15 (2) (2026) 627-633

Journal of Physical Education, Sport, Health and Recreations

http://journal.unnes.ac.id/journals/peshr

Role of Physical Literacy in Quality of Life: Mediating Activity and Resilience

Siti Rukmiyanti[1]*, Muchamad Ishak[2], Andy Supriady[3]

[123]STKIP Pasundan, Cimahi, Indonesia.

Keywords

Physical Literacy; Physical Activity; Resilience: Quality of Life.

Abstract

This study investigates how physical literacy affects students' quality of life while examining physical activity and resilience as mediating factors. A cross-sectional design was used involving 350 students from West Bandung Regency selected through random sampling. Data were collected using the Perceived Physical Literacy Instrument (PPLI), the International Physical Activity Questionnaire-Short Form (IPAQ-SF), the Indonesian Resilience Scale, and the WHOQOL-BREF. Data analysis was conducted using process Macro Model 6 with 5,000 bootstrap samples to examine direct and indirect relationships. The findings showed that physical literacy significantly predicts physical activity and resilience ($p < 0.001$), while physical activity significantly predicts resilience ($p < 0.001$). Both physical activity and resilience significantly improve quality of life, with resilience showing the strongest effect. However, physical literacy does not have a direct effect on quality of life ($p > 0.05$). Significant indirect effects indicate that physical activity and resilience act as full mediators between physical literacy and quality of life. These findings suggest that developing physical literacy through physical activity and resilience can enhance students' quality of life.

*Corresponding author :
E-mail: 24850003@stkippasundan.ac.id

p-ISSN 2460-724X
e-ISSN 2252-6773

INTRODUCTION

The physical literacy which comprises motivation and self-efficacy and physical competence and knowledge and understanding according to Whitehead functions as the vital base which enables individuals to sustain their engagement in physical activities. Physical literacy has been associated with different health outcomes which include both physical and mental health (Cairney et al., 2019; Fortnum et al., 2025; Sauri et al., 2025; Shanshan et al., 2025; Yang et al., 2024). Physical literacy serves an essential function for students because it enhances their life quality through its promotion of physical exercise participation and resilience building (Hebinck et al., 2023; Galán-Arroyo, 2024).

The concept of physical literacy functions as a multidimensional framework that requires people to acquire their emotional competencies and their physical abilities and their cognitive capacities and their social skills to achieve success in physical activities according to (Cairney et al., 2019; L. Liu et al., 2026; Whitehead, 2010). Research shows that mental health and subjective well-being and resilience ability improve through physical literacy development because people who master physical literacy skills can better handle stress and situation challenges according to (Gao et al., 2024; Leung et al., 2025; Shanshan et al., 2025). The research demonstrates that physical literacy affects both physical health and mental health because it helps people build their psychological strengths according to the research findings.

The relationship between physical literacy and life quality depends on physical activity which acts as the main mediating element (Cairney et al., 2019; Fortnum et al., 2025). Physical activity improves body fitness which results in enhanced life satisfaction and total life satisfaction (Galán-arroyo, 2024; Ye et al., 2025). Students who engage in physical activities will experience better emotional health and they will also develop social skills and motor skills (Arbour-nicitopoulos et al., 2018; Eshiev et al., 2024; Tóthová & Kudláčová, 2025).

The resilience variable functions as an essential element which mediates the connection between physical literacy and life quality (Y. Liu & Chen, 2021). Resilience describes the capacity of individuals to adapt positively when they face stress and obstacles and environmental restrictions (Primasari et al., 2022). Research shows that physical activity leads to resilience development via its ability to improve emotional self-regulation and boost confidence and provide social backing (Jiang et al., 2025; Wu et al., 2022). The study indicates that students who possess high resilience capacity will experience better psychological health status. Physical literacy encourages people to engage in physical exercise which also builds resilience abilities that enhance their complete quality of life.

Physical literacy has gained recognition as a field of study which researchers have investigated particularly in Western contexts yet the existing research model which examines its connection to quality of life through serial mediation remains extremely limited. Advanced research in developed countries has progressed substantially yet Indonesian educational research studies on how physical literacy indirectly affects student quality of life through combined physical activity andresilience remain uncommon. Previous research findings have limited generalizability because their samples consist mostly of developed countries which exhibit different social and cultural characteristics along with educational systems compared to Indonesia.

Dikomentari [1]: explain the novelty and urgency in this research

The study presents empirical evidence about physical literacy as a fundamental element which operates through a sequence of physical activity and resilience to improve student quality of life. The research requires immediate attention because Indonesian students experience increasing physical inactivity and mental health problems which require educational solutions based on scientific evidence. The study identifies physical activity and resilience as complete mediators which provide theoretical insights while enhancing the model's external validity and extending the study's applicable results across the research area.

METHODS

The research method used in this study was a quantitative cross-sectional research design (Creswell & Creswell, 2018).

Participants and Sampling Procedures

The research included 350 current students who studied at different educational institutions throughout West Bandung Regency. The researchers used random sampling to obtain study data which represented the entire population of study participants. The study used data collection methods which followed the (Hair et al., 2019) analysis guidelines to achieve necessary statistical power requirements.

Instrumentation and Measurement Protocols:

The Student Physical Activity Questionnaire (PPLI) assesses physical literacy using the Physical Literacy Instrument (PPLI), instrument developed and validated by (Sum et al., 2018). This 9-item instrument uses a five-point Likert scale to measure 8 points. The scale in measurement uses 1-5 from strongly disagree-strongly agree.

The International Physical Activity Questionnaire-Short Form (IPAQ-SF) (Craig et al., 2003) functions as a validated assessment instrument which measures physical activity levels in different population groups to assess their physical activity levels. The IPAQ-SF collects data on walking and moderate-intensity and vigorous-intensity activities by asking participants about their walking and moderate-intensity and vigorous-intensity activities during the past week. The researchers established metabolic equivalent (MET) values by following standardized protocols which assigned 3.3 METs to walking and 4.0 METs to moderate activity and 8.0 METs to vigorous activity. The researchers showed total weekly physical activity by measuring it in MET-minutes per week.

The study applied Indonesian Resilience Evaluation Scale from (Primasari et al., 2022) to measure resilience which defines the ability of people to adjust and recover from all types of adverse events and psychological stress situations. The instrument contains 8 items which utilize a five-point Likert scale that ranges from 1 = strongly disagree to 5 = strongly agree. The instrument demonstrates adequate psychometric performance for Indonesian populations because it shows internal reliability and construct validity which supports its use in mental health research.

The World Health Organization developed (WHO, 1996) to assess quality of life through its measurement system. The instrument consists of 26 items which assess four main domains of physical health and psychological health and social relationships and environmental factors. The items use a five-point Likert scale for measurement and the scoring process follows WHO official guidelines which require score transformation into a 0-100 scale for better understanding and complete evaluation. WHOQOL-BREF has been used worldwide and it demonstrates strong valid and reliable results across different cultural settings which include Indonesia.

Data Collection Procedures

Th researchers created a secure web platform which enabled students to gather data with Google Forms while achieving precise accuracy standards for their collected responses. Researchers provided participants with complete study details, including information about the study's purpose and their participation rights and the methods used to protect their personal information. Participants used electronic consent to consent to student participation before researchers began distributing questionnaires. The survey platform required mandatory responses while giving participants the freedom to leave the survey at any time. The data collection process lasted four weeks.

Statistical Analysis

The research used the PROCESS Macro for SPSS version 4.2 (Hayes, 2018) to perform data analysis through a systematic method which utilized Model 6 to conduct multiple mediation analysis. The method allows researchers to measure both direct and indirect effects of their study through bias-corrected bootstrap confidence intervals which protect against errors in estimating mediation effects.

The indirect effect was computed through the multiplication of paths a and b (ab) which showed how physical activity and resilience mediated the effect. The researchers used

bootstrap resampling with 5,000 iterations to create bias-corrected 95% confidence intervals which showed all estimated effects. The mediation results showed statistical significance because the confidence intervals displayed zero exclusion. The research team assessed effect sizes by following Jacob Cohen's established guidelines and they also evaluated how much the results mattered in real-world educational applications.

RESULTS AND DISCUSSION

Table 1. Path Analysis Results (Direct Effects)

Path	Koefisien (β)	SE	t	p-value	Conclusion
X → M1	35,52	10,98	3,24	0,000	Significant
X → M2	0,29	0,04	6,48	0,000	Significant
M1 → M2	0	0	6,04	0,000	Significant
X → Y	-0,24	0,13	-1,84	0,070	Not Significant
M1 → Y	0	0	3,95	0,000	Significant
M2 → Y	1,75	0,14	12,1	0,000	Significant

Source: 2026 data processing results

The pathway analysis results demonstrate that physical literacy (X) positively and significantly affects M1 physical activity (β = 35,52; p < 0,001) and M2 resilience (β = 0,29; p < 0,001). The research shows that physical activity has significant effects on resilience (β significant; p < 0,001) because the two variables create a chain relationship through their mediating effects. The study found that physical literacy (β = -0,24; p = 0,070) did not have a direct impact on quality of life because the relationship did not occur through direct means. The study found that both physical activity and resilience had positive and significant effects on quality of life (p < 0,001) while resilience showed stronger effects than physical activity. The study findings show that people achieve better quality of life through mediating variables than through direct effects.

Table 2. Mediation Test Results (Indirect Effect)

Mediation Process	Effect	BootSE	BootLLCI	BootULCI	Conclusion
Total Indirect Effect	0,68	0,12	0,46	0,92	Significant
X → M1 → Y	0,09	0,03	0,03	0,16	Significant
X → M2 → Y	0,51	0,1	0,32	0,72	Significant
X → M1 → M2 → Y (Serial Mediation)	0,08	0,03	0,03	0,15	Signifikan

Source: 2026 data processing results

The mediation test results demonstrate that physical literacy has a significant total indirect effect on quality of life (Effect = 0,68; CI [0,46; 0,92]) which confirms the existence of mediation effects in the model. The physical activity path (X → M1 → Y) shows a significant effect (Effect = 0,09) while the resiliensi path (X → M2 → Y) demonstrates the biggest effect size (Effect = 0,51). The serial mediation path (X → M1 → M2 → Y) demonstrates statistical significance (Effect = 0,08) because physical literacy enables people to exercise more which builds their resiliensi skills that lead to better quality of life. The research team confirmed all mediation effects were statistically significant because every bootstrap confidence interval stopped short of reaching zero.

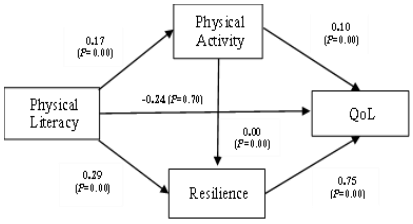

Figure 1. Mediation model

Base on **figure 1**, mediation model demonstrates that physical literacy leads to a significant upward impact on physical activity (β = 0.17; p < 0.001) and resilience (β = 0.29; p < 0.001) while physical activity creates a positive impact on resilience (β = 0.10; p < 0.001). The study found that resilience and physical activity both contribute positively to quality of life but resilience serves as the most influential element (β = 0.75; p < 0.001). The link between physical literacy and quality of life remains unbroken because the direct relationship has no statistical significance (β = -0.24; p = 0.70).

The research results demonstrate that physical literacy does not directly impact life quality; instead it acts as an indirect factor which affects life quality through its role in physical activity and resilience development. The results match with the physical literacy framework which states that people build psychological well-being through their physical activity experiences. People who possess high physical literacy skills display improved motivation and self-assurance and their ability to perform physical activities results in better health outcomes for their body and mind.

The research found that people who have better physical literacy skills also show better physical activity levels which confirms previous studies that identified physical literacy as the main reason people continue to exercise throughout their lives (Tremblay et al., 2018). People who participate in physical activity experience better quality of life because their body functions better and their stress levels decrease and their emotional health improves according to (Mahindru et al., 2023), (Rodríguez-Fernández et al., 2017) and (WHO, 2019). Physical activity serves as the primary connection which enables people to move from physical literacy toward better life quality.

The study results reveal that resilience acts as the major force which brings about improvements in life quality. This finding aligns with previous research which demonstrated that resilience functions as a vital skill that helps people manage their stress and difficult times and all life situations which results in better psychological health (Chung et al., 2023; Chuning et al., 2024; Masten, 2015). Physical activity contributes to the development of resilience by helping people manage their emotions better and building their self-confidence and developing their social support network (Li et al., 2024; Lirola et al., 2025; Wu et al., 2022). This effect strengthens the mediation pathway which connects physical literacy with physical activity and resilience development..

The non-significant direct effect of physical literacy on quality of life suggests that this relationship is complex and dependent on mediating variables. This indicates the presence of full mediation, whereby the benefits of physical literacy on quality of life are realized only when individuals actively engage in physical activity and possess strong resilience. In other words, physical literacy functions as a foundational construct that promotes active behavior and strengthens psychological capacities, which in turn enhance quality of life (Cairney et al., 2019; Pot et al., 2018).

Theoretically, this study contributes to strengthening the integration of physical literacy, physical activity, and resilience in explaining quality of life. Practically, the findings imply that educational and health interventions should not only focus on improving physical competence but also on fostering resilience and encouraging sustained engagement in physical activity. Campus-based programs that integrate these three components have the potential to produce more comprehensive improvements in students' quality of life.

Practical and Theoretical Practice

Theoretically, this study contributes to strengthening the understanding of the mechanisms underlying the relationship between physical literacy and quality of life through a mediation approach. The finding of full mediation confirms that the influence of physical literacy on quality of life is indirect and contingent upon intermediary variables, namely physical activity and resilience. This result supports the embodied cognition framework, which emphasizes that bodily experiences through physical activity play a crucial role in shaping psychological well-being. Furthermore, this study enriches the existing literature by integrating physical and psychological dimensions within a comprehensive conceptual model.

Thus, it not only advances the theoretical development of physical literacy but also provides an empirical basis for future research to explore other relevant mediating variables in enhancing quality of life.

From a practical perspective, the findings indicate that improving students' quality of life cannot rely solely on the development of physical literacy; it must be accompanied by efforts to promote active engagement in physical activity and the strengthening of resilience. Therefore, higher education institutions should design integrated intervention programs, such as physical activity-based curricula, recreational sports initiatives, and resilience development training (e.g., coping skills training or mental health support). This approach is considered more effective, as physical activity not only enhances physical health but also contributes to the development of psychological resilience, ultimately improving students' overall quality of life. Additionally, educators and academic practitioners may adopt experiential learning approaches to reinforce the relationship between physical literacy and students' active behaviors.

CONCLUSION

This study concludes that physical literacy does not have a significant direct effect on quality of life; however, it exerts a significant indirect effect through physical activity and resilience. Physical activity is shown to function as a mediating variable that enhances resilience, while resilience emerges as the most dominant factor in determining students' quality of life. These findings indicate the presence of full mediation, whereby the influence of physical literacy on quality of life is entirely transmitted through physical activity and resilience.

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