

# Physical and Psychological Well-being of Higher Education Students in Mathematics Context

Jay Fie P. Luzano, PhD

Assistant Professor IV, Bukidnon State University  
Malaybalay City, Bukidnon, Philippines  
jayfieluzano@buku.edu.ph

**Abstract:** While excelling in tertiary mathematics offers significant academic satisfaction, the inherent rigor of the subject can also induce substantial student stress and anxiety, potentially impacting not only academic achievement but also overall well-being. This scoping review explores the existing body of research by investigating how the demands of learning mathematics in higher education influence students' physical and psychological well-being. Results revealed three (3) emerging themes on physical well-being, namely; (1) Sedentary Lifestyle and Its Impact; (2) Stress and Its Physiological Effects; and (3) Sleep Quality and Academic Performance. Then, another three (3) emerging themes on psychological well-being, such as; (1) Academic Pressure and Mental Well-being; (2) Impostor Syndrome and Self-Esteem Issues; and (3) Social Isolation and Loneliness. This study highlights the need to create programs to promote students' holistic well-being beyond academic achievement in mathematics. Colleges and universities may explore interventions promoting physical activity, stress management, and social connection within the mathematics learning environment.

**Keywords—**physical well-being; psychological well-being; Higher Education students; Mathematics context

## 1. INTRODUCTION

Achieving success in higher education mathematics can be a source of great accomplishment. However, the demanding nature of the subject can also lead to significant stress and anxiety for students (Namkung, Peng, & Lin, 2019). This stress can have a far-reaching impact, influencing not just their academic performance but also their overall well-being. Understanding this complex relationship between the challenges of mathematics and student health is crucial (Rodríguez et al., 2020).

This scoping review explores the existing body of research by investigating how the demands of learning mathematics in higher education influence students' physical and psychological well-being. This study analyzed studies that investigate the various factors associated with mathematics education, such as course difficulty, teaching methods, and assessment pressure. By examining how these factors interact with students' learning styles, prior experiences, and self-beliefs, the researcher aims to gain a deeper understanding of the potential impact on their well-being (Fhloinn et al., 2014).

This study synthesized the findings from various studies to provide a holistic picture of how mathematics education in higher education intersects with student well-being. This knowledge can be instrumental in informing the development of more supportive learning environments and pedagogical practices that promote not only academic success but also the holistic well-being of students in higher education mathematics courses (Martín & Zavala, 2006).

Furthermore, this research holds particular significance in the current educational landscape. With an increasing emphasis on STEM fields (Science, Technology, Engineering,

and Mathematics), the number of students enrolling in higher education mathematics courses is steadily rising. This trend highlights the need to ensure these courses are not only academically rigorous but also foster a positive and supportive learning environment that prioritizes student well-being (Bonem, Fedesco, & Zissimopoulos, 2020).

By identifying the challenges students face and the factors contributing to stress and anxiety, this study can recommend targeted interventions and support mechanisms. These might include incorporating stress-reduction techniques into the curriculum, promoting a growth mindset around learning mathematics, or fostering a sense of community among students (Tomasetto et al., 2020). This study can pave the way for the development of effective strategies that promote not only academic achievement but also the overall health and well-being of students in higher education mathematics courses (Pang-an, et al., 2022).

It is important to acknowledge that the well-being of students in higher education mathematics is not solely influenced by the demands of the subject itself. Social and cultural factors also play a significant role. For example, gender stereotypes associated with mathematics ability can contribute to anxiety, particularly for female students. Additionally, cultural expectations around academic performance can add another layer of pressure. This further explores how these external factors interact with the learning environment and individual student characteristics to create a holistic picture of student well-being in higher education mathematics (Schneider & Preckel, 2017).

By acknowledging the multifaceted nature of this issue, the review can provide a more nuanced understanding of this aforementioned concern. This is valuable not only for educators but also for policymakers and student support

services. With a comprehensive picture of the challenges that students face, stakeholders can work together to develop a multi-pronged approach that addresses both the academic demands and the broader social and cultural factors impacting student well-being in higher education mathematics.

## 2. METHODS

This research examined existing literature on the physical and psychological well-being of higher Education students in mathematics context. This study employed a scoping review method, known for its broad search strategy as outlined by Arksey and O'Malley (2005). This approach retrieves all relevant studies, regardless of methodology, and allows for flexibility and the researcher's reflection throughout the process.

Arksey et al. (2005) described a six-step scoping review process: identifying research questions, searching for literature, selecting studies, extracting data, synthesizing findings, and reporting results. This study began by formulating three distinct research questions.

Next, the researchers utilized the Google Scholar and ResearchGate search engines for articles published between 2000 and 2023 using the keywords "physical and psychological well-being of higher education students in mathematics context". In the third stage, we applied strict inclusion criteria. We meticulously reviewed each paper's abstract, methodology, results, discussion, and conclusion sections. Only papers directly addressing the physical and psychological well-being of higher Education students in the mathematics context were included. Irrelevant studies were excluded.

Similar to systematic reviews, stage four involved data extraction, where relevant information from selected studies was meticulously organized. Finally, the fifth stage involved content analysis to synthesize, summarize, and discuss the key findings extracted from the reviewed literature.

## 3. RESULTS AND DISCUSSION

### Physical Well-being of Higher Education Students in Mathematics Context

#### *Sedentary Lifestyle and Its Impact*

Many higher education students studying mathematics often spend long hours seated, either in lectures, studying, or working on assignments. This sedentary lifestyle can lead to various physical health issues such as back pain, poor posture, and decreased cardiovascular health (Peterson et al., 2018).

Exploring strategies to promote physical activity and ergonomic practices among mathematics students can mitigate these health risks and enhance overall well-being (Nellutla et al., 2012).

#### *Stress and Its Physiological Effects*

The rigorous academic demands of mathematics courses in higher education often contribute to elevated stress levels among students. Chronic stress can manifest in physical symptoms such as headaches, muscle tension, and gastrointestinal problems (Núñez-Peña et al., 2013).

Understanding the physiological mechanisms through which stress impacts the body and implementing stress management techniques tailored to mathematics students can improve their physical health outcomes and academic performance (Shankar & Park, 2016).

#### *Sleep Quality and Academic Performance*

Mathematics students in higher education frequently experience sleep disturbances due to academic workload, exam pressure, and irregular study schedules. Poor sleep quality not only affects physical health but also impairs cognitive function and academic performance (Galland et al., 2015; Luzano, 2020).

Exploring the relationship between sleep patterns, physical health, and academic outcomes among mathematics students can inform interventions aimed at improving sleep hygiene and promoting overall well-being (Phillips et al., 2017).

### Psychological Well-being of Higher Education Students in Mathematics Context

#### *Academic Pressure and Mental Well-being*

Higher education students pursuing mathematics often face intense academic pressure due to the challenging nature of the subject and high expectations for success (Luzano, 2024). This pressure can lead to heightened levels of stress, anxiety, and depression among students (Urbina-Garcia, 2020).

Exploring the specific sources of academic pressure within the mathematics context and implementing targeted interventions such as stress management programs and counseling services can help alleviate psychological distress and enhance mental well-being (Hamaideh, 2010; Romorosa et al., 2023).

#### *Impostor Syndrome and Self-Esteem Issues*

Mathematics students in higher education may experience impostor syndrome, characterized by feelings of inadequacy and a persistent fear of being exposed as a fraud despite evidence of competence. This psychological phenomenon can significantly impact self-esteem and confidence levels, ultimately affecting academic performance and overall psychological health (Cisco, 2020).

Investigating strategies to combat impostor syndromes, such as mentorship programs, peer support networks, and cognitive-behavioral interventions, can empower mathematics students to overcome self-doubt and thrive in their academic pursuits (Abdelal, 2020).

#### *Social Isolation and Loneliness*

The rigorous nature of mathematics coursework and the solitary nature of problem-solving can contribute to social isolation and feelings of loneliness among higher education students. Prolonged social isolation can exacerbate psychological health issues such as depression and anxiety, posing significant challenges to overall well-being (Fruehwirth, Biswas, & Perreira, 2021).

Examining the role of social support networks, extracurricular activities, and peer collaboration in mitigating social isolation among mathematics students can inform strategies to foster a sense of belonging and community within the academic environment, thereby promoting psychological resilience and mental wellness (Alcock, et al, 2020).

#### 4. CONCLUSION AND RECOMMENDATION

This analysis highlights the multifaceted impact of higher education mathematics programs on students' physical and psychological well-being. Factors like sedentary lifestyles, academic pressure, and social isolation all contribute to potential health risks. However, exploring these connections can lead to targeted interventions, such as promoting physical activity, stress management techniques, and fostering social connections, which can improve students' overall well-being and academic success.

Further research is needed to explore the specific ways that the mathematics learning environment contributes to these challenges and how it can be optimized to promote student well-being. This could involve investigating effective teaching practices, creating supportive learning communities, and developing specialized resources tailored to the unique needs of mathematics students.

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