization to sustain instructional effectiveness under pressure. Foster cross-school collaboration through peer support networks and mentoring systems, incentivizing active participation in stress management initiatives through professional recognition and career progression pathways.

Shift administrative policies to reduce unnecessary workloads and enhance teacher autonomy, linking support initiatives to measurable improvements in teaching quality and student engagement. Promote partnerships between schools and community organizations to create integrated support ecosystems, embedding wellness programs and collaborative problem-solving practices within the institutional culture. Develop standardized guidelines for stress management practices and curate shared resources, such as stress management toolkits and reflective practice materials, for cross-school adaptation. Strengthen teacher support by implementing regular workshops to enhance emotional resilience, establishing mental health initiatives to address burnout, and redesigning evaluation processes to recognize process-oriented instructional practices and adaptive problem-solving under challenging conditions. These integrated efforts will enhance emotional stability, instructional excellence, and teacher well-being, ensuring stress management becomes a transformative lever for improving PE teaching effectiveness and educational quality in Changsha.

Transparency:

The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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