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Students' engagement in Philippine tertiary PE program: a path for enhancing experience and curriculum development

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ABSTRACT

This study aims to assess student engagement across several dimensions of the physical activity towards health and fitness (PATH-Fit) program and explore the interrelationships among these dimensions to inform curriculum development and enhance students' experience. Using a quantitative research design, specifically a descriptive correlation approach, the study employed a survey instrument to measure various aspects of student engagement, including interest and motivation, perceived benefits, teaching and learning environment, assessment and feedback, and overall satisfaction. A sample of 633 college students from Southern Philippines was selected using simple random sampling to ensure representative and unbiased data. Data analysis and interpretation were done using descriptive and Spearman rho's correlation coefficient. The results reveal that students exhibit moderate engagement in the PATH-Fit program. Analysis shows significant relationships among all engagement variables, indicating that improvements in one area, such as the teaching and learning environment, can positively influence others, like interest and motivation. The interrelationships highlight the interconnectedness of engagement dimensions, suggesting that a holistic approach is necessary for enhancing overall student involvement. In conclusion, while the PATH-Fit program succeeds in capturing students' interest to some extent, there is considerable potential for increasing engagement. By addressing multiple dimensions of engagement simultaneously, the program can better meet students' needs and improve their overall satisfaction and involvement.

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1. INTRODUCTION

Student engagement is a widely studied concept that refers to the degree of attention, interest, and passion students demonstrate in the learning process. It encompasses active participation in both academic and extracurricular activities, fostering deeper learning and better educational outcomes [1]. In physical education (PE), student engagement becomes even more critical, directly impacting students' physical activity levels, skill development, and attitudes toward fitness and health [2]. Engaged students are more likely to develop a lifelong appreciation for physical fitness, exhibit higher motivation, and demonstrate

improved performance in PE courses [3]. Thus, student engagement in PE measures students' immediate interest and indicates their future health behaviors [4].

Student engagement has gained prominence as educators and policymakers recognize its vital role in improving educational quality and student outcomes [5]. In tertiary PE, the stakes are higher because this is the final formal exposure students have to structured physical activity [6]. Without meaningful engagement, students may graduate without fully internalizing the health benefits of physical activity or developing the skills needed to maintain a physically active lifestyle [7]. As a result, enhancing student engagement in PE courses is essential for educational institutions to ensure graduates are well-equipped for personal well-being and societal participation [8].

On the other hand, implementing PE at the tertiary level in numerous educational institutions in the Philippines has faced significant challenges [9]. These difficulties include curriculum implementation issues, teacher training insufficiencies, and a lack of emphasis on the subject, with its purpose often seen as more political than cultural. This historical context suggests that tertiary PE has been influenced by factors other than pedagogical concerns [10]. The scholarly debate surrounding these issues emphasizes the importance of a comprehensive approach to improvement; thus, Abbasov and Mavlyanov [11] emphasize the critical role of increased resources, such as investments in human workforce development and school facilities, in improving PE's overall quality, and effectiveness. These challenges are common in the Philippines, as similar issues have been reported in Malaysia, where PE subjects are often devalued and underprioritized. In public schools in Brazil, PE teachers have encountered difficulties such as low wages, inadequate infrastructure, and a lack of materials [12].

Intending to address these significant issues, the Philippine Commission on Higher Education (CHED) mandated all higher education institutions (HEIs) to shift and offer the new tertiary PE program, physical activity towards health and fitness (PATH-Fit), through CMO 39, series of 2021. As PATH-Fit is designed to provide a comprehensive and standardized curriculum, this initiative represents a proactive response to pressing issues such as the need for standardized teaching approaches. It provides a framework emphasizing physical fitness, essential life skills, and holistic development. Further, the program aligns with current educational needs, introducing novel approaches to improve tertiary PE's overall quality and effectiveness [13].

The primary goal of PATH-Fit is to redefine and improve the landscape of Philippine tertiary PE by going beyond traditional frameworks. This will be made possible by offering a comprehensive program that integrates physical fitness with developing essential life skills, addressing long-standing challenges [14]. The CHED CMO 39 (s. 2021) further explained that the curriculum aims to provide students with a well-rounded educational experience emphasizing physical health, teamwork, communication, and holistic growth. PATH-Fit seeks to elevate the quality and effectiveness of tertiary PE by aligning with contemporary educational needs and introducing innovative approaches, ensuring that graduates are equipped with the knowledge and skills required for both personal well-being and active participation in society.

While numerous studies have delved into tertiary PE in the Philippines, focusing on aspects such as curriculum efficacy [15], pedagogical approaches, and the overall learning experience, there is still a significant gap in research that investigates explicitly the engagement levels of students in these programs. Although scholars have explored a wide range of topics related to PE, such as the use of technology [16] and the flexibility of program curricula [17], the specific issue of how engaged students are in these courses remains underexplored. Engagement is a crucial factor in ensuring the success of any educational program, especially one like PATH-Fit, that seeks to foster lifelong physical activity habits. However, studies rigorously assessing and quantifying student engagement in tertiary PE remain scarce.

This study, therefore, aims to fill this research gap by assessing the engagement levels of Filipino students in PATH-Fit courses. This study seeks to answer the research question: "what are the engagement levels of Filipino students in the PATH-Fit program, and how do different engagement dimensions interrelate to inform potential curriculum development?" The study will provide insights into the factors influencing student engagement by examining key areas such as attendance, participation, interest, and perceived benefits. The findings of this research will contribute significantly to the existing body of knowledge by offering empirical data on engagement levels in tertiary PE. This topic needs to be addressed. Furthermore, this study will have practical implications for teachers, administrators, and curriculum developers. For teachers, understanding the factors that enhance or hinder student engagement can inform instructional strategies and classroom management practices. For administrators, the results will highlight areas for improvement regarding resource allocation and program support. Finally, the study will contribute to curriculum development by providing data-driven recommendations to enhance the PATH-Fit program, ensuring that it not only meets the educational needs of students but also actively engages them in their learning process.

2. METHOD

2.1. Design

This research utilized a quantitative research design, particularly the descriptive correlation approach, to assess the engagement levels of students in the PATH-Fit program and its implications for curriculum development. Quantitative research design is a systematic investigation that quantifies data and uses statistical methods to uncover patterns, relationships, or trends [18]. It involves the collection of numerical data and the application of mathematical techniques to answer specific research questions. This approach allows researchers to measure variables and analyze relationships objectively, providing high accuracy and reliability in the findings [19].

The descriptive correlation approach, a subtype of quantitative research, is used to describe the characteristics of a population and explore the relationship between two or more variables without manipulating any of them [20]. In this approach, researchers can identify whether a relationship exists between variables and the strength of that relationship, though it does not establish cause and effect. Descriptive correlation studies provide valuable insights into existing conditions and associations, making them practical for understanding patterns and trends within a specific context [21].

This research design is the most appropriate for the study because it aims to assess the current engagement levels of students in the PATH-Fit program and explore any potential correlations between engagement and various variables. Using this design, the study generated quantifiable data that will help inform curriculum development and instructional strategies based on the relationships between student engagement and other variables. The descriptive correlation approach allows for a clear and systematic examination of how variables influence student engagement, providing evidence-based recommendations for improving the PATH-Fit curriculum.

2.2. Respondents and population

The respondents of this study were 633 college students from various universities in Southern Philippines enrolled in the PATH-Fit program (with approximately 4,000 population). These students represented a diverse population regarding academic year levels, degree programs, and demographic backgrounds, providing a comprehensive overview of engagement levels across different student groups. This sample size is adequate as it represents a significant proportion of the student population enrolled in the PATH-Fit program, providing a sufficient basis for generalizing findings and ensuring the reliability and validity of the study's results.

This study employed simple random sampling to select the respondents. Simple random sampling is a probability sampling technique where each individual in the population has an equal chance of being selected. This method was chosen to ensure that the sample would be representative of the larger population of college students enrolled in the PATH-Fit program, minimizing selection bias, and enhancing the generalizability of the study's findings. The sampling technique strengthens the conclusions' reliability by giving every student an equal participation opportunity. It provides a solid foundation for the recommendations that will be made for curriculum development in the PATH-Fit program.

2.3. Research instrument

This study utilized a researcher-made survey instrument benchmarked from the study of Bryan and Solomon [22], titled "student motivation in physical education and engagement in physical activity." The instrument demonstrated Cronbach's alpha value ranging from 0.716 to 0.758. A Cronbach's alpha within this range indicates good internal consistency and reliability, suggesting the instrument effectively measures student engagement in PE. This level of reliability means that the items in the instrument are closely related and consistently capture various aspects of student engagement, providing confidence in the instrument's ability to generate accurate and meaningful data.

Further, the researchers modified the original instrument to align it with the specific context of the PATH-Fit program in the Philippines. These modifications included adapting language and terminology to suit the local educational system and cultural context and incorporating particular variables related to the PATH-Fit curriculum, such as attendance, participation, perceived benefits, and the teaching-learning environment. The adjustments ensured the instrument's relevance to the study objectives while maintaining validity and reliability.

The modified instrument consisted of several sections that measured vital dimensions of student engagement, including cognitive, emotional, and behavioral engagement, using a Likert scale. This scale allowed respondents to indicate the extent of their agreement or disagreement with various statements, providing quantifiable data for analysis. Additionally, the instrument was pilot-tested among a small group of students (30 respondents) to assess further its reliability (Cronbach's alpha=0.980) and ensure that it accurately reflected students' experiences in the PATH-Fit program before being administered to the whole sample.

2.4. Statistical analysis

Descriptive statistics, particularly mean and weighted mean, were employed to summarize and describe the overall level of student engagement. These measures provided an average score for each dimension of engagement, including attendance, participation, interest, motivation, perceived benefits, and satisfaction. For inferential analysis, Spearman's rho correlation coefficient was utilized to examine student engagement relationships. Spearman's rho is a non-parametric measure of rank correlation, making it suitable for assessing the strength and direction of the association between two variables when the data does not necessarily follow a normal distribution [23]. The combination of descriptive and inferential statistics enabled a thorough analysis of the data, allowing the researchers to describe the current state of student engagement and explore meaningful correlations that could inform curriculum development and future improvements to the PATH-Fit program.

3. RESULTS

The results of this study, derived from survey responses of 633 college students in Southern Philippines, provide an in-depth analysis of student engagement in the PATH-Fit program. Data collection utilized a structured adapted questionnaire, which measured multiple dimensions of engagement including interest and motivation, perceived benefits, teaching and learning environment, assessment and feedback, and overall satisfaction. Table 1 presents the interrelationship among various dimensions of students' engagement levels in the Philippine PATH-Fit program. This analysis explores how each dimension—such as interest and motivation, attendance and participation, perceived benefits, teaching and learning environment, assessment and feedback, and overall satisfaction—correlates with one another, providing insights into the interconnectedness of these factors.

Table 1. Interrelationship of students' engagement levels in the Philippine PATH-Fit program

	Attendance and participation	Interest and motivation	Perceived benefits	Teaching and learning environment	Assessment and feedback
Interest and motivation	0.742**				
Perceived benefits	0.741**	0.817**			
Teaching and learning environment	0.644**	0.753**	0.787**		
Assessment and feedback	0.667**	0.786**	0.806**	0.820**	
Overall satisfaction	0.632**	0.760**	0.801**	0.802**	0.832**

Note: ** statistically significant at p-value<0.05

4. DISCUSSION

4.1. Students' engagement in the Philippine PATH-Fit program

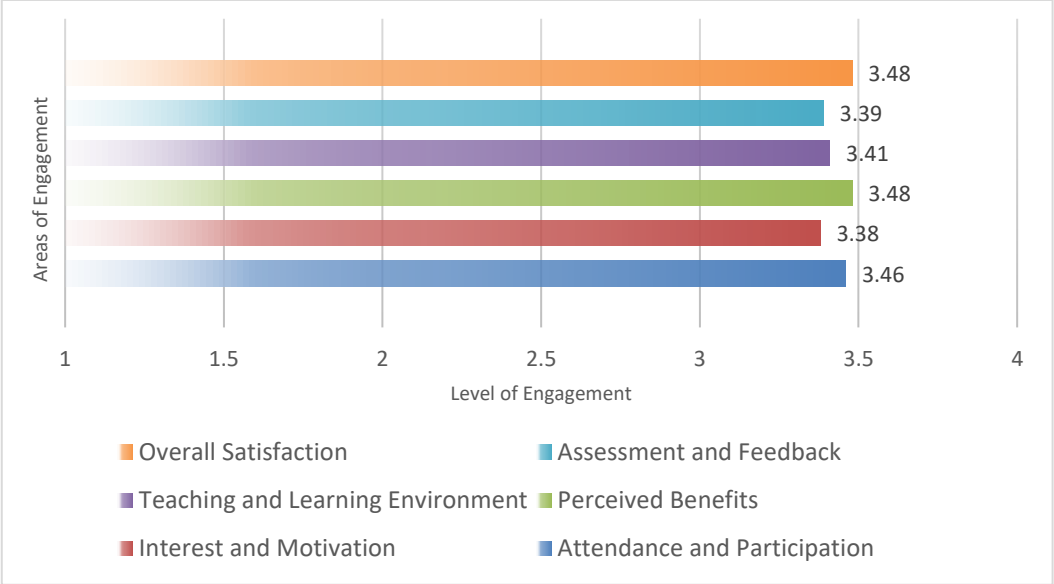
Figure 1 presents the level of students' engagement in the Philippine PATH-Fit program. Based on the data, the overall mean is 3.43, which corresponds to the interpretation of "moderately engaged." This means that, on average, students demonstrate a fair level of engagement in the PATH-Fit program. This implies that while students generally recognize the importance of the PATH-Fit program and participate at an acceptable level, their engagement is not optimal when fully committed to and invested in the learning process. This level of engagement suggests that although the program effectively captures students' attention, it may not fully meet their expectations or needs in areas such as teaching methods, activity variety, or the perceived benefits of PE.

Prioritizing student engagement is crucial to achieving academic excellence because engagement directly influences learning outcomes [24]. Engaged students are more motivated, actively participate in class, and are more likely to retain information. This deepens their understanding of the subject matter, enhances critical thinking skills, and fosters a positive attitude toward learning [25]. Engaged students are better at applying knowledge in real-world contexts, which leads to higher academic performance [26]. Educators prioritizing engagement create a dynamic learning environment catering to diverse learning needs, empowering students to reach their full academic potential [27].

4.2. Overall satisfaction

Concerning overall satisfaction, the mean score of 3.48, with a corresponding interpretation of "moderately engaged," indicates that while students are generally satisfied with the PATH-Fit program, they are not fully engaged or overwhelmingly content with their experience. This implies that although the program meets students' basic needs and expectations to a certain extent, it may not fully echo them in terms of engagement, enjoyment, or perceived value. Several factors could influence this moderate level of

satisfaction, such as the structure of activities, the relevance of the curriculum to their personal fitness goals, or even the accessibility, and availability of resources. To enhance overall satisfaction, the program may need to better tailor its content and activities to student preferences [28], provide more dynamic and diverse fitness options [29], and ensure that students see the benefits of their participation. Strengthening the perceived value of the program through enhanced engagement strategies and ensuring that students feel fully supported in achieving their physical fitness and well-being goals would likely lead to higher satisfaction [30].



Note: 4.00-3.50 (Highly engaged); 3.49-2.50 (Moderately engaged); 2.59-1.50 (Rarely engaged); 1.49-100 (Not engaged)

Figure 1. Students' engagement in the Philippine PATH-Fit program

4.3. Assessment and feedback

Regarding assessment and feedback, the mean score of 3.39, with a corresponding interpretation of "moderately engaged," indicates that students find the assessment methods and feedback provided in the PATH-Fit program helpful but not entirely fulfilling or effective in enhancing their engagement. This score suggests that while students receive feedback on their performance, it may need to be more frequent, detailed, or constructive enough to fully support their learning and improvement. Effective feedback in PE is vital as it directly impacts student learning, skill development, and motivation. It helps students understand their strengths and areas for improvement, guiding them toward better performance, and technique [31]. Feedback also boosts confidence by acknowledging progress, encouraging perseverance, and fostering a positive attitude toward physical activity [32]. Teachers provide clear, specific, and actionable advice to help students set achievable goals, refine their skills, and develop a growth mindset. Effective feedback creates a supportive learning environment that enhances student engagement and leads to continuous improvement in PE [33].

4.4. Teaching and learning environment

Regarding the teaching and learning environment, the mean score of 3.41, with a corresponding interpretation of "moderately engaged," indicates that students generally find the learning atmosphere and teaching methods in the PATH-Fit program somewhat conducive to their engagement. This implies that the current teaching methods, resources, and learning conditions are adequate but may need to be more dynamic and interactive to fully capture students' attention and interest. Boosting student engagement in the teaching and learning environment is essential for creating an active, inclusive, and motivating classroom. Engagement can be enhanced by employing interactive teaching methods, such as group activities, discussions, and hands-on learning, that cater to different learning styles [34]. Providing real-world connections to the subject makes learning more relevant and meaningful for students [35]. Creating a supportive environment where students feel heard, valued, and encouraged to express their ideas fosters a sense of belonging. Regular feedback, recognition of effort, and opportunities for student input further motivate students to participate actively, leading to a more dynamic, and practical learning experience [36].

4.5. Perceived benefits

Concerning perceived benefits, the mean score of 3.48, with a corresponding interpretation of "moderately engaged," indicates that students recognize some value and advantages of participating in the PATH-Fit program. This implies that students see some positive aspects of the program, but they may not fully appreciate or experience the extent of its benefits. This could be due to a lack of clear communication about the program's goals, insufficient emphasis on the long-term benefits of physical activity, or a gap between students' expectations and their actual experiences.

Students need to appreciate the benefits of PE for their lifelong fitness because it equips them with the knowledge, skills, and habits necessary for maintaining a healthy lifestyle [37]. PE teaches students the importance of regular physical activity, which helps prevent chronic diseases, manage stress, and improve mental health; by understanding how physical fitness impacts overall well-being, students are likelier to adopt healthy behaviors beyond the classroom [38]. PE fosters a positive attitude toward exercise, encouraging students to stay active throughout their lives, which is crucial for achieving long-term physical and mental health [39].

4.6. Interest and motivation

Concerning interest and motivation, the mean score of 3.38, with a corresponding interpretation of "moderately engaged," suggests that students display a reasonable level of interest in the PATH-Fit program. This implies that while students are somewhat interested in the activities and goals of the PATH-Fit program, they may be somewhat enthusiastic and committed. This could be due to a lack of variety in the program's activities, insufficient alignment with personal fitness goals, or external distractions like academic pressures. In the context of Filipino students, balancing the demands of academic workloads, family responsibilities, and extracurricular activities may also play a role in diminishing their motivation to engage in physical fitness courses fully.

Enhancing students' motivation and interest in PE is essential because it directly influences their participation, performance, and overall health [40]. When motivated and interested, students are likelier to engage actively, put in effort, and develop a positive attitude toward physical activity. This improves their physical skills and fosters teamwork, discipline, and resilience [41]. Increased motivation helps students overcome challenges, sustain participation, and embrace fitness as a lifelong habit. A motivated and engaged student is more likely to recognize the value of PE, leading to better physical and mental health outcomes throughout their lives [42].

4.7. Attendance and participation

In the attendance and participation section, the mean score of 3.46, with a corresponding interpretation of "moderately engaged," indicates that students generally attend and participate satisfactorily in the PATH-Fit program, but their engagement is not exceptionally high. This implies that while the level of attendance is relatively reasonable and students are participating in the program, their overall engagement may not be as solid or enthusiastic as it could be. Boosting students' attendance and participation in PE is crucial because it ensures they gain the full benefits of physical activity, including improved fitness, mental health, and social skills [43]. Regular attendance and active participation help students develop motor skills, understand the value of teamwork, and build healthy habits that can last a lifetime. Consistent involvement in PE enhances students' self-discipline, boosts confidence, and reduces the risk of lifestyle-related diseases [44]. By encouraging attendance and participation, educators create a positive environment that emphasizes the importance of physical well-being, leading to more engaged, healthier, and well-rounded students [45].

4.8. Interrelationship of students' engagement levels in the Philippine PATH-Fit program

Table 1 presents the interrelationship of the levels of engagement in PATH-Fit of students. Based on the data, the interest and motivation variable displayed significant relationships across all areas of engagement, with correlation coefficients as: attendance and participation (0.742**), perceived benefits (0.817**), teaching and learning environment (0.753**), assessment and feedback (0.786**), and overall satisfaction (0.760**). Similarly, perceived benefits also showed significant relationships with all other areas of engagement: attendance and participation (0.741**), interest and motivation (0.817**), teaching and learning environment (0.753**), assessment and feedback (0.786**), and overall satisfaction (0.760**).

For the teaching and learning environment, significant relationships were observed in all areas: attendance and participation (0.644**), interest and motivation (0.753**), perceived benefits (0.787**), assessment and feedback (0.820**), and overall satisfaction (0.802**). Further, assessment and feedback demonstrated significant relationships across all variables: attendance and participation (0.667**), interest and motivation (0.786**), perceived benefits (0.806**), teaching and learning environment (0.820**), and overall satisfaction (0.832**). Finally, overall satisfaction also exhibited significant relationships with all

areas: attendance and participation (0.632**), interest and motivation (0.760**), perceived benefits (0.801**), teaching and learning environment (0.802**), and assessment and feedback (0.832**).

This interrelationship across all variables means a strong and consistent connection exists between different aspects of student engagement in the PATH-Fit program. The high correlation coefficients indicate that improvements or changes in one engagement area will likely influence other areas (e.g., enhancing students' interest and motivation could positively impact their attendance, perceived benefits, and overall satisfaction). This implies that the various dimensions of engagement are interconnected and mutually influential.

Further, addressing one area, such as improving the teaching and learning environment, can have a ripple effect on other aspects of engagement, such as increasing perceived benefits and overall satisfaction. This interconnectedness highlights the importance of a holistic program development and evaluation approach. By simultaneously enhancing multiple aspects of student engagement, the PATH-Fit program can foster a more comprehensive and practical educational experience, ultimately leading to greater overall success and satisfaction among students.

Furthermore, each area influences the others, creating a synergistic effect that enhances the overall student experience. For example, a positive teaching and learning environment can boost interest and motivation, leading to better attendance and active participation [46]. In turn, consistent participation enhances perceived benefits, reinforcing the value of PE, which increases overall satisfaction [47]. Practical assessment and constructive feedback can further elevate motivation, driving students to engage more deeply [48]. This interconnectedness creates a ripple effect—improving one area often leads to positive changes in others, ultimately fostering a cycle of increased engagement, better learning outcomes, and greater satisfaction in PE [49].

Generally, the findings of this study, which revealed that students in the PATH-Fit program exhibited moderate levels of engagement across various dimensions such as interest and motivation, perceived benefits, teaching and learning environment, assessment and feedback, and overall satisfaction, align with several prior studies on PE in higher education. For example, the study by Sierra-Díaz *et al.* [50] highlighted that student engagement PE courses often fluctuates due to factors such as teaching approaches and available facilities, which corresponds with the moderate engagement levels reported in this study. Similarly, Fong *et al.* [51] found that perceived benefits and teaching practices significantly impact student participation and motivation, reinforcing this study's findings that the teaching and learning environment plays a crucial role in enhancing student engagement.

Moreover, the strong interrelationship observed between the engagement variables in this study is consistent with the findings of Halif *et al.* [52] who identified that when one aspect of student engagement, such as motivation, improves, other areas like participation and satisfaction tend to follow suit. This interconnectedness suggests that improving one area, such as assessment and feedback, can have a positive ripple effect across other aspects of engagement. Similarly, Mitchell and Walton-Fisette [53] emphasized the need for integrated and flexible curricula that respond to student needs, which further supports the notion that enhancing teaching strategies and feedback processes can elevate overall student engagement in PE. Thus, the findings of this study not only corroborate existing research but also emphasize the need for a comprehensive approach to fostering engagement in tertiary PE programs.

In addition, by assessing student engagement levels in the PATH-Fit program and highlighting the interconnectedness of various engagement dimensions, it provides valuable insights for curriculum developers, educators, and policymakers. The findings suggest that enhancing specific areas such as teaching strategies, assessment methods, and feedback can improve overall student engagement, informing the development of more interactive and student-centered PE programs. Methodologically, the study contributes by utilizing a descriptive correlation approach, demonstrating its effectiveness in identifying relationships among engagement variables, which can be applied in future research on educational engagement. Additionally, the results can guide policy adjustments, particularly in allocating resources to improve teaching environments, updating curriculum frameworks, and ensuring that PE programs remain responsive to the needs and preferences of students in higher education.

Lastly, for future research, it is recommended to expand the scope of investigation by including a more diverse range of respondents from various geographical regions and institutional types, allowing for broader generalization of findings across the country. Additionally, longitudinal studies could explore how engagement levels in PATH-Fit courses evolve over time and what factors contribute to sustained or fluctuating engagement. Future research should also consider the role of technology and digital tools in enhancing student participation and motivation, especially considering the growing trend toward blended learning environments. Lastly, qualitative approaches, such as interviews or focus groups, could complement the quantitative findings by providing deeper insights into the specific challenges and preferences of students in PE programs.

5. CONCLUSION

This study concludes that while students demonstrate moderate involvement across various dimensions, there is considerable room for enhancement. The overall engagement, encompassing aspects such as interest, motivation, perceived benefits, teaching and learning environment, assessment and feedback, and overall satisfaction, indicates that students are somewhat invested in the program but are not fully engaged. This moderate engagement suggests that the program successfully captures students' attention to some degree but falls short of maximizing their involvement and enthusiasm.

Further, this study concludes that the significant relationships across all areas suggest that improvements in one aspect of engagement will likely influence others positively. For instance, enhancing the teaching and learning environment or providing more effective assessment and feedback can increase interest, motivation, and a greater appreciation of the program's benefits. This interconnectedness highlights the importance of a comprehensive approach to enhancing student engagement. The PATH-Fit program can more effectively foster a holistic and satisfying educational experience by addressing multiple dimensions simultaneously, improving overall student outcomes and satisfaction.

Hence, adopting a holistic approach that addresses multiple dimensions simultaneously to enhance the PATH-Fit program is crucial. Enhancing the teaching and learning environment with innovative, student-centered strategies can positively influence other areas, such as interest, motivation, and perceived benefits. The program should also focus on improving assessment and feedback mechanisms, which correlate with overall satisfaction and other engagement aspects. The program can better support student learning and motivation by providing timely, constructive feedback and diverse assessment methods. Lastly, integrating varied physical activities that align with students' interests and goals and communicating the program's benefits can further enhance student involvement.

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AUTHOR CONTRIBUTIONS STATEMENT

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C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

Authors state no conflict of interest.

INFORMED CONSENT

We have obtained informed consent from all individuals included in this study.

ETHICAL APPROVAL

The research related to human use has been complied with all the relevant national regulations and institutional policies in accordance with the tenets of the Helsinki Declaration and has been approved by the authors' institutional review board or equivalent committee.

DATA AVAILABILITY

The authors confirm that the data supporting the findings of this study are available within the article.

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