ORIGINAL ARTICLE

Teacher Support in Adapted Physical Education and Learning Engagement among Physically Disadvantaged College Students: The Mediating Role of Psychological Resilience

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***Abstract**:* Despite the advancements in inclusive education policies, physically disadvantaged college students still experience low engagement due to inadequate pedagogical adaptation and lack of psychological resources. Grounded in social support theory and positive psychology, the study aims to examine the direct relationship between teacher support and student learning engagement, and to assess the mediating effect of psychological resilience. A quantitative, cross-sectional survey design was used, involving 337 students from seven public and private universities. Data were collected through validated scales on teacher support, psychological resilience, and learning engagement. Paper-based surveys were administered in classrooms with informed consent and analyzed using PROCESS Macro (Model 4) in SPSS 29.0. Research methods included descriptive statistics, correlation, regression, and bootstrapped mediation analysis. The results reveal that teacher support significantly and positively predicted both student psychological resilience and learning engagement, with psychological resilience partially mediating the relationship between teacher support and student engagement. The study underscores the importance of emotional support and psychological empowerment in inclusive physical education.

Science Insights Education Frontiers 2026; 33(1):5307-5322.
DOI: 10.15354/sief.26.or189

How to Cite: Lin, C. (2026). Teacher support in adapted physical education and learning engagement among physically disadvantaged college students: The mediating role of psychological resilience. Science Insights Education Frontiers, 33(1):5307-5322.

Keywords *Teacher Support, Learning Engagement, Psychological Resilience, Adapted Physical Education, Physically Disadvantaged College Students*

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Conflict of Interests*: None*

Funding*: This study is funded by the project "Research on the Impact of Adaptive Physical Education on the Psychological Resilience of Physically Disadvantaged College Students" (2025XZP39) under the 2025 Guangxi University of Foreign Languages' Program for Fundamental Scientific Research Competence Enhancement in Young and Middle-aged Teachers.*

Ethical Statement*: Ethical approval for this research was granted by the Research Ethics Committee of Kuala Lumpur University of Science & Technology (KLUST), where the author was undertaking a postgraduate program. All procedures involving human participants adhered to the ethical guidelines set by the institution and internationally recognized ethical standards. The study ensured the protection of participants' rights, confidentiality, and well-being throughout the research process.*

Informed Consent*: Written informed consent was obtained from all participants prior to their involvement in the study. Participants were provided with detailed information about the research, including its purpose, procedures, potential risks, and their right to withdraw from the study at any time without penalty. By signing the consent form, participants confirmed their voluntary participation and understanding of the study's scope. All data collected remained confidential and were used solely for academic purposes.*

AI Declaration*: The author affirms that artificial intelligence did not contribute to the process of preparing the work.*

Introduction

AMID the ongoing advancement of educational equity and inclusive education, adapted physical education (APE) has emerged as a vital component in promoting the holistic development of physically disadvantaged college students. In APE contexts, teachers act as not only knowledge transmitters but also providers of emotional support and motivational guidance, and facilitators of social inclusion. Existing studies have demonstrated that teacher support has significant influence on students' learning engagement and psychological development (Leo et al., 2022). McNamara and Rizzo (2023) emphasize that the proactive attitudes of educational leaders and teachers are essential for improving the quality of APE instruction. Similarly, Centeio et al.'s study (2021) finds that in resource-constrained teaching environments, supportive teacher behaviors substantially enhance students' willingness to participate in physical activities. Valle-Flórez et al. (2021) highlight the importance of inclusive attitudes among university faculty toward students with disabilities or physical limitations, while Calderón et al. (2021) suggest that blended instructional models can strengthen teacher–student interaction and students' perception of teacher support, thereby improving student engagement. Thus, teacher support not only optimizes the learning conditions for physically disadvantaged students but also serves as an essential external resource that fosters their mental well-being and active learning.

Despite increasing emphasis on inclusive education, physically disadvantaged college students continue to encounter multiple challenges in physical education (PE) settings. Insufficient teacher support and inadequate instructional adaptation in PE often result in low levels of learning engagement, diminished psychological resilience, and weakened academic motivation (Hastie et al., 2022; Wibowo et al., 2024). Psychological resilience, defined as the capacity to positively adapt in the face of adversity, has been identified as a key mediator between external support and student engagement (Kocatürk & Çiçek, 2023; Qiu et al., 2025). Research indicates that students with higher levels of psychological resilience are more capable of internalizing teacher support into sustained learning motivation and active participation (Salih et al., 2023; Cao et al., 2024). However, current research in the APE domain has largely focused on instructional strategies and inclusive policy implementation, while empirical investigations examining the interplay among teacher support, student psychological resilience, and learning engagement remain limited (Zhang et al., 2022; Lobo et al., 2025). Accordingly, this study seeks to construct a mediation model to examine how teacher support affects the learning engagement of physically disadvantaged college students through the mediating effect of psychological resilience, with a view to providing theoretical and practical insights for optimizing APE practices and psychological support systems in higher education.

Guangxi Zhuang Autonomous Region (hereinafter referred to as Guangxi) boasts abundant higher education resources and balanced regional development, yet it also faces challenges such as urban-rural disparities and uneven development among educational institutions. These factors create a diverse educational ecosystem suitable for studying the relationship between teacher support and students' psychological characteristics within the APE context. Higher education institutions in this region generally emphasize the comprehensive role of PE in fostering students' holistic development, with APE progressively advancing. The attitudes and support behaviors of teachers towards physically disadvantaged students are comparable and representative across different institutions. Furthermore, students in Guangxi's higher education institutions face considerable academic pressure and a competitive environment, which presents an opportunity to examine the role of psychological resilience in the mechanism of learning engagement within a high-stress academic setting. Therefore, conducting this research in Guangxi not only aligns with the educational context but also provides a practical foundation and theoretical value for regional implementation and development of educational intervention strategies.

Literature Review

Teacher Support and Learning Engagement among Physically Disadvantaged College Students

In APE, teacher support stands as a key external factor influencing students' learning engagement. Research suggests that teacher support spans multiple dimensions, ranging from academic guidance to emotional encouragement, social recognition, and psychological care (Leo et al., 2022). McNamara and Rizzo (2023) emphasize that school administrators' and teachers' attitudes toward APE are directly related to teachers' willingness to provide supportive instruction, which in turn shapes students' classroom participation and sense of psychological safety. Centeio et al.'s (2021) study reveals that during the COVID-19 pandemic, teacher support was essential for maintaining students' learning motivation and participation under remote instruction conditions. Valle-Flórez et al. (2021) highlight that in inclusive education settings, teachers' acceptance of students' physical differences has a significantly positive impact on students' self-identity and sense of participation. Additionally, according to Calderón et al. (2021), blended instructional approaches can enhance the quality of teacher–student interaction and students' perceived support, thereby boosting their engagement. Therefore, teacher support in APE not only directly facilitates instruction but also indirectly enhances learning engagement and

psychological well-being among physically disadvantaged college students by creating a positive socio-emotional climate.

Moreover, the relationship between teacher support and student learning engagement can be explained through motivational and psychological need-based mechanisms. According to self-determination theory, supportive teacher behaviors fulfill students' basic psychological needs—autonomy, competence, and relatedness—which in turn foster self-determined motivation and active learning engagement (Leo et al., 2022). In PE settings, a supportive instructional environment helps disadvantaged students overcome physical limitations, build confidence, and develop learning resilience. Hastie et al. (2022) argue that learning engagement extended beyond class participation to include cognitive, emotional, and behavioral dimensions. Simón-Chico et al. (2023) demonstrate that challenge-based learning tasks, when appropriately supported by teachers, can significantly enhance students' intrinsic motivation and engagement. As per Lobo et al. (2025), by stimulating students' curiosity and grit, teachers could foster their sustained motivation in PE learning. Wibowo et al. (2024) report that increased frequency of teacher guidance and feedback under a flipped classroom model significantly boosted student engagement. In summary, teacher support constitutes a vital educational resource for enhancing the learning engagement of physically disadvantaged students. Its impact transcends instructional effectiveness, contributing profoundly to students' psychological satisfaction and development of self-efficacy.

The Mediating Role of Psychological Resilience

Psychological resilience is regarded as a critical psychological resource that enables individuals to adapt positively in the face of adversity, stress, and challenges (Kocatürk & Çiçek, 2023). In the PE context, resilience helps students maintain engagement and perseverance when confronted with physical limitations, social stigma, or academic difficulties. Qiu et al. (2025), in a comprehensive meta-analysis, identified a significant positive relation between physical activity and psychological resilience, demonstrating that regular participation in PE enhances individuals' capacity for emotional recovery and adversity tolerance. Salih et al. (2023) argue that resilient students in sports faculties are better able to sustain learning motivation despite intensive training demands. Cao et al. (2024) demonstrate through a chain mediation model that coping styles and resilience mediate the relationship between physical activity and mental health. Collectively, these findings affirm that psychological resilience serves as a fundamental psychological asset to physically disadvantaged college students, enabling them to experience adaptive and meaningful engagement in APE.

In the relationship between teacher support and student learning engagement, psychological resilience is hypothesized to play a key mediating role. Supportive teacher behaviors, such as encouragement, empathy, and trust, contribute to the development of students' psychological resources, enhancing their capacity to navigate academic and physical challenges (Zhang et al., 2022). Abd Allah and Abd Allah (2021) argue that training in positive thinking significantly improves students' resilience and performance in physical skills. Patenteu et al.'s (2024) study finds that among martial arts athletes; resilience not only reduces injury risk but also fosters self-regulation and persistent learning behaviors. Balki et al. (2023) note that educational attainment and perceived social support indirectly affect social adaptation and emotional stability of the individual via the mediating path of resilience. For physically disadvantaged college students, teacher support acts as a vital environmental resource that strengthens their psychological resilience, which in turn ensures sustained learning engagement and commitment. Zhang et al. (2022) also verified the mediating effect of exercise tolerance and resilience on the relationship between physical activity and emotional states, emphasizing the central role of resilience in the learning process. Thus, psychological resilience is not merely an indicator of the individual's adaptability but also a key mechanism through which external teacher support is internalized into student motivation.

This study aims to systematically examine the interrelationships among teacher support, student psychological resilience, and learning engagement in the APE context. It investigates how various dimensions of teacher support directly affect learning engagement of physically disadvantaged college students to determine the teacher's role in promoting inclusive physical education. More importantly, it explores how psychological resilience mediates the relationship between teacher support and student learning engagement, revealing how external support fosters students' psychological adaptability and stress tolerance, and consequently enhances their sustained academic motivation and engagement. The study culminates in proposing a conceptual model that links teacher support, student psychological resilience, and learning engagement, offering theoretical and practical insights for optimizing APE pedagogy, enhancing educational equity, and improving student well-being in higher education.

Research Objectives

The primary objective of this study is to examine how teacher support in APE affects the learning engagement of physically disadvantaged college students via the mediation of psychological resilience. Specifically, the study aims to:

i. Investigate the direct relationship between teacher support and student learning engagement in APE.
ii. Assess the mediating effect of psychological resilience on the relationship between teacher support and student learning engagement in APE.

By addressing these objectives, the study seeks to provide empirical evidence that clarifies the crucial role of psychological resilience in linking teacher support to learning engagement among physically disadvantaged college students in APE settings. Furthermore, it tries to offer a theoretical foundation for developing strategies that enhance student engagement by strengthening teacher support and cultivating psychological resilience.

Methodology

This study adopts a quantitative research method with a cross-sectional survey design. The research sample was drawn from a group of physically disadvantaged college students across seven universities in Guangxi, China. In this study, physically disadvantaged college students are defined as those meeting either of the following criteria: (i) students whose physical fitness test scores are below 59.9 points according to the National Student Physical Fitness Standards (2014 Revision) (hereafter referred to as the Standards); or (ii) students with a body mass index (BMI) test result of BMI < 17.8 (male) or BMI ≥ 28.0 (male), or BMI < 17.1 (female) or BMI ≥ 28.0 (female). As stipulated by the Standards, all universities conduct a physical fitness test for students annually. This study utilizes the most recent data from these university-wide physical fitness tests. A convenience sampling method was employed, and data were collected through both offline paper questionnaires and an online survey platform. To ensure the representativeness and scientific validity of the sample, a stratified sampling strategy was adopted for participant selection. First, seven universities were chosen from different categories (e.g., comprehensive, applied, and teachers' universities) and ownership types (public and private) to ensure diversity. After that, 50 students were randomly selected from each university to participate in the survey, ensuring representation across different academic years and majors. During the distribution process, participants were recruited through convenience sampling, with an emphasis on voluntary participation and the provision of accurate and valid information. Following the collection of questionnaires, invalid ones were excluded, leaving a total of 337 valid responses for analysis.

The dependent variable in this study is learning engagement, indicating the level of students' active participation in the learning process.

Table 1. Demographic Profile of the Respondents (n = 337).

Profile	Description	Frequency	Percentage
Gender	Male	182	54.0%
	Female	155	46.0%
Age	Freshmen	70	20.8%
	Sophomores	92	27.3%
	Juniors	103	30.6%
	Seniors	72	21.4%
School Type	Public Universities	247	73.3%
	Private Universities	90	26.7%

The independent variable is teacher support, reflecting the extent of assistance teachers provide to facilitate student learning. The mediating variable is psychological resilience, which refers to students' ability to cope with challenges and stress. Regarding scale selection, the teacher support perception scale is adapted from the one used by Yi's (2023) study, which includes 19 items in three dimensions: learning support (9 items), ability support (4 items), and emotional support (6 items). The psychological resilience scale is derived from the version employed by Li (2022), which itself was adapted and localized from the Connor and Davidson (2003) scale. It contains 25 items in three dimensions: tenacity (13 items), strength (8 items), and optimism (4 items). The learning engagement scale is based on the tool used by Luo (2023), consisting of 17 items in three dimensions: vigor (6 items), dedication (5 items), and absorption (6 items). All three scales use a Likert five-point scoring system. According to reliability measurements of the data collected, for teacher support perception, the Cronbach's α coefficients of the three dimensions and the full scale are 0.914, 0.928, 0.910, and 0.949, respectively; for psychological resilience, the figures are 0.762, 0.799, 0.805, and 0.876, respectively; and for learning engagement, the figures are 0.871, 0.820, 0.886, and 0.908, respectively.

Results

As shown in **Table 1**, a total of 337 physically disadvantaged college students from seven universities in Guangxi participated in this study. Among them, 182 were male (54.0%) and 155 were female (46.0%), reflecting a relatively balanced gender distribution with a slight predominance of males. The participants represented all four undergraduate levels, with juniors (30.6%) and sophomores (27.3%) constituting the largest groups. This may suggest that upper-year students were more engaged in the study, potentially due to their more extensive exposure to APE courses and

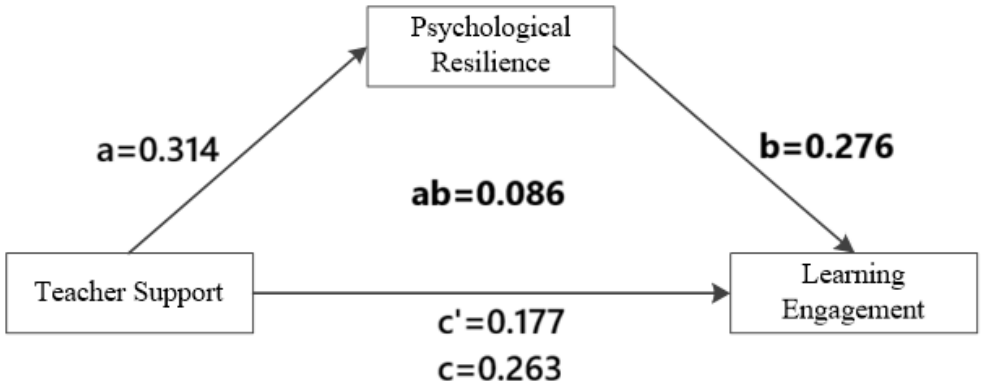

Figure 1: A Simple Mediation Model for Teacher Support and Student Learning Engagement with Psychological Resilience as the Mediator.

greater capacity to reflect on their learning experiences. Freshmen and seniors accounted for 20.8% and 21.4%, respectively, indicating that the sample reasonably represented physically disadvantaged students across different academic years. In terms of institution type, students from public universities accounted for 73.3% of the sample, while those from private universities represented 26.7%, suggesting a higher participation rate among students from public universities.

Using Model 4 of the PROCESS macro developed by Hayes (2013), this study tested the mediating effect of student psychological resilience on the relationship between teacher support (independent variable) and student learning engagement (dependent variable) through SPSS 29.0. The results reveal that teacher support significantly and positively predicted the students' psychological resilience (path a = 0.314, $p < .001$), suggesting that the greater the instructional and emotional support perceived by college students from teachers in APE, the higher their levels of psychological resilience. Further analysis reveals that psychological resilience significantly and positively predicted learning engagement in the students (path b = 0.276, $p < .001$), indicating that those with higher levels of resilience tend to demonstrate greater initiative and persistence in physically demanding learning situations. The indirect effect of teacher support on learning engagement through psychological resilience was tested using the Bootstrap resampling method with 5000 iterations. The analysis confirmed the statistical significance of the mediating pathway, with an indirect effect (ab) of 0.086 and a bias-corrected 95% confidence interval [0.052, 0.132], which did not include zero. This result demonstrates the significance of the mediating role of psychological resilience. In addition, the direct effect of teacher support on student learning engagement remained significant ($c' =$

Table 2: Model Coefficients for the Simple Mediation Model.

Path	Coefficient (β)	SE	t / Z	95% CI	p
a: Teachers' Support → Psychological Resilience	0.314	0.043	7.3	[0.230, 0.398]	<0.001
b: Psychological Resilience → Learning Engagement	0.276	0.038	7.26	[0.202, 0.350]	<0.001
c: Total Effect (direct + indirect)	0.263	0.049	5.37	[0.167, 0.359]	<0.001
c': Direct Effect (controlling for M)	0.177	0.045	3.93	[0.089, 0.265]	<0.001
ab: Indirect Effect (a × b)	0.086	—	—	[0.052, 0.132]	—
Sobel Test (Z)	—	—	4.68	—	<0.001

0.177, $p < .001$), indicating a partial mediation effect. The overall model exhibited a good fit: the regression model predicting psychological resilience from teacher support yielded $R^2 = 0.303$, and the combined predictive power of teacher support and psychological resilience on learning engagement resulted in $R^2 = 0.274$. These findings demonstrate strong explanatory power and practical relevance of the model in explaining the mechanisms through which teacher support affects learning engagement in physically disadvantaged college students in APE contexts.

As shown in **Figure 1**, teacher support significantly and positively predicted psychological resilience ($\beta = 0.314$, $p < .001$), indicating that greater perceived support from instructors can result in stronger psychological adaptability among physically disadvantaged college students. Psychological resilience, in turn, exerted a significant positive effect on learning engagement ($\beta = 0.276$, $p < .001$), suggesting that students with higher levels of resilience exhibit greater involvement and sustained motivation in APE. The total effect of teacher support on learning engagement (path c) was 0.263, indicating a significant overall facilitative effect. After controlling for psychological resilience, the direct effect (path c') was 0.177, and the indirect effect (ab path) 0.086, both of which remained statistically significant ($p < .001$), indicating the presence of a partial mediation effect. Therefore, psychological resilience acts as a significant mediator in the relationship between teacher support and learning engagement, forming a robust indirect pathway. These findings underscore the crucial role of teacher support in activating students' internal psychological resources and enhancing their engagement in physically challenging learning settings.

The data presented in **Table 2** indicated a significant positive effect of teacher support on psychological resilience in physically disadvantaged students. The coefficient for path a was 0.314, with a standard error (SE) of 0.043, t-value of 7.3, and p-value < 0.001, suggesting that teacher support is a significant predictor of the students' psychological resilience. The 95%

confidence interval [0.230, 0.398] excluded zero, further confirming the statistical significance of this relationship. These results imply that when students perceive support from their teachers, their psychological resilience is substantially strengthened. Emotional support, academic support, and encouragement from teachers effectively enhance the students' adaptability and their ability to cope with challenges. The findings show that teacher support not only addresses the students' emotional needs but also promotes the growth of their psychological resilience. Enhanced psychological resilience serves as a critical factor that enables the students to effectively cope with academic pressures and life challenges. Therefore, teacher support plays a pivotal role in enhancing the students' psychological resilience, particularly in challenging educational settings such as APE.

The analysis of path b showed that psychological resilience significantly predicted learning engagement. The coefficient for path b was 0.276 (SE = 0.038, t = 7.26, and $p < 0.001$), with a 95% confidence interval of [0.202, 0.350], which did not include zero. This indicated a statistically significant positive prediction of student learning engagement by psychological resilience. Students with higher psychological resilience demonstrated greater initiative and persistence in APE. Strengthened psychological resilience enables the students to better cope with the challenges of PE courses, prompting them to invest more energy into learning activities. This finding suggests that psychological resilience is an important psychological mechanism underpinning learning engagement. It allows the students to maintain positive attitudes and behavioral performance in the face of difficulties, which increases their participation and sustained motivation. Therefore, cultivating psychological resilience is crucial for enhancing the students' learning engagement, especially in PE courses that require high levels of physical and psychological adaptability.

The combined analysis of paths c, c′, and the indirect effect ab revealed that teacher support not only indirectly affected the students' learning engagement via their psychological resilience but also directly impacted their learning engagement. The coefficient for path c was 0.263 (SE = 0.049, t = 5.37, $p < 0.001$), indicating a statistically significant positive effect of teacher support on overall learning engagement. The Path c′ had a coefficient of 0.177 (SE = 0.045, t = 3.93 and a $p < 0.001$), indicating that teacher support still had a statistically significant direct effect on learning engagement after controlling for the influence of psychological resilience. The indirect effect ab was 0.086, with a 95% confidence interval of [0.052, 0.132], which did not include zero, further corroborating the mediating role of psychological resilience between teacher support and learning engagement. The Sobel test yielded a z-value of 4.68, with $p < 0.001$, supporting the statistical significance of the mediation effect. These results suggest that psychological resilience mediates the effect of teacher support

Table 3: Indirect Effect of Psychological Resilience on the Relationship between Teacher Support and Student Learning Engagement.

Effect Type	Effect Size (β)	SE	95% CI (Bias-Corrected)
Total Effect (c)	0.263	0.049	[0.167, 0.359]
Direct Effect (c′)	0.177	0.045	[0.089, 0.265]
Indirect Effect (ab)	0.086	—	[0.052, 0.132]

on learning engagement, while teacher support increases learning engagement both directly and indirectly. This finding has a theoretical implication for APE practice by highlighting the dual mechanism through which teacher support enhances the students' learning engagement.

Table 3 indicated a total effect of 0.263, demonstrating that teacher support had an overall positive effect on the students' learning engagement. Both the direct effect (0.177) and the indirect effect (0.086) were statistically significant. The confidence interval for the indirect path that excluded zero further supported the mediating role of psychological resilience. This suggests that teacher support in APE not only directly enhances learning engagement but also indirectly promotes it by strengthening psychological resilience in physically disadvantaged college students.

Discussion

First off, this study reveals a significant direct relationship between teacher support and the learning engagement of physically disadvantaged college students. In the APE context, teacher behavior not only reflects instructional effectiveness but also serves as a crucial catalyst for students' emotional experiences and behavioral participation. Prananto et al. (2025), through a systematic review, find that perceived teacher support significantly increases student engagement, especially among higher education students. According to Leo et al. (2022), teacher behaviors are primary predictors of students' learning motivation and classroom engagement, particularly in PE settings. Centeio et al. (2021) emphasize that under complex or restrictive conditions, teachers' encouragement, adaptive guidance, and sustained support are decisive forces for maintaining students' engagement. McNamara and Rizzo (2023) further note that administrators' emphasis on APE is conveyed through teacher behaviors, which in turn affect students' sense of participation and belonging. Valle-Flórez et al. (2021) identified faculty acceptance and support for students with physical differences as key psychological environmental factors that shape student agency. These findings collectively support the present study's conclusion that in APE,

teacher support includes not only technical and instructional guidance but also emotional care and psychological assistance, exerting a lasting impact on the students. Given that learning engagement is a dynamic process highly susceptible to social interactions in the external environment, teacher support plays a direct, continuous, and essential role in the engagement mechanism.

On the psychological level, the study identifies a significant mediating role of psychological resilience in the relationship between teacher support and student engagement in APE. Psychological resilience, defined as an individual's capacity to self-regulate, recover, and persist under adverse conditions, serves as a stable mediator in educational processes. According to Guo et al. (2025), student academic self-efficacy and resilience mediate the enhancement effect of teacher emotional support on student learning engagement. He et al.'s study (2025) find that academic resilience is central to students' learning engagement, with peer relationships and learning motivation acting as mediators. Cao et al. (2024), using a chain mediation model, demonstrate that active participation in physical activities affect college students' mental health through coping styles and resilience, which ultimately impacts their learning behaviors. Salih et al.'s (2023) study reveal that students in sports programs with higher psychological resilience demonstrate stronger adaptability and perseverance under intense academic pressure. Together, these findings suggest that psychological resilience is not only a vital psychological resource for physically disadvantaged students confronting the challenges of PE but also a key mechanism through which the effects of teacher support are internalized and sustained in learning behaviors. By enhancing student psychological resilience, teacher support can extend beyond emotional impact, providing a psychological pathway for the profound transformation of learning engagement. This insight offers a new intervention perspective for APE, underscoring that emotional support and psychological empowerment should be integrated into the teacher support framework to establish a mechanism that converts external motivation into internal drive.

Conclusion

The results of this study reveal the significant impact of teacher support on learning engagement among physically disadvantaged college students, particularly in APE. Teacher support not only directly promotes the students' learning engagement but also indirectly enhances it by improving their psychological resilience. Both emotional and academic support from teachers significantly increase the students' psychological resilience, which in turn boosts their learning engagement. These findings suggest that teacher support in physical education is not confined to the transmission of knowledge and skills but also include emotional and psychological support,

which is particularly critical for physically disadvantaged students. Consistent teacher support enables students to maintain high levels of learning motivation and engagement in the face of academic and physical challenges, thereby facilitating their sustained learning involvement. The results provide a theoretical basis for APE practice by emphasizing the essential role of teacher support in promoting the students' academic development.

Furthermore, this study validates the mediating effect of psychological resilience on the relationship between teacher support and student learning engagement, highlighting psychological resilience as a key psychological resource that helps physically disadvantaged students adapt and recover from adverse conditions in PE. Psychological resilience plays a central role in the learning engagement mechanism. It not only helps the students adapt to complex learning environments but also enhances their coping ability and persistence under the pressure of PE courses. By fostering the students' psychological resilience, teachers can ignite students' intrinsic motivation for learning, building on emotional and behavioral support. These findings provide a new perspective for APE, suggesting that teacher support systems should integrate emotional support and psychological empowerment to help students achieve higher levels of engagement and outcomes in the face of academic challenges.

The study has its limitations because of its cross-sectional design. Since all data were collected at a single point of time, it is not possible to establish robust causal inferences. Therefore, future research could adopt longitudinal or experimental design to further investigate the long-term effects of teacher support on student engagement in APE and to clarify causal relationships. Additionally, the use of cross-sectional data may also lead to the incomplete exclusion of potential confounding factors. As such, future studies should explore the specific effects of different types of APE courses on students' psychological resilience, and how various teacher support behaviors work on psychological resilience development in physically disadvantaged students in diverse cultural and educational contexts. Further research could also examine the interaction between psychological resilience and other individual differences, such as in personality traits and access to social support, to further refine the theoretical model on teacher support and student engagement.

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Received: January 11, 2026
Revised: February 17, 2026
Accepted: March 05, 2026