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Beyond compliance: recreational physical activity as a catalyst for lifelong engagement among university students

Más allá del cumplimiento: la actividad física recreativa como catalizador del compromiso permanente entre estudiantes universitarios

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Abstract
This study investigated the role of recreational physical activity as a catalyst for sustained involvement among university students, within the context of tertiary physical education in the Philippines. The study specifically examined students' perceptions across six developmental domains: lifelong physical activity orientation, physical fitness and functional movement, mental health and stress management, social interaction and values development, personal responsibility and self-management, and relevance to adult life. A quantitative-descriptive design with a comparison element was utilized, including 1,067 university students (Group A = 576; Group B = 491). Data were analyzed with weighted mean, standard deviation, and

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independent samples t-test. The results demonstrated consistently elevated levels of concordance across all domains (M = 3.23–3.35), suggesting that recreational physical activities significantly impact holistic development and encourage ongoing participation in physical exercise. No significant difference was seen between groups (t = -1.218, p = 0.223), indicating that the benefits are received universally. The findings underscore the necessity of transitioning postsecondary physical education from a compliance-oriented participation framework to a more student-centric, recreational, and lifetime involvement paradigm. The research offers empirical evidence for the improvement of policies and the broadening of curricula in physical education programs at the tertiary level.

Keywords: recreational activities; university students; lifelong physical activity; physical education programs; student engagement

Resumen

Este estudio investigó el papel de la actividad física recreativa como catalizador de la participación sostenida entre estudiantes universitarios, en el contexto de la educación física terciaria en Filipinas. Específicamente, se examinaron las percepciones de los estudiantes en seis dominios de desarrollo: orientación hacia la actividad física a lo largo de la vida, condición física y movimiento funcional, salud mental y manejo del estrés, interacción social y desarrollo de valores, responsabilidad personal y autogestión, y relevancia para la vida adulta. Se utilizó un diseño cuantitativo-descriptivo con un componente comparativo, incluyendo a 1,067 estudiantes universitarios (Grupo A = 576; Grupo B = 491). Los datos fueron analizados mediante media ponderada, desviación estándar y prueba t para muestras independientes. Los resultados mostraron niveles consistentemente elevados de concordancia en todos los dominios (M = 3.23–3.35), lo que sugiere que las actividades físicas recreativas influyen significativamente en el desarrollo holístico y fomentan la participación continua en el ejercicio físico. No se observaron diferencias significativas entre los grupos (t = -1.218, p = 0.223), lo que indica que los beneficios se experimentan de manera universal. Los hallazgos subrayan la necesidad de transformar la educación física en el nivel superior, pasando de un enfoque centrado en el cumplimiento a un paradigma más centrado en el estudiante, recreativo y orientado a la participación a lo largo de la vida. Esta investigación aporta evidencia empírica para la mejora de políticas y la ampliación de los planes de estudio en los programas de educación física a nivel terciario.

Palabras clave: actividades recreativas; estudiantes universitarios; actividad física a lo largo de la vida; programas de educación física; participación estudiantil

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Introduction

Physical education (PE) remains a vital component of higher education, promoting students' psychomotor, cognitive, and affective development while fostering lifelong engagement in physical activity (Tomar, 2022). In the Philippines, the Commission on Higher Education (CHED) requires the integration of Physical Activity Towards Health and Fitness (PATHFit) courses to cultivate healthy and active lifestyles among university students. Despite this mandate, recent discussions advocating the reduction or removal of tertiary PE courses, primarily to address curriculum congestion and prioritize discipline-specific competencies, have raised concerns regarding the continued relevance and educational value of PE. These developments underscore the need to examine PE not merely as a curricular requirement but as a learning experience that may cultivate students' sustained motivation to engage in physical activity beyond academic compliance.

This issue is especially pressing due to the ongoing high levels of physical inactivity in the Philippines. National and global surveillance data demonstrate that a significant percentage of Filipino students and young adults do not achieve the prescribed levels of physical activity, with reports indicating that over 90% of adolescents are physically inactive according to WHO standards (Rogayan & Padre, 2025). Additional national data indicates that around 41% of Filipino adults do not participate in adequate physical activity, hence heightening susceptibility to non-communicable diseases, including cardiovascular conditions, diabetes, and obesity (WHO, 2023). These trends highlight an increasingly sedentary culture, intensified by digitization, academic expectations, and lifestyle changes during university years (Campoamor-Olegario et al., 2025). In this perspective, postsecondary physical education represents one of the last organized possibilities to impact health behaviors before to students' transition into adulthood.In addressing this challenge, recreational physical activity emerges as a critical and sustainable approach. Unlike traditional performance-oriented or competitive physical activities, recreational activities emphasize voluntary participation, enjoyment, and intrinsic motivation, making them more conducive to long-term adherence. Empirical evidence indicates that recreational physical activity positively influences academic performance and overall well-being among university students, while sedentary behaviors are associated with adverse health

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and educational outcomes (Beciete & Guillena, 2025). Furthermore, recreational activities—including fitness exercises, dance, sports, and outdoor pursuits—serve as accessible and engaging entry points for promoting active lifestyles, particularly among Generation Z students who favor flexible, socially interactive, and experience-driven forms of participation (Tagare & Villaluz, 2021).

In the Philippines, Physical Education (PE) is recognized as an essential component of higher education, contributing to students' holistic development through the promotion of physical competence, health literacy, and lifelong engagement in physical activity. This role is institutionalized through the Commission on Higher Education (CHED) Memorandum Order No. 39, series of 2021, which prescribes the implementation of the Physical Activity Towards Health and Fitness (PATHFit) curriculum for first- and second-year undergraduate students. The curriculum is designed to provide structured learning experiences that promote active lifestyles and wellness while supporting the development of lifelong physical activity habits. Although the policy establishes PE as a mandatory component of general education during the first two years of college, its limited duration has prompted questions regarding its capacity to foster sustained participation in physical activity beyond course completion.

CHED Memorandum Order No. 39, series of 2021, positions Physical Education as a vehicle for promoting lifelong physical activity through the PATHFit curriculum. The policy emphasizes the development of physical fitness, functional movement, mental well-being, social responsibility, personal responsibility, and inclusive participation to encourage students to adopt healthy and active lifestyles beyond formal education. Collectively, these outcomes reflect the broader goal of fostering autonomous engagement in physical activity rather than mere compliance with academic requirements (Melguizo-Ibáñez et al., 2022; Sun et al., 2023; Prieto-González et al., 2025).

Despite these intended outcomes, participation in physical activity among university students remains a growing concern. Sedentary lifestyles, increasing academic demands, and declining physical activity levels continue to challenge the achievement of lifelong active living, prompting ongoing discussions regarding the effectiveness and relevance of tertiary Physical Education in sustaining students' engagement beyond the required PATHFit courses.

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These concerns suggest that while CHED CMO 39 provides a strong policy framework, understanding the factors that promote continued participation in physical activity after course completion remains an important area for investigation.

The importance of this study lies in the fact that it will be beneficial to both policy and practice. To begin, it provides evidence from the actual world that the Philippines ought to maintain and enhance its physical education programs in higher education. Third, it addresses concerns about public health by offering suggestions for active methods to encourage students at universities to break their habit of leading inactive lifestyles. To summarize, the findings of the study suggest that physical education should not only be maintained as a required component of the curriculum, but it should also be reimagined as a driving force behind long-term health and flourishing.

Materials and methods

Research Design

This study utilized a quantitative descriptive research design with a comparative component. Specifically, it employed a cross-sectional survey methodology to examine the perceived effects of leisure physical activities on essential developmental domains among university students. The descriptive aspect of the study determined the level of students' agreement regarding the perceived effects of recreational physical activities across the identified developmental domains. Meanwhile, the comparative component examined whether significant differences existed between two independent groups (Group A and Group B) using an independent samples *t*-test.

A quantitative descriptive design with a comparative component is appropriate for studies that aim to describe variables while examining differences between groups using inferential statistical techniques. According to Creswell and Creswell (2018), quantitative descriptive research systematically measures and describes variables through numerical data, whereas comparative analyses allow researchers to investigate whether statistically significant differences exist between naturally occurring groups. Similarly, Johnson and Christensen (2020) noted that descriptive quantitative studies may incorporate comparative statistical

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procedures, such as the independent samples *t*-test, to determine group differences without manipulating variables. The cross-sectional survey methodology further supports this design by collecting data from participants at a single point in time, providing an efficient means of describing perceptions and comparing groups within the study population.

This design is suitable because the study seeks to assess perceptions, behaviors, and results as they occur naturally, devoid of variable manipulation. Quantitative-descriptive designs are extensively utilized in physical education and sports research to evaluate involvement patterns, motivation, and developmental effects (Tomar, 2022). Additionally, the incorporation of a comparison analysis enhances the study by ascertaining the existence of differences across groups, which is crucial for verifying the generalizability of recreational physical activity interventions.

Respondents and sampling

The study's respondents were 1,067 university students, split into two groups: Group A (n = 576) and Group B (n = 491). Group A are 4th year students while Group B are 3rd year students. These respondents were taking courses at a college or university that were related to recreational activities. A non-probability sampling method, namely convenience sampling, was utilized. Convenience sampling is often used in institutional research since it makes it easy to get participants, especially when the study is on a certain group of people, like university students (Andrade, 2021). Participants were chosen based on their availability and enrollment in courses that incorporate recreational physical activities. This method is frequently employed in educational and sports research, since respondent access is contingent upon institutional environment and course enrollment. Although convenience sampling restricts the generalizability of results, it is extensively employed in educational and behavioral research due to the context-dependent nature of participant access. The substantial sample size (n = 1,067) augments the statistical power and dependability of the results, somewhat alleviating sampling constraints. Nevertheless, results must be evaluated judiciously, especially when extrapolating beyond analogous institutional contexts.

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The study's large sample size enhances the stability and precision of the statistical estimates, thereby increasing confidence in detecting meaningful differences and relationships among the variables. Previous studies have shown that larger samples in physical activity research contribute to more stable estimates of behavioral patterns and perceptions (Bailey et al., 2023). However, while the inclusion of more than a thousand respondents strengthens the robustness of the statistical analyses, the generalizability of the findings remains limited due to the use of convenience sampling.

The selection of university students as respondents is appropriate because they represent a critical population in the transition toward lifelong engagement in physical activity. Evidence suggests that physical activity behaviors established during emerging adulthood substantially influence health behaviors later in life (Singh et al., 2024). Consequently, although the findings should be interpreted within the context of the sampling approach, they provide valuable insights into the perceptions and experiences of university students regarding recreational physical activities.

Research Instrument

The study utilized a researcher-developed questionnaire aligned with the framework of recreational physical activity and the domains outlined in CHED CMO 39. The instrument was developed to assess six critical areas: lifelong physical activity orientation, physical fitness and functional movement, mental health and stress management, social interaction and values development, personal responsibility and self-management, and relevance to adult life and lifelong engagement. The degree of students' agreement regarding the impact of recreational activities on their development was elicited by measuring each item in the questionnaire using a 4-point Likert scale, which ranged from 1 (Strongly Disagree), 2 (Disagree), 3 (Agree), and 4 (Strongly Agree).

The instrument was pilot tested among 40 students who were not enrolled in the actual study to guarantee its clarity, reliability, and appropriateness. Moreover, the questionnaire was validated by 4 experts in Physical Education and Sport Science. The instrument showed a high level of internal consistency and reliability, as evidenced by a Cronbach's alpha coefficient of

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0.89, which was obtained during the pilot testing. The instrument was expressly developed to assess students' perceptions of the impact of recreational physical activities on their psychological, social, and physical growth. According to Joshi et al. (2015), the efficacy of Likert scales in quantifying subjective experiences has made them a widely accepted tool in behavioral and educational research. Additionally, the questionnaire was developed in accordance with recognized domains of physical education outcomes and was based on existing literature. Research indicates that multidimensional instruments are indispensable for assessing the comprehensive influence of physical activity programs on various developmental domains (Melguizo-Ibáñez et al., 2022).

Statistical Analysis

In order to guarantee a thorough interpretation of the findings, descriptive and inferential statistics were implemented. According to Kaur et al. (2018), descriptive statistics are indispensable for the purpose of summarizing and organizing data by employing metrics such as mean and standard deviation. The weighted mean (WM) was used to determine the respondents' overall level of agreement for each indicator, while the standard deviation (SD) was used to measure the variability of their responses. These statistics are appropriate for summarizing and interpreting Likert-scale data. An independent samples t-test (Welch's t-test) was implemented to ascertain whether there was a substantial distinction between Group A and Group B for inferential analysis. This test is particularly relevant when comparing the means of two independent groups with unequal sample sizes and variances, and it was administered at a 0.05 level of significance ($\alpha = 0.05$). This statistical approach is appropriate for the analysis of the data, as it enables the comparison of groups and the description of the perceived impact of recreational activities, thereby enhancing the analytical profundity of the research. Similar statistical methodologies have been extensively implemented in sports science and physical education research to assess program efficacy and investigate group distinctions (Heinrich et al., 2023).

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Ethical Considerations and Informed Consent

Ethical principles were observed throughout the conduct of the study to protect the rights and welfare of the participants. Prior to data collection, respondents were provided with an informed consent form explaining the study's purpose, procedures, voluntary nature of participation, and their right to withdraw at any time without penalty. The study involved a voluntary questionnaire that posed no more than minimal risk to participants; therefore, formal ethics committee approval was not required under the institution's research guidelines. No personally identifiable information was collected, and all responses were kept confidential, securely stored, and reported only in aggregate form. The collected data was used solely for research purposes. Adherence to these ethical standards promotes the integrity and credibility of educational and behavioral research involving human participants (Resnik, 2012).

Results

This table 1 presents a comparative analysis of students' responses regarding the perceived outcomes of recreational activities across several key developmental domains. These include lifelong physical activity orientation, physical fitness and functional movement, mental health and stress management, social interaction and values development, personal responsibility and self-management, and relevance to adult life and lifelong engagement. The data compare the mean scores and standard deviations of Group A and Group B, along with the overall weighted mean and corresponding verbal interpretations. The results provide an overview of how recreational activities contribute to students' holistic development in both groups.

TABLE 1. Summary of Students' Responses on the Impact of Recreational Activities Across Key Developmental Domains

Lifelong Physical Activity Orientation	Group A	SD	Group B	SD	VI
The recreational activities encourage me to remain physically active beyond course requirements.	3.37	0.65	3.42	0.63	Strongly Agree
I am motivated to engage in recreational physical activities outside of school hours.	3.20	0.73	3.23	0.76	Agree

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The activities help me value physical activity as part of a lifelong healthy lifestyle.	3.36	0.62	3.44	0.61	Strongly Agree
I am confident in selecting appropriate recreational activities for my personal fitness needs.	3.31	0.62	3.35	0.65	Strongly Agree
Overall	3.31	0.66	3.36	0.66	Strongly Agree
Physical Fitness and Functional Movement	Group A	SD	Group B	SD	VI
The recreational activities improve my overall physical fitness.	3.33	0.62	3.38	0.64	Strongly Agree
The activities help me develop proper functional movement patterns.	3.36	0.59	3.40	0.61	Strongly Agree
I feel physically capable of participating in various recreational activities after completing the course.	3.31	0.63	3.33	0.69	Strongly Agree
Overall	3.33	0.61	3.37	0.65	Strongly Agree
Mental Health and Stress Management	Group A	SD	Group B	SD	VI
Participation in recreational activities helps reduce my academic stress.	3.17	0.77	3.26	0.79	Agree
The activities contribute positively to my mental and emotional well-being.	3.25	0.70	3.31	0.73	Strongly Agree
Recreational activities help me relax and recover from academic demands.	3.18	0.76	3.22	0.80	Agree
Overall	3.20	0.75	3.26	0.77	Agree
Social Interaction and Values Development	Group A	SD	Group B	SD	VI
The recreational activities promote positive social interaction among students.	3.39	0.57	3.38	0.67	Strongly Agree
I learned the importance of cooperation and teamwork through these activities.	3.40	0.58	3.45	0.59	Strongly Agree
The activities encourage respect, fairness, and sportsmanship.	3.43	0.56	3.48	0.57	Agree
I experience a sense of belonging when participating in these activities.	3.32	0.63	3.35	0.66	Strongly Agree
Overall	3.38	0.58	3.41	0.62	Strongly Agree
Personal Responsibility and Self-Management	Group A	SD	Group B	SD	VI
The recreational activities encourage responsibility for my own health and fitness.	3.34	0.61	3.38	0.66	Strongly Agree
I developed better self-discipline in maintaining an active lifestyle.	3.27	0.68	3.31	0.68	Agree

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The course helps me manage my time effectively between academics and physical activity.	3.20	0.73	3.25	0.77	Agree
Overall	3.27	0.67	3.31	0.70	Strongly Agree
Relevance to Adult Life and Lifelong Engagement	Group A	SD	Group B	SD	VI
The recreational activities are relevant to adult life and long-term wellness.	3.36	0.60	3.37	0.66	Strongly Agree
I am likely to continue engaging in similar recreational activities after graduation.	3.23	0.71	3.24	0.75	Agree
The course helped me recognize recreational physical activity as part of a balanced lifestyle.	3.36	0.62	3.37	0.66	Strongly Agree
Overall	3.32	0.64	3.33	0.69	Strongly Agree

This table 2 presents the results of an independent samples t-test assuming unequal variances, conducted to determine whether a significant difference exists between Group A and Group B. It includes the mean, variance, number of observations, computed t-statistic, degrees of freedom, and corresponding p-values. The results serve as the basis for assessing the statistical significance of the difference between the two groups.

TABLE 2. Test of Significant Difference Between Group A and Group B Using t-Test (Unequal Variances)

Mean	3.148074534	3.18765792
Variance	0.26060544	0.295133683
Observations	576	491
Hypothesized Mean Difference	0	
df	1013	
t Stat	-1.218359613	
P(T<=t) one-tail	0.11168551	
t Critical one-tail	1.646359226	
P(T<=t) two-tail	0.223371019	
t Critical two-tail	1.962308565	

The independent samples t-test revealed that the difference between the two groups was not statistically significant, t(1013) = -1.22, p = .223. Since the obtained p-value was greater than the significance level of .05, the null hypothesis was not rejected. This indicates that there

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was no significant difference between Group A and Group B in terms of their measured responses.

The findings suggest that both groups exhibited comparable perceptions or levels of agreement regarding the variable being examined. Although Group B obtained a slightly higher mean score, the difference was not large enough to indicate a meaningful distinction between the groups.

Discussion

The findings indicate that students generally perceived recreational physical activities as contributing positively to multiple developmental domains. Among the identified domains, lifelong physical activity orientation obtained the highest ratings (M = 3.33, Strongly Agree), suggesting that students associated recreational participation with greater interest, confidence, and willingness to engage in physical activities beyond academic requirements. These findings align with the principles of self-determination theory, which emphasize that autonomy, competence, and positive experiences contribute to sustained engagement in health-related behaviors. Previous research similarly suggests that enjoyable and autonomy-supportive physical education experiences are associated with stronger motivation and intentions to maintain physical activity participation beyond structured settings (Wintle, 2022; Fierro-Suero et al., 2022; Reigal et al., 2024). Thus, recreational activities may serve as meaningful experiences that support students' orientation toward lifelong physical activity.

Similarly, the results for Physical Fitness and Functional Movement (M = 3.35, Strongly Agree) suggest that students perceived recreational activities as associated with improvements in physical competence, movement confidence, and fitness-related outcomes. This finding is consistent with research emphasizing that structured, varied, and functional movement-based activities are linked to enhanced physical fitness and movement proficiency among students (Li et al., 2023; Heinrich et al., 2023; Li et al., 2025). Rather than indicating direct improvement caused by participation, these findings suggest that engaging recreational activities may provide opportunities for students to develop physical capabilities and greater confidence in performing movement tasks.

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The Mental Health and Stress Management domain obtained a comparatively lower, although still positive, rating (M = 3.23, Agree). This indicates that students perceived recreational activities as beneficial for psychological well-being and stress management. Existing evidence suggests that physical activity participation is associated with improved emotional regulation, reduced psychological distress, and better coping responses among university students (Rodríguez-Romo et al., 2022; Teuber et al., 2024; Liu et al., 2024). However, the findings also suggest that recreational activities represent one contributing factor to student well-being, as psychological outcomes may also be influenced by academic demands, personal circumstances, and available support systems.

The findings on Social Interaction and Values Development (M = 3.32, Strongly Agree) highlight students' perceptions that recreational activities provide opportunities for collaboration, communication, sportsmanship, and belongingness. This supports literature emphasizing the social and character-building dimensions of physical education, particularly through cooperative learning and shared activity experiences (Zhou et al., 2023; Zhou & Colomer, 2024). Recreational activities may therefore function as environments where students develop interpersonal skills and social values alongside physical engagement.

Likewise, Personal Responsibility and Self-Management (M = 3.29, Strongly Agree) reflects students' perceptions that recreational participation is associated with increased responsibility, self-regulation, and behavioral management. Previous studies indicate that physical activity contexts can support autonomy, self-regulatory behaviors, and goal-oriented practices that are relevant to maintaining healthy lifestyles (Ahn & Kim, 2022; Olsen & Mehus, 2022; Pfeffer et al., 2023). These findings reinforce the role of recreational activities as learning environments where students may practice personal accountability and decision-making related to health behaviors.

The results for Relevance to Adult Life and Lifelong Engagement (M = 3.32, Strongly Agree) further indicate that students recognize the value of recreational activities beyond their academic experience. Research suggests that meaningful physical activity participation during young adulthood is associated with future activity patterns and health behaviors (Elsden et al., 2022; Lenze et al., 2024). Collectively, the findings across domains suggest that recreational

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physical activities may contribute to the development of positive perceptions, competencies, and behavioral orientations that support continued engagement in active lifestyles.

Regarding group differences, the independent samples t-test using Welch's correction showed no significant difference between Group A (M = 3.15, SD = 0.51) and Group B (M = 3.19, SD = 0.54), t(1013) = -1.22, p = .223. This indicates that the two groups demonstrated comparable perceptions regarding the assessed variable.

The consistently positive ratings across developmental domains suggest potential implications for higher education practice. While the findings do not establish causal effects, they indicate that recreational physical activities may be considered as a valuable component of university wellness initiatives. Higher education institutions may explore opportunities to integrate recreational and wellness-oriented physical activity experiences beyond the foundational years of college, particularly those that promote enjoyment, autonomy, social connection, and lifelong engagement. Such initiatives could complement existing physical education programs by supporting students' continued relationship with physical activity during the transition toward adulthood.

Several limitations should be acknowledged. The use of convenience sampling limits the generalizability of the findings beyond the study population. Additionally, the reliance on self-reported data may introduce response bias. Finally, the cross-sectional design prevents the establishment of causal relationships between recreational physical activity participation and developmental outcomes. Future studies may consider longitudinal approaches, probability sampling techniques, and objective measures of physical activity to further examine these relationships

Conclusions

This study confirms the essential and multifaceted function of recreational physical exercise in furthering the primary goals of higher education physical programs. In all six domains such as lifelong physical activity orientation, physical fitness and functional movement, mental health and stress management, social interaction and values development, personal responsibility and self-management, and relevance to adult life, students consistently

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exhibited favorable outcomes, with mean scores varying from “Agree” to “Strongly Agree.” These results demonstrate that leisure activities are not only supplemental elements of physical education but are essential mechanisms for promoting comprehensive student development. The robust results in lifelong physical activity orientation and adult-life relevance underscore the ability of recreational experiences to foster lasting health practices, intrinsic drive, and functional independence outside academic environments.

The lack of a statistically significant difference between the two groups indicates that the advantages of recreational physical activity are no significant difference was found between the groups irrespective of grouping characteristics. The similarity of responses across groups suggests that the perceived benefits of recreational physical activities may be applicable across comparable student populations. The findings indicate that factors such as enjoyment, accessibility, and personal relevance may contribute to students' positive perceptions of recreational activities, regardless of group membership. However, further research involving diverse populations and sampling approaches is needed to determine the broader applicability of these findings.

Collectively, these findings offer persuasive empirical evidence supporting the reclassification of physical education in higher education from a compliance-oriented obligation to a developmental and health-enhancing field. This study demonstrates that recreational physical activity significantly improves physical fitness, psychological well-being, social competence, and behavioral self-regulation.

Thus, the study may inform curricular enhancementsthat broaden physical education beyond the elementary years. Incorporating structured, recreational physical activity programs into the 3rd and 4th year levels presents a strategic opportunity to strengthen healthy health behaviors during a critical life stage. This method connects with public health concerns by tackling sedentary lifestyles and simultaneously improving students' ability for lifetime physical activity involvement.

This study suggests that incorporating structured recreational physical activity in higher education programs may support the promotion of active lifestyles and student well-being.

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However, further research using longitudinal and experimental designs is recommended to establish causal relationships and examine long-term effects more comprehensively.

Limitations

First, the use of convenience sampling limits the generalizability of the findings, as respondents were selected from a particular institutional environment and may not reflect the wider university community. Second, the use of self-reported data may introduce response biases, such as social desirability and recall bias, which could influence participants' perceptions of recreational physical activity. Third, the cross-sectional design constrains causal inference. Although notable correlations were identified among developmental categories, the study is unable to determine directional or causal links between recreational physical exercise and the reported results. Fourth, the study concentrates on perceptual data while excluding objective measures (e.g., physiological indicators or activity tracking), thereby limiting the capacity to authenticate genuine behavioral involvement and health-related consequences. Lastly, the research did not clearly account for confounding variables, such prior physical activity experience, academic demands, or environmental accessibility to facilities, which may have affected participants' responses. Future research may consider probability-based sampling, objective assessment methods, and longitudinal or experimental designs to strengthen external validity and provide stronger evidence regarding causal relationships.

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