

DOI: doi.org/10.21009/03.1401.PF01

THE ROLE OF STUDENT WELL-BEING IN THE SUCCESS OF PHYSICS LEARNING: A LITERATURE REVIEW

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Abstract

Student well-being plays a crucial role in academic success, particularly in challenging subjects such as physics. It encompasses school-related, social, emotional, and academic aspects that interrelate to foster an optimal learning experience. This study aims to investigate the relationship between student well-being and achievement in physics learning while offering insights for educators to develop a supportive learning environment that enhances student well-being. The method employed in this article is a Systematic Literature Review (SLR) based on the PRISMA 2020 protocol. Data were gathered from articles published over the past six years, sourced from the Scopus database. The findings indicate that supportive learning environments, such as classrooms and laboratories, indirectly influence physics learning outcomes. Emotional well-being, including the ability to manage stress and maintain intrinsic motivation, directly impacts student engagement in physics education. Furthermore, social support from teachers and peers significantly contributes to boosting students' self-confidence. This research confirms that student well-being not only affects academic success but also fosters essential social and emotional skills.

Keywords: education, student well-being, physics learning

INTRODUCTION

Student well-being has recently emerged as a critical agenda for education systems worldwide due to its wide-ranging benefits. It can be viewed as a condition that supports successful learning in schools and as one of the key outcomes of 21st-century education [1]. Student well-being reflects the relationship between students and their schools, fostering an atmosphere conducive to teaching and learning for the attainment of knowledge and academic achievement [2]. Research indicates that student well-being plays a vital role in determining the quality of educational outcomes [3]. Students with higher levels of well-being tend to perform better academically and, in the future, are more likely to secure employment, lead socially active lives, and contribute positively to their nation [4]. Emotional well-being in students is directly linked to their intrinsic motivation and engagement in the learning process.

Emotional factors in student well-being encompass mental balance, positive self-perception, and the ability to manage stress and daily challenges [5]. Emotional factors, such as mental health issues, can render learning difficult or even distressing due to heightened pressure. An educational environment that prioritizes and supports students' emotional development can enhance their ability

to cope with academic and social pressures, boost their motivation to learn, and foster a robust sense of self-confidence.

Supporting students' well-being not only enhances their health but also bolsters their academic success. Research indicates that the school environment including factors such as school climate, effective management, and the provision of facilities and infrastructure significantly influences students' positive affect while reducing levels of depression [6]. It is essential for schools to provide facilities and infrastructure that facilitate learning and to implement management practices that foster student development, ensuring that students' needs are met and that a strong emotional connection between students and their schools is established. By prioritizing these elements, schools can create a nurturing foundation that empowers students to thrive both academically and emotionally.

The social aspect of student well-being relates to their relationships with peers, teachers, and the broader learning environment. Strong peer relationships are essential for fostering learning-related well-being. When students feel connected to their peers, they tend to exhibit greater engagement in the learning process and experience reduced burnout [7]. Supportive teacher-student interactions enhance student engagement, positively influencing both academic performance and overall well-being [8]. Moreover, perceived support from teachers correlates positively with students' enjoyment of school, underscoring the importance of nurturing these relationships. A supportive learning environment, characterized by positive relationships and effective communication, significantly enhances students' learning experiences [9]. However, while the benefits of social relationships are evident, challenges such as peer bullying and the complexity of students' emotional well-being can adversely affect their overall well-being. Addressing these issues is crucial to developing targeted strategies that support students in achieving their academic goals.

Equally important is the academic aspect, which involves learning achievement, academic motivation, and learning satisfaction. Students who feel successful in their academic achievements, have clear goals, and feel involved in the learning process, tend to have more positive levels of well-being [10]. Physics is often regarded as a challenging subject due to its abstract nature and the need to comprehend complex concepts [11]. Research on student well-being holds the potential to yield valuable insights into how interventions aimed at enhancing well-being can positively influence academic achievement. Consequently, understanding this relationship could serve as a critical first step toward developing more holistic and effective educational strategies to support student success.

One aspect often overlooked is how a student-center teaching approach can enhance student well-being within the context of physics education. This approach, which emphasizes active student engagement and adaptation to individual needs, can alleviate academic stress by allowing students to explore physics concepts at their own pace [12]. By integrating teaching strategies responsive to students' emotional and social well-being, educators can foster more inclusive and meaningful learning experiences, ultimately promoting both academic success and sustained well-being.

This research can assist educators and policymakers in designing more effective strategies to support students in realizing their academic potential. The scarcity of in-depth studies on student well-being highlights the need for further research to examine how it contributes to academic achievement. This gap in understanding underscores the uncertainty surrounding how various dimensions of student well-being influence learning outcomes in physics. The purpose of this article is to investigate how students' well-being affects their capacity to address academic challenges, particularly in physics education, and to offer insights for educators in fostering a learning environment that promotes student well-being.

METHOD

The Systematic Literature Review (SLR) is a research method designed to identify, evaluate, and synthesize relevant literature on a specific topic [13]. SLR adheres to a rigorous protocol, including systematic steps to minimize bias in the review process, and in this study, it follows the PRISMA 2020 protocol developed by Page [14]. Thus, this approach ensures that the synthesis of scientific evidence is conducted transparently and reproducibly, supporting research-based decision-making.

Literature data regarding the impact of student well-being on physics achievement were collected from the past six years, spanning 2019 to 2024, and sourced from the Scopus database. Data

collection involved using the keywords "Student" AND ("Well-Being" OR "Well Being") AND "Student Well-Being" OR "Student Well Being," subsequently refined by adding more specific keywords: "Student" AND "Well-Being" AND "Student Well-Being" AND "Physics." The resulting data were then extracted based on each relevant variable and thoroughly reviewed. The flowchart for article selection is presented in Figure 1.

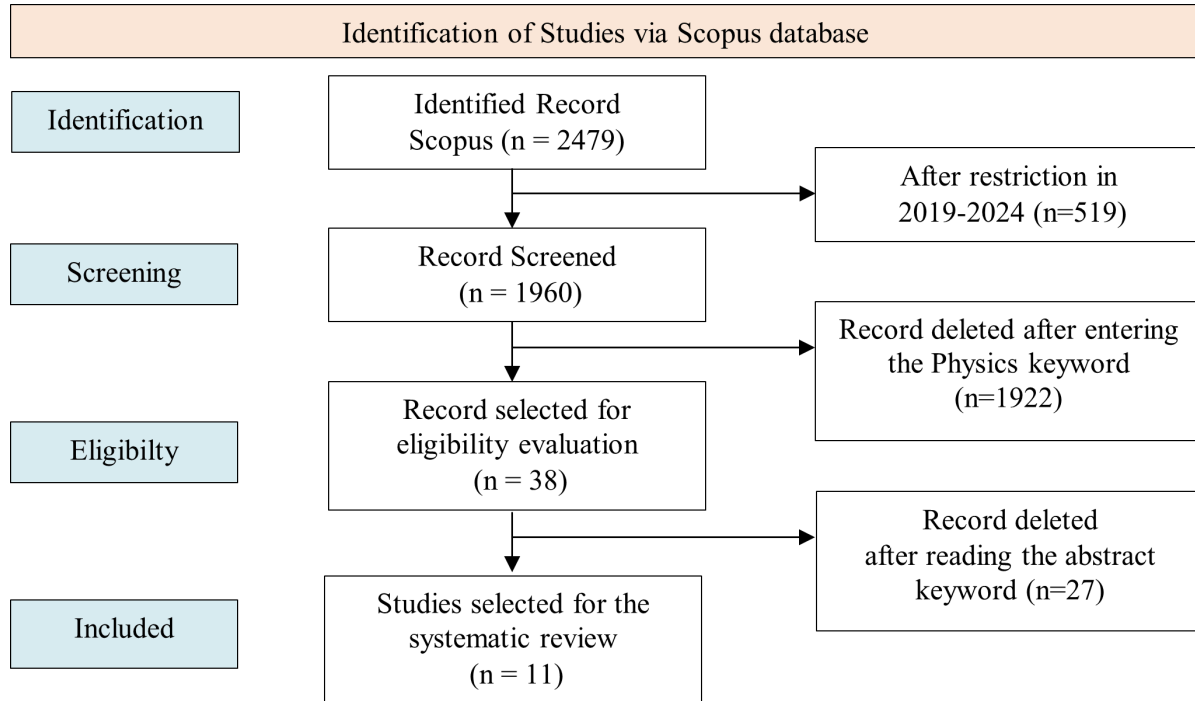


Figure 1. PRISMA flowchart of the study

RESULT

Before presenting the detailed results of empirical studies in Table 1, it is pertinent to emphasize that recent research underscores the close relationship between student well-being and their success in physics education. A variety of methodological approaches, ranging from in-depth interviews to quantitative analyses, have been employed to elucidate how emotional, social, and learning environment factors contribute to student engagement and comprehension of physics concepts. Preliminary findings suggest that student well-being not only serves as a facilitator of the learning process but also acts as a primary driver in enhancing academic motivation and resilience. Thus, these studies provide a robust foundation for understanding how educational approaches centered on well-being can be optimized to support improved learning outcomes in physics.

Table 1. Description of the results of empirical studies about student well-being

Journal	Author	Research Method	Main Findings
International Journal of Science Education	Nyström et al. [15]	Case study with in-depth interviews	Learning physics enhances well-being, imparts meaning to life, and supports emotional stability and self-confidence.
BMJ OPEN	Chen et al. [16]	Systematic review and meta-analysis	Mobile-based mindfulness meditation enhances mental well-being, reducing stress, anxiety, and depression
Theory and Research in Education	Coulombe et al. [17]	Qualitative approach and critical review	Positive education can enhance student well-being through a meaningful

Journal	Author	Research Method	Main Findings
			social-ecological approach and Personal Projects Analysis.
Physical Review Physics Education Research	Shafer et al. [18]	Case study with survey and Likert scale	Adapting learning strategies, relying on peers for emotional support, and increasing independence in managing stress emerge as key strategies for maintaining well-being.
Physical Review Physics Education Research	Brookes et al. [19]	Qualitative approach with semi-structured interviews and quantitative data from experimental classroom results	The Investigative Science Learning Environment (ISLE) approach enhances self-confidence, fosters community support, increases enjoyment of learning, reduces stress, and boosts motivation and problem-solving skills.
International Journal of Science and Mathematics Education	Ewan et al. [20]	Case study with survey	Self-efficacy is the primary factor of well-being
Journal of Physics: Conference Series	Mario et al. [21]	Quantitative factor analysis	Motivation and learning styles play a significant role in physics learning, while psychological well-being does not directly affect academic performance
PERC Proceedings	Doty et al. [22]	Qualitative Research Method Using Semi-Structured Interviews	The approach adopted by teachers can influence student well-being, particularly with respect to accessibility, emotional support, and integration into the academic community
Frontiers in Psychology	Ling et al. [23]	Descriptive Quantitative Approach Using Survey and Questionnaire Methods	Student well-being is multidimensional, with spiritual well-being exerting the greatest influence on specific academic achievements
Innovative Higher Education	Passeggia et al. [24]	Quantitative Approach Based on Structural Equation Modeling	subjective well-being mediates the relationship between academic motivation and engagement, with positive emotions and a favorable self-perception contributing to increased engagement and a reduced risk of dropout
AIP Conference Prosiding	Kirova [25]	Literature Review	Poor mental health adversely affects academic outcomes, highlighting the need for awareness, institutional support, and an inclusive learning environment to enhance student well-being.

Research shows that student well-being in physics learning is closely linked to emotional and social dimensions that support engagement as well as academic success. Nyström [15] found that learning physics imparts meaning to life, a sense of connection to the world, and emotional balance, particularly among underrepresented groups. Students reported that collaboration and support from teachers in facing academic challenges can strengthen their well-being. This finding is supported by Brookes [19] who demonstrated that the Investigative Science Learning Environment (ISLE) approach improves students' understanding of physics concepts and their well-being through collaborative efforts and non-punitive formative assessment. Self-efficacy and a sense of belonging are strongly correlated with well-being, serving as key predictors of academic achievement across genders [20].

Teaching approaches responsive to individual needs are a central theme in this context. The social-ecological approach, grounded in Personal Projects Analysis, facilitates personalized learning

and supports student well-being [17]. STEM approaches are correlated with academic achievement and well-being, though research indicates that female students face greater challenges [26]. Emotional health is a critical factor influencing students' well-being in physics education. Schools implementing whole-school approaches [17] or mental well-being programs [27] enable students to feel supported and empowered to achieve their goals. This support can be strengthened through anti-bullying and counseling policies that foster a positive school climate [28]. A supportive learning environment, encompassing both physical facilities and social relationships, has also proven to be a vital foundation for student well-being. The quality of infrastructure, such as laboratories and classrooms, is significantly correlated with student satisfaction and enhances learning [29]. However, teacher effectiveness and teaching practices often exert a greater influence than physical conditions, though a conducive environment remains a prerequisite for success.

The shift in social support from family to peers can also assist students in managing stress [18]. Peers provide a space to share experiences, offer emotional support, and suggest relevant solutions based on their own insights. Additionally, peer relationships foster a sense of community and solidarity, which can alleviate feelings of loneliness or isolation. With this support in place, students feel more motivated to tackle challenges and perceive their environment as one of equality, enabling them to cope with stress more effectively.

This study uncovered an intriguing pattern demonstrating that students' emotional and social well-being including self-confidence, calmness, and a sense of belonging directly influences engagement and outcomes in physics learning, with a supportive learning environment, both physical and social, serving as a primary driver. This pattern suggests that a learning approach integrating intrinsic motivation with social support not only sharpens students' focus and resilience in physics education but also significantly bolsters their overall well-being. Consequently, the interplay among emotional well-being, the learning environment, and student engagement establishes a robust foundation for academic success.

Within the realm of educational practice and policy, these findings advocate for practical changes. Physics teachers should refine their skills in facilitating collaboration and adopt strategies, such as non-punitive evaluation of student work, to bolster student well-being [19]. Responsive and empathetic teaching approaches can enhance student engagement in learning. Policies should prioritize the provision of high-quality infrastructure that supports mental well-being, while also ensuring that facilities accommodate students with disabilities. Establishing study groups can serve as a tangible step to foster a sense of belonging and alleviate academic stress. Furthermore, integrating mental well-being and emotion management into physics education can create a more holistic learning experience, ensuring that education not only focuses on academic achievement but also nurtures student development.

A supportive learning environment enhances student well-being, encompassing self-confidence, calmness, and satisfaction, which collectively equip them to tackle the complex challenges of physics. Engagement and academic achievement also improve through social support and inclusive strategies, as evidenced by deeper conceptual understanding and higher grades. For underrepresented groups, such as women or students with disabilities, a holistic approach that prioritizes student well-being can unlock greater opportunities for success, thereby reducing disparities in physics education. Students further benefit from improved emotional health through well-being programs and social support, enabling them to focus on their studies and manage academic pressure effectively. Physical well-being, supported by a safe environment and adequate facilities, strengthens their readiness to learn. Overall, an approach that prioritizes well-being fosters more resilient, motivated, and capable students, empowering them to realize their full academic potential.

A limitation of this review lies in the limited presentation of empirical data in several articles, resulting in analyses that are predominantly descriptive and lack quantitative depth. The methods employed in the reviewed studies also exhibit weaknesses, such as a reliance on qualitative approaches primarily interviews and surveys that offer rich insights but fall short in statistical precision, coupled with a scarcity of interventional experiments capable of measuring the tangible impact of well-being on academic achievement. Future research could adopt a more comprehensive approach to address these gaps. One potential step is to broaden the scope of data sources by leveraging multiple databases, thereby yielding more representative findings. Combining quantitative

and qualitative methods, such as field experiments, could provide stronger evidence of the relationship between student well-being and academic outcomes. Additionally, the development of educational policies such as emotional support programs or innovative teaching approaches could be tested to evaluate their influence on student well-being in physics education.

CONCLUSION

This study affirms that student well-being plays a crucial role in enhancing their resilience against academic challenges, particularly in physics education. A supportive learning environment, both physical and social, has been shown to positively contribute to students' engagement in comprehending complex physics concepts. Furthermore, emotional well-being including the ability to manage stress and sustain intrinsic motivation directly influences their academic achievement. Social support from teachers and peers also exerts a significant impact on building students' self-confidence and increasing their participation in the learning process. Consequently, there is a need for learning strategies that not only target academic outcomes but also prioritize student well-being. The implications of these findings offer valuable insights for educators and policymakers in designing more inclusive and responsive educational environments, thereby fostering an optimal learning experience.

ACKNOWLEDGEMENT

This research is funded by RKAT Sebelas Maret University fiscal year 2025 through the PENELITIAN FUNDAMENTAL B (PFB-UNS) research scheme with the Research Assignment Agreement Number: 369/UN27.22/PT.01.03/2025

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