European Journal of Physical Education and Sport Science
ISSN: 2501 - 1235
ISSN-L: 2501 - 1235
Available on-line at: www.oapub.org/edu

DOI: 10.46827/ejpe.v12i8.6183 Volume 12 | Issue 8 | 2025

EXPLORING THE NEXUS BETWEEN HEALTH-ENHANCING PHYSICAL ACTIVITY AND ENVIRONMENTAL SUSTAINABILITY

Simon Kormla Donkor[i]
Department of Basic Education,
School of Education and Life-Long Learning,
University of Education, Winneba,
Ghana
orcid.org/0009-0000-9819-1607

Abstract:
This study examined the relationship between health-enhancing physical activity (HEPA) and environmental sustainability. Guided by the Health Belief Model (HBM), this study used a positivist research philosophy and quantitative approach and a correlational research design. The study employed a stratified sampling technique to select 390 students. Data were collected through a self-developed questionnaire with a Cronbach's reliability coefficient of 0.84 and analysed using frequency, percentages, means, standard deviations, as well as Pearson's Product-Moment Correlation. Findings indicate that students engage in moderate but mostly structured physical activities, with academic workload and screen time as key barriers to self-initiated participation. While students recognize the importance of environmental sustainability, their active engagement in sustainability efforts remains limited. A moderate but statistically positive relationship was found between physical activity engagement and environmental sustainability attitudes, suggesting that integrating eco-friendly initiatives into physical education can enhance both student participation and environmental responsibility. The study recommends incorporating sustainability-focused activities such as eco-walks, recycling programs, and awareness campaigns in schools. These strategies can promote independent physical activity while fostering environmental stewardship, contributing to holistic student well-being and ecological consciousness.

Keywords: physical activity, environmental sustainability, health-enhancing, physical education, student engagement, eco-friendly practices

[i] Correspondence: email ksdonkor@uew.edu.gh

1. Introduction

In recent times, there has been a growing awareness of the connection between health-enhancing physical activity (HEPA) and environmental sustainability. HEPA, defined by the World Health Organization (WHO) (2020) as any physical activity that is sufficiently intense to improve health outcomes, has been identified as one of the most cost-effective ways to prevent chronic diseases such as cardiovascular disease, diabetes, and obesity. Simultaneously, the necessity for sustainable practices to lower carbon emissions, save natural ecosystems, ensure future ecological balance, combat climate change and environmental deterioration has been highlighted by the expanding amount of research on these topics. The interaction between these two domains (health and sustainability) has significant implications for urban planning, public policy, and lifestyle choices. For example, promoting walking, cycling, and other forms of active transportation not only improves individual health outcomes (Donkor & Seibu, 2019) but also reduces greenhouse gas emissions. Likewise, urban green spaces, which support both physical activity and environmental sustainability, contribute to biodiversity, improve air quality, and provide recreational opportunities.

In educational contexts, the value of physical activity in fostering health and well-being has long been acknowledged, particularly in schools where students are exposed to various forms of physical education (PE). In many educational systems, physical education has been identified as a key avenue for fostering both physical fitness and lifelong healthy behaviours. Regular participation in health-enhancing physical activities (HEPA), including exercises such as walking and cycling that involve moderate to vigorous physical exertion, has been shown to improve physical health, enhance mental well-being, and contribute to academic success (Donkor, 2025; Goh & Monyeki, 2014). However, despite its acknowledged benefits, engagement in physical activities among school-aged children and adolescents often remains suboptimal, particularly in developing countries where barriers such as academic workload, lack of motivation, and limited resources hinder active participation (Bélanger *et al.*, 2011; Brassington *et al.*, 2012). Simultaneously, environmental sustainability has become an urgent issue globally, with increasing concern about the environmental impacts of human activities. In the context of physical education, this includes the environmental sustainability of sports and exercise activities, the maintenance of eco-friendly sports facilities, and the promotion of sustainable behaviours such as waste reduction and resource conservation within the school environment (Gamage *et al.*, 2016). Students' attitudes towards environmental sustainability, particularly in relation to physical education, can play a critical role in cultivating positive environmental behaviours. This is important because fostering such attitudes in young people not only influences their actions during school activities but can also affect their future decision-making regarding sustainability practices (Orr, 2004). The integration of environmental sustainability into physical education has the potential to link the benefits of physical activity with environmental awareness. By encouraging students to engage in physical activities that promote environmental stewardship, such

as eco-walks, recycling programs in sports, and green initiatives, schools can create a more sustainable environment while simultaneously promoting healthier, more active lifestyles (Maxwell *et al.*, 2018). However, research on the intersection of physical activity participation and environmental sustainability within educational settings remains limited, particularly in senior high schools. Incorporating the Health Belief Model (HBM) into the study provides a theoretical framework for cognitizing students' attitudes and behaviours towards both physical activity and environmental sustainability. According to Becker (1974) Health Belief Model (HBM), people are more inclined to adopt health-promoting behaviours when they feel that their health is in danger and that acting will have more advantages than disadvantages. In this study, the model helps to explore how students' perceptions of health risks, environmental threats, and the benefits of engaging in physical activities may influence their engagement in both health-enhancing physical activity and sustainability efforts. This research aims to explore whether these two areas, physical activity and environmental sustainability, are related, and how schools can strategically integrate both into their programs to promote a more holistic approach to student health and environmental awareness.

2. Statement of the Problem

Over the past decade, there has been a notable downturn in the physical activity levels among senior high school students (Seidu *et al.*, 2020). A combination of academic workload, increased screen time, and lack of motivation has been identified as a significant barrier to student participation in physical activities (Morrow *et al.*, 2018; Oyeyemi *et al.*, 2017; Strong *et al.*, 2005). While physical activity is essential for physical health, mental well-being, and academic performance (Bailey, 2005), many learners do not regularly participate in physical activities that improve their health despite the well-established benefits (Sallis *et al.*, 2012). Research suggests that structured physical education (PE) classes may be the primary source of activity for students, but self-initiated, independent engagement in physical activities outside of school hours remains limited (Biddle *et al.*, 2019). This creates a gap in our understanding of how personal motivation and external factors impact sustained participation in physical activity among students.

In parallel, environmental sustainability has become a critical global issue, and educational settings are being called upon to play a more active role in promoting environmental awareness and responsibility (UNESCO, 2014). While some studies suggest that students are increasingly aware of environmental concerns, such as pollution and resource conservation (Davis & Elliott, 2014), their direct involvement in sustainability efforts within schools remains limited (Gage *et al.*, 2020; Wamala, 2010). Although schools can promote sustainability through eco-friendly practices and environmental education, there is a lack of empirical evidence on how environmental attitudes intersect with students' involvement in physical activities, particularly in the context of physical education.

While there is growing recognition that physical activity programs could integrate sustainability initiatives (such as eco-walks, green sports events, and waste-reduction efforts) to foster both physical and environmental responsibility (Cao, 2015; Sallis *et al.*, 2012), the relationship between students' engagement in health-enhancing physical activities and their attitudes toward environmental sustainability remains underexplored. It is essential to investigate how participation in physical activity influences students' environmental attitudes, as well as how environmental consciousness may, in turn, impact their engagement in physical activities. Because of this vacuum in the literature, more research is needed to determine how incorporating sustainability into physical education programs could improve students' ecological responsibility and general well-being; hence, this study sought to bridge this nexus by exploring the relationship between students' participation in health-enhancing physical activities and their attitudes toward environmental sustainability.

3. Research Objectives

The study sought to:

1) assess the level of health-enhancing physical activity among senior high school students.
2) ascertain senior high school students' attitude towards environmental sustainability.
3) determine the relationship between health-enhancing physical activity and environmental sustainability among senior high school students.

3.1 Research Questions

The research questions were:

1) What is the level of engagement in health-enhancing physical activities among senior high school students?
2) What is the attitude of senior high school students towards environmental sustainability?

3.2 Hypothesis

The hypothesis below was tested.

H_{01}: There is no statistically significant relationship between health-enhancing physical activity and environmental sustainability among senior high school students.

It is hoped that this study will inspire the populace to choose walking, biking, or other forms of exercise that do not rely on vehicles. Not only do these activities boost our health, but they also help reduce greenhouse gas emissions and air pollution, making the planet healthier for everyone.

4. Theoretical Framework

The Health Belief Model (HBM), developed by Becker (1974), explains health-related behaviours based on individuals' perceptions of risk, benefits, barriers, and self-efficacy. The model suggests that people engage in health behaviours when they perceive themselves as susceptible to health risks, recognize the severity of consequences, believe in the benefits of taking action, and have minimal perceived barriers. Additionally, cues to action (external triggers) and self-efficacy (confidence in one's ability) influence behavioural change. This study applies the HBM to examine senior high school students' engagement in health-enhancing physical activity (HEPA) and environmental sustainability behaviours. Students who perceive the health risks of physical inactivity and environmental degradation may be more likely to adopt active lifestyles and sustainable habits. Perceived benefits, such as improved well-being and a cleaner environment, reinforce these behaviours, while perceived barriers, such as a lack of facilities or awareness, may hinder them. Schools can provide cues to action, such as awareness programs and eco-friendly initiatives, to encourage participation. Self-efficacy plays a key role, as students who are confident in their ability to engage in physical activity and sustainable practices are more likely to do so. The HBM, therefore, provides a framework for understanding the factors influencing students' behaviours and guiding interventions that promote active and environmentally responsible lifestyles.

5. Methodology

Positivism, the scientific theory that underpins this investigation, is predicated on the idea that reality is quantifiable, objective, and unaffected by human experience (Creswell, 2014). Positivist research relies on empirical data and statistical analysis to establish patterns, relationships, and generalizable conclusions (Saunders, Lewis, & Thornhill, 2019). This study examines the relationship between health-enhancing physical activity (HEPA) and environmental sustainability among senior high school students, using quantitative methods to test hypotheses and establish causal relationships. Premised on a positivist paradigm, the study ensures objectivity, reliability, and systematic analysis of data, allowing for a comprehensive understanding of the factors influencing students' engagement in HEPA and sustainable behaviours.

In order to test hypotheses and investigate correlations between variables, the study uses a quantitative research technique, which entails the methodical collection and analysis of numerical data (Creswell & Creswell, 2018). A quantitative approach is appropriate as it allows for statistical examination of the relationship between HEPA and environmental sustainability, ensuring precision, replicability, and generalizability of findings. This approach enables the use of structured instruments, such as surveys, to gather standardized responses from a large sample (Bryman, 2016). The data was analysed using statistical tools, providing empirical evidence to support or refute the hypothesis.

This study utilizes a correlational research design, which aims to describe characteristics of a population and examine relationships between variables without manipulating them (Babbie, 2020). The descriptive component assesses students' engagement in HEPA and their attitudes toward environmental sustainability, while the correlational aspect determines the strength and direction of the relationship between these variables (Cohen, Manion, & Morrison, 2018). This design is suitable as it provides insights into the extent to which HEPA influences environmental sustainability behaviours among senior high school students

The study population comprises senior high school students who engage in various levels of physical activity and are exposed to environmental sustainability education. This population is chosen because adolescents are at a crucial stage where lifelong habits regarding physical activity and environmental responsibility are developed (WHO, 2020). The sample size was 390 students, which was informed by Cochran's (1977) formula, ensuring a statistically representative selection of students. A proportionate stratified random sampling technique is employed, dividing the population into strata based on gender to ensure diversity (Kumar, 2019). From each stratum, a simple random sampling method is used to select participants, ensuring fairness and minimizing selection bias. This approach enhances the reliability and generalizability of the findings.

A structured questionnaire serves as the primary research instrument, comprising closed-ended questions to ensure consistency and ease of analysis (Dillman, Smyth, & Christian, 2014). The questionnaire consists of three sections: Demographic Information (age, gender, school level); Health-Enhancing Physical Activity (HEPA) Scale-assessing students' engagement in physical activities; Environmental Sustainability Attitude Scale-measuring students' perceptions and behaviours toward sustainability. The instrument was pretested to ensure clarity and appropriateness for the target population. Validity refers to the extent to which the research instrument accurately measures what it intends to measure (Creswell & Plano Clark, 2018). Content validity is ensured by seeking expert reviews from physical education and environmental science educators, while construct validity is established through factor analysis of questionnaire items. Reliability refers to the consistency of the instrument over repeated applications (Tavakol & Dennick, 2011). A pilot study is conducted, and Cronbach's alpha coefficient is used to assess the internal consistency of the questionnaire. A reliability coefficient of 0.84 was obtained. Field (2018) and Taber (2018) assert that a reliability of 0.70 or more is considered acceptable.

Data collection follows ethical and systematic procedures to ensure accuracy and integrity. First, permission is sought from school authorities, and informed consent is obtained from participants. The questionnaires are administered in person during school hours to maximize response rates. Participants are given clear instructions, and researchers remain available to clarify doubts. The completed questionnaires are collected and stored securely for analysis. Data was analysed using Statistical Package for the Social Sciences (SPSS). The analysis includes descriptive statistics like the frequency distributions, mean, and standard deviation to summarize data. The results

were presented in tables, and pie charts for easy interpretation. Furthermore, the association between HEPA and environmental sustainability was investigated using Pearson's correlation.

Ethical guidelines are followed to ensure participants' rights, privacy, and safety. Ethical approval is obtained from the school authorities of selected schools. Participants are provided with informed consent forms detailing the study's purpose, voluntary participation, confidentiality, and the right to withdraw at any stage (Bryman, 2016). Anonymity is maintained by using coded responses instead of personal identifiers. Data is securely stored and used strictly for academic purposes. Additionally, the study adheres to principles of non-maleficence, as emphasized by Resnik (2020), ensuring no harm or distress is caused to participants during data collection.

6. Results and Discussion

6.1 Demographic Data

The demographic characteristics of the study participants provide essential insights into their engagement in health-enhancing physical activities and attitudes toward environmental sustainability. The data includes gender, age group, and grade level distributions, which are crucial for interpreting the study's findings.

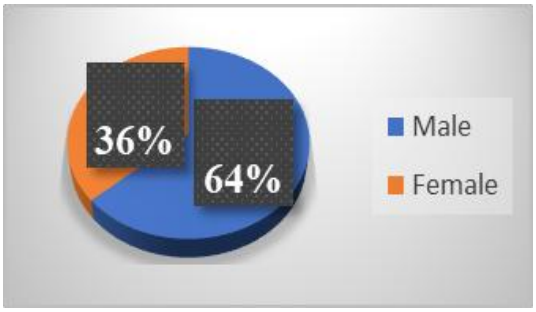

Figure 1: Gender Distribution

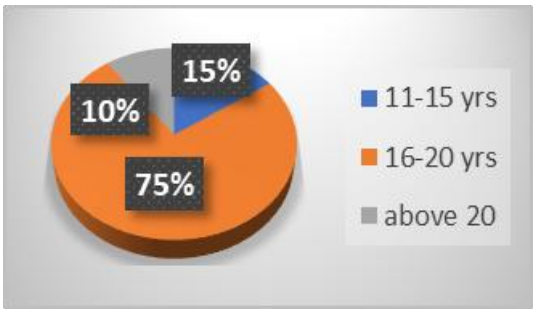

Figure 2: Age Distribution

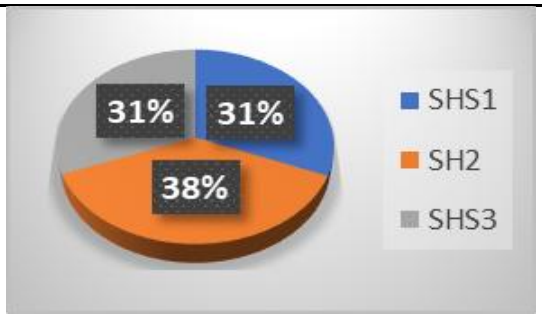

Figure 3: Grade Level

The gender distribution indicates that 248 (63.6%) of participants were male, while 142 (36.4%) were female. This imbalance suggests potential gender differences in participation rates, with previous research indicating that males are generally more physically active than females (WHO, 2020). The lower female representation may influence the overall findings on environmental sustainability attitudes, stressing the need for focused interventions to encourage female participation in physical activities and male engagement in environmental issues.

The age distribution shows that 291 (74.6%) of students were between 16 and 20 years old, 60 (15.4%) were between 11 and 15 years, and 39 (10.0%) were above 20 years. This indicates that most students are in their mid to late adolescence, a critical period for developing lifelong health behaviours. Older students may have a more developed understanding of environmental sustainability, but their lower proportion in the sample means the study's findings are more representative of younger adolescents.

The grade level distribution is fairly balanced, with 122 (31.3%) in SHS 1, 147 (37.7%) in SHS 2, and 121 (31.0%) in SHS 3. This suggests that the study findings are not biased toward any particular grade level. However, research suggests that SHS 3 students may engage less in physical activities due to academic pressure. Additionally, they may have a better grasp of environmental sustainability topics due to curriculum progression.

Research Question 1: What is the level of engagement in health-enhancing physical activities among senior high school students?

The analysis of Research Question 1 sought to determine the level of engagement in health-enhancing physical activities among senior high school students. The results in Table 1 provide insights into the extent to which students participate in various physical activities, with mean (M) scores indicating the frequency of engagement and standard deviation (SD) representing variability in responses.

Table 1: Students' engagement in health-enhancing physical activities

Statement	N	M	SD
I engage in at least 30 minutes of moderate-to-vigorous physical activity most days of the week.	390	2.45	0.52
I regularly participate in school-organized physical education (PE) classes and actively take part in exercises.	390	2.41	0.33
I am involved in extracurricular sports activities such as football, basketball, volleyball, or athletics.	390	2.41	0.43
I walk or cycle to school or other destinations as part of my daily routine.	390	3.12	0.51
I spend my free time engaging in physical activities such as jogging, dancing, or playing outdoor games.	390	2.02	0.46
I participate in household chores that require physical effort, such as sweeping, scrubbing, or lifting objects.	390	2.38	0.84
I take part in inter-school or community sports competitions.	390	2.71	0.63
I engage in flexibility and strength-training exercises, such as stretching, push-ups, or lifting weights.	390	2.61	0.56
I reduce my screen time (e.g., watching TV, playing video games) to make time for physical activities.	390	2.15	0.42
I engage in physical activities even when I have academic work or assignments to complete.	390	1.44	0.73
I initiate and organize physical activities with my peers, such as group workouts or friendly matches.	390	2.43	0.73
I monitor my physical activity levels by tracking my exercise routines or setting fitness goals.	390	2.12	0.41
I maintain a consistent routine of engaging in physical activities regardless of external encouragement	390	2.02	0.56
Mean of means/standard deviation	**390**	**2.33**	**0.55**

Key: N = Number of Respondents; M = Mean; SD = Standard Deviation.
Source: Fieldwork, 2024.

The results on engagement of students in health-enhancing physical activities indicate a moderate level of participation, with an overall mean score of 2.33 (SD = 0.55). While some activities, particularly those incorporated into daily routines, showed higher engagement, other activities that required self-initiation or time commitment were less frequently practiced. This suggests that students engage in physical activities more out of necessity or structured programs rather than self-motivation.

One of the most commonly engaged activities was walking or cycling to school (M = 3.12, SD = 0.51). This indicates that students are more likely to be physically active when transportation options necessitate movement. The relatively high engagement in inter-school or community sports competitions (M = 2.71, SD = 0.63) and flexibility and strength-training exercises (M = 2.61, SD = 0.56) suggests that students participate in structured and organized physical activities, particularly those with a competitive element or instructional guidance. This highlights the importance of school-organized programs in promoting physical activity.

Moderate engagement was observed in school-organized physical education (M = 2.41, SD = 0.33) and extracurricular sports (M = 2.41, SD = 0.43), indicating that while

students take part in these activities, their participation levels are not as high as expected. The low standard deviation in these responses suggests consistency in students' engagement levels across the sample. Additionally, participation in household chores requiring physical effort (M = 2.38, SD = 0.84) and peer-initiated physical activities (M = 2.43, SD = 0.73) was moderate, suggesting that students engage in physical activities more when structured by external forces such as school schedules or home responsibilities.

However, the study found low engagement in self-initiated activities, particularly in engaging in physical activity despite academic workload (M = 1.44, SD = 0.73). This suggests that academic responsibilities serve as a significant barrier to students' participation in physical activities. Additionally, reducing screen time for physical activity (M = 2.15, SD = 0.42) and tracking fitness progress (M = 2.12, SD = 0.41) received low scores, indicating that students are not proactive in monitoring their physical activity levels or prioritizing exercise over screen-based entertainment. This highlights a lack of awareness or motivation to engage in consistent physical activity outside of structured programs. The findings indicate that while students engage in moderate levels of physical activity, their participation is largely structured rather than self-initiated. Academic workload, screen time, and lack of motivation serve as key barriers to physical activity engagement. However, their involvement in self-directed activities such as jogging, cycling, or personal fitness routines was lower. This trend can be explained through the perceived barriers component of the HBM, which suggests that individuals are less likely to engage in health behaviours when faced with obstacles such as academic workload, lack of time, or low motivation. The results show that many students struggle with time constraints and competing academic responsibilities, which limit their ability to engage in self-initiated physical activities. These findings are consistent with previous studies. Bailey *et al.* (2013) found that secondary school students often engage in physical activities only when they are structured by schools, with low participation in independent exercise routines. Similarly, Dumith *et al.* (2011) found that adolescents experience a significant decline in physical activity due to competing academic and social demands. This suggests that schools play a crucial role in shaping students' physical activity habits, and interventions should address barriers such as academic pressure and screen time to encourage a more active lifestyle.

Research Question 2: What is the attitude of senior high school students towards environmental sustainability?

Research Question 2 explored the attitude of senior high school students towards environmental sustainability. As environmental issues become increasingly urgent on a global scale, fostering environmentally responsible attitudes among youth is essential. The role of educational institutions, particularly through physical education programs, is critical in shaping students' perspectives on sustainability. The result is presented in Table 2.

Table 2: Students' attitude towards environmental sustainability

Statement	N	M	SD
I believe outdoor physical activities should be conducted in clean and well-maintained environments.	390	3.24	0.32
I feel responsible for keeping sports fields and exercise areas free from litter and waste.	390	2.53	0.40
I am concerned about the impact of pollution on air quality and its effect on my ability to engage in physical activities.	390	2.52	0.49
I believe schools should promote eco-friendly practices in physical education.	390	3.10	0.66
I feel motivated to participate in environmental initiatives that improve outdoor spaces for physical activities.	390	3.47	0.71
I think conserving water and energy in school sports facilities is important for sustainability.	390	2.96	0.34
I support using eco-friendly materials and equipment in physical education.	390	3.29	0.41
I feel satisfied when engaging in physical activities that promote both fitness and environmental awareness, such as eco-walks and green runs.	390	2.54	0.42
I believe maintaining green spaces in schools and communities encourages greater participation in physical activities.	390	2.53	0.30
I am willing to take personal actions, such as disposing of waste properly during sports activities.	390	2.32	0.45
I feel that environmental sustainability should be integrated	390	2.50	0.46
Mean of means/standard deviation	**390**	**2.82**	**0.45**

Key: N = Number of Respondents; M = Mean; SD = Standard Deviation.
Source: Fieldwork, 2024.

The results on senior high school students' attitudes towards environmental sustainability in the context of physical education indicate a moderately positive disposition, with an overall mean score of 2.82 (SD = 0.45). This suggests that while students generally recognize the importance of environmental sustainability, their commitment to taking personal actions for environmental conservation remains relatively low. A significant proportion of students expressed strong agreement - maintained environments (M = 3.24, SD = 0.32), highlighting their awareness of the importance of a hygienic setting for engaging in physical activities. Similarly, students strongly supported the promotion of eco-friendly practices in physical education (M = 3.10, SD = 0.66) and the use of eco-friendly materials and equipment (M = 3.29, SD = 0.41). These responses suggest that students are receptive to integrating environmental consciousness into their physical activity routines when institutional policies support such efforts.

Moreover, the students demonstrated high motivation to participate in environmental initiatives that enhance outdoor spaces for physical activities (M = 3.47, SD = 0.71). This finding indicates that engaging students in projects such as tree planting, waste management campaigns, and eco-friendly sports events could significantly boost their environmental responsibility. However, students perceived personal responsibility for keeping sports fields and exercise areas clean was moderate (M = 2.53, SD =0.40), suggesting that while they value sustainability, they may rely more on external

enforcement rather than personal initiative. Concerns about the impact of pollution on air quality and physical activity participation were moderate (M = 2.52, SD = 0.49), reflecting an awareness of environmental challenges but a lack of active advocacy or behavioural change. Similarly, while students acknowledged the importance of conserving water and energy in school sports facilities (M = 2.96, SD = 0.34), their willingness to take personal actions, such as disposing of waste properly during sports activities (M = 2.32, SD =0.45), was relatively low. Furthermore, students moderately agreed that maintaining green spaces in schools and communities encourages greater participation in physical activities (M = 2.53, SD =0.30). This underscores the need for schools to invest in green spaces to promote both health-enhancing physical activity and environmental sustainability. The results suggest that while students recognize the importance of environmental sustainability in physical education, their direct engagement in sustainability efforts is limited. Schools should consider integrating sustainability-focused physical activities such as eco-walks, recycling programs in sports, and awareness campaigns to reinforce positive environmental attitudes. However, their actual participation in sustainability actions, such as properly disposing of waste during sports activities or engaging in environmental initiatives to improve outdoor spaces was comparatively lower. This pattern aligns with the self-efficacy and perceived benefits constructs of the HBM. While students recognize the benefits of environmental sustainability, they may lack confidence or awareness about how to actively contribute to environmental conservation efforts. A study by Collado and Evans (2019) found that while young people generally hold pro-environmental attitudes, their ability to engage in sustainability practices is influenced by access to environmental education and institutional support. Similarly, Tonge *et al.* (2015) found that students who are directly involved in environmental sustainability programs, such as school-based recycling or tree planting initiatives, exhibit stronger environmental responsibility than those who only receive theoretical knowledge on the topic.

H_{o1}: There is no statistically significant relationship between health-enhancing physical activity and environmental sustainability among senior high school students. This hypothesis was tested to determine whether students' engagement in physical activities is linked to their attitudes and behaviours toward environmental sustainability. Given the increasing emphasis on promoting both active lifestyles and eco-friendly practices in schools, understanding this relationship is crucial for developing integrated physical education and sustainability programs.

The interpretation of the strength of the correlation was based on a widely used scale for correlation coefficients (r), which measures the linear relationship between two variables. This scale follows the guidelines popularized by social science researchers Kothari and Garg's (2019).

Table 3: Interpretation of the strength of correlation

Correlation Coefficient (r)	Strength of Relationship
r=<0.3	Weak relationship
r=>0.30 but≥0.50	Moderate relationship
r=≥0.50	Strong relationship

Table 4: Relationship between health-enhancing physical activity and environmental sustainability (N = 390)

Variable	Mean	SD		HEPA	ES
HEPA	2.33	0.55	Pearson Correlation	1	0.671**
			Sig. (2-tailed)		0.001
ES	2.82	0.45	Pearson Correlation	0.671**	1
			Sig. (2-tailed)	0.001	

Key: HEPA ES = Environmental Sustainability
Source: Fieldwork, 2024.

The Pearson correlation results in Table 4 indicate a strong positive correlation (r = 0.671, p = 0.000) between HEPA and ES, suggesting that students who actively engage in physical activities are more likely to exhibit positive attitudes and behaviours toward environmental sustainability.

Since the p-value (< 0.001) is less than the standard significance level of 0.05, the null hypothesis (Ho_1) is rejected, indicating a statistically significant relationship between health-enhancing physical activity and environmental sustainability. This suggests that incorporating sustainability-focused activities into physical education programs, such as eco-walks, bikeability, recycling initiatives in sports, and awareness campaigns on environmental conservation, can strengthen both students' engagement in physical activities and their environmental responsibility. This relationship can be explained using the cue to action component of the HBM, which suggests that external influences, such as structured programs and peer encouragement, can reinforce behaviour change. Schools that promote eco-friendly physical activities, such as outdoor fitness programs in green spaces, eco-friendly sports events, and sustainability-themed PE lessons, may cultivate both physical activity engagement and environmental consciousness among students. Tappe *et al.* (2013) found that students who regularly engage in outdoor physical activities develop a stronger appreciation for environmental conservation. Similarly, Muller *et al.* (2020) found that integrating sustainability themes into physical education fosters both physical well-being and environmental stewardship in students. These findings suggest that physical activity programs that incorporate sustainability elements may have a dual impact on students' health and their pro-environmental attitudes.

7. Findings

The results indicate that while students engage in moderate levels of physical activity, their participation is largely structured rather than self-initiated. Academic workload, screen time, and lack of motivation serve as key barriers to physical activity engagement. The results again suggest that while students recognize the importance of environmental sustainability in physical education, their direct engagement in sustainability efforts is limited. Schools should consider integrating sustainability-focused physical activities such as eco-walks, recycling programs in sports, and awareness campaigns to reinforce positive environmental attitudes. Finally, this suggests that incorporating sustainability-focused activities into physical education programs, such as eco-walks, recycling initiatives in sports, and awareness campaigns on environmental conservation, can strengthen both students' engagement in physical activities and their environmental responsibility.

8. Conclusions

The study highlights the interconnected nature of physical activity engagement and environmental sustainability among senior high school students. While students show moderate levels of physical activity participation, structural barriers such as academic workload and lack of motivation hinder independent engagement. Additionally, although students express positive attitudes toward environmental sustainability, their direct involvement in sustainability practices remains limited. The findings suggest that a more integrated approach to physical education, one that incorporates sustainability-focused activities, can bridge the gap between awareness and action. The results also demonstrate a moderate positive relationship between health-enhancing physical activity and environmental sustainability. This implies that promoting environmentally sustainable practices within physical education can encourage greater student participation in both health and environmental initiatives. Schools play a crucial role in shaping students' behaviours, and structured interventions can significantly influence students' attitudes and actions toward sustainability and physical activity.

8.1 Recommendations

Given these findings, it is evident that promoting sustainability-oriented physical education programs can serve as a strategic approach to improving both physical activity levels and environmental consciousness among students. It is recommended that schools should consider: Reducing barriers to self-directed physical activity by creating flexible exercise programs, promoting active transportation (walking and cycling), and integrating physical activity into daily school routines. Incorporating sustainability education into PE programs, such as awareness campaigns on eco-friendly sports practices, tree planting events linked to outdoor activities, and sustainability-themed fitness challenges. Lastly, encouraging student-led sustainability initiatives, such as

waste management in sports areas, energy conservation in school sports facilities, and peer-led fitness programs in green spaces.

Conflict of Interest Statement

The author declares no conflicts of interest.

About the Author(s)

Simon Kormla Donkor is a Senior Lecturer in the Department of Basic Education at the University of Education, Winneba, Ghana. He has held several key positions including Internship Coordinator, Faculty of Educational Studies Examinations Officer, Supported Teaching in Schools Coordinator, and presently serves as academic counsellor and the Examinations Coordinator at the Institute for Teacher Education and Continuing Professional Development (ITECPD) at the University of Education, Winneba. He is currently pursuing a PhD in the Department of Health, Physical Education and Sports at the University of Cape Coast, Ghana. Simon holds a Master of Philosophy (MPhil) degree in Health, Physical Education, Recreation and Sports from the University of Education, Winneba (2012–2014). He also earned his undergraduate degree from the Department of Health, Physical Education and Sports at the University of Cape Coast, and completed a three-year Post-Secondary Teacher Training Certificate program at Amedzofe Training College (now E. P. College of Education) from 2001 to 2004. His teaching and research interests encompass Physical Education, Curriculum and Pedagogy, Teacher Education and Classroom Practices, as well as Environmental Sustainability through Physical Education. He has actively participated in various symposiums and research projects that contribute to physical education pedagogy and innovations in Ghana.

References

Bailey R. (2006). Physical education and sport in schools: a review of benefits and outcomes. *The Journal of School Health, 76*(8), 397–401. https://doi.org/10.1111/j.1746-1561.2006.00132.x

Becker, M. H. (1974). The Health Belief Model and Personal Health Behavior. *Health Education Monographs, 2*(4), 324-508. http://dx.doi.org/10.1177/109019817400200407

Bélanger, M., Donovan, D., & Jacob, L. (2011). Influence of screen time on physical activity in children and adolescents: A systematic review. *Journal of Public Health, 33*(3), 222-232.

Biddle, S. J. H., Asare, M., & Vella, S. A. (2019). Physical activity and health outcomes in children and adolescents: An update. *Journal of Sport and Health Science*, *8*(1), 1-13.

Brassington, G. S., Hekler, E. B., Cohen, Z., & King, A. C. (2012). Health-enhancing physical activity. In A. Baum, T. A. Revenson, & J. Singer (Eds.), *Handbook of health psychology* (2nd ed., pp. 353–374). Psychology Press.

Bryman, A. (2016). *Social Research Methods* (5th ed.). Oxford University Press.

Cao Z. (2015). Physical Activity Levels and Physical Activity Recommendations in Japan. In: Kanosue K, Oshima S, Oka K, Cao Z, editors. *Physical Activity, Exercise, Sedentary Behaviour and Health*. Japan: Springer; 2015: 3-15. 6. Fox KR. Retrieved from https://link.springer.com/book/10.1007/978-4-431-55333-5

Cohen, L., Manion, L., & Morrison, K. (2018). *Research Methods in Education* (8th ed.). Routledge. https://doi.org/10.4324/9781315456539

Davis, J. L., & Elliott, M. (2014). Environmental sustainability in education: The role of school programs. *Environmental Education Research*, *20*(4), 478-499.

Donkor, S. (2025). Exploring Cycling Behaviours and Influences: A Study of Junior High School Students in the Effutu Municipality. *Advances in Physical Education*, *15*(1), 12-31. Doi: 10.4236/ape.2025.151002.

Donkor, S.K & Seibu, M (2019). Closing the Sedentary Lifestyle Gaps: Investigating the Factors Influencing Exercise and Physical Activity Habits among Sandwich Students of University of Education, Winneba. *Journal of Physical Activity Research,* 2019, *4*(1), 73-79. http://dx.doi.org/10.12691/jpar-4-1-10

Field, A. (2013). *Discovering Statistics Using SPSS* (4th ed.). Sage Publications. Retrieved from https://books.google.ro/books/about/Discovering_Statistics_Using_IBM_SPSS_St.html?id=srb0a9fmMEoC&redir_esc=y

Fink, A. (2017). *How to Conduct Surveys: A Step-by-Step Guide* (6th ed.). Sage Publications. Retrieved from https://eric.ed.gov/?id=ED565650

Gage, A. J., Adams, D., & Saito, E. (2020). The environmental attitudes of high school students and implications for sustainability education. *Journal of Environmental Education*, *48*(3), 214-229.

Gamage, K. A. A., Dissanayake, D. M. R. S., & Wijesiri, N. S. (2016). Sustainability in Physical Education and Sport. *Journal of Sustainability in Education, 12*(1), 42-56.

Goh, S. L., & Monyeki, M. A. (2014). Physical activity and health-related fitness among children and adolescents: Evidence from South African studies. *South African Journal of Sports Medicine, 26*(4), 118-123.

Iwuala, S. O, Sekoni, A. O, Olamoyegun, M. A, Akanbi, M. A, Sabir, A. A, Ayankogbe, O. O. (2015). Self-reported physical activity among health care professionals in South-West Nigeria. *Niger J ClinPract. 18(7*), 790-795. Retrieved from https://doi.org/10.4103/1119-3077.163275

Janz, N. K., & Becker, M. H. (1984). The Health Belief Model: A Decade Later. *Health Education Quarterly, 11*(1), 1-47. https://doi.org/10.1177/109019818401100101

Kothari, C. R., & Garg, G. (2019). *Research Methodology: Methods and Techniques* (4th ed.). New Age International Publishers, New Delhi. Retrieved from https://repository.dinus.ac.id/docs/ajar/Kothari_-_Research_Methodology_Methods_and_Techniques_-_2004.pdf

Maxwell, J., McKinley, R., & Johnson, M. (2018). Sustainability in physical education: Promoting environmental responsibility through physical activity. *Environmental Education Research, 24*(5), 673-689.

Mertens, D. M. (2014). *Research and Evaluation in Education and Psychology: Integrating Diversity with Quantitative, Qualitative, and Mixed Methods* (4th ed.). Sage Publications. Retrieved from https://us.sagepub.com/en-us/nam/research-and-evaluation-in-education-and-psychology/book277790

Morrow, J. R., Haskell, W. L., & Blair, S. N. (2018). Physical activity and health: A report of the Surgeon General. *U.S. Department of Health and Human Services*. Retrieved from https://profiles.nlm.nih.gov/spotlight/nn/catalog/nlm:nlmuid-101584932X106-doc

Orr, D. W. (2004). *Earth in Mind: On Education, Environment, and the Human Prospect*. Island Press. Retrieved from https://www.uwosh.edu/sirt/wp-content/uploads/sites/86/2017/08/Orr_Earth-in-Mind.pdf

Oyeyemi, A. L, Muhammed. S, Oyeyemi, A. Y, Adegoke, B. O. A, (2017). Patterns of objectively assessed physical activity and sedentary time: Are Nigerian health professional students complying with public health guidelines? PLoS ONE.12:1-14. https://doi.org/10.1371/journal.pone.0190124

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the Health Belief Model. *Health Education Quarterly*, *15*(2), 175-183. Retrieved from https://pubmed.ncbi.nlm.nih.gov/3378902/

Sallis, J. F., Owen, N., & Fisher, E. B. (2012). *Ecological models of health behavior*. In *Health behavior and health education: Theory, research, and practice* (pp. 465-485). Jossey-Bass. https://psycnet.apa.org/record/2008-17146-000

Seidu, A. A, Ahinkorah, B. O, Agbaglo, E, Darteh, E.K.M, Ameyaw, E.K., *et al.* (2020) . Are senior high school students in Ghana meeting WHO's recommended level of physical activity? Evidence from the 2012 Global School-based Student Health Survey Data. PLOS ONE 15(2). https://doi.org/10.1371/journal.pone.0229012

Strong, W. B., Malina, R. M., & Blimkie, C. J. R. (2005). Evidence-based physical activity for school-age youth. *Journal of Pediatrics*, 146(6), 732-737. https://doi.org/10.1016/j.jpeds.2005.01.055

UNESCO. (2014). Shaping the future we want: UN Decade of Education for Sustainable Development (2005-2014). *United Nations Educational, Scientific and Cultural Organisation*. Retrieved from https://unesdoc.unesco.org/ark:/48223/pf0000230171

Wamala S. (2010). Physical Activity in the Prevention and Treatment of Disease. Swedish National Institute of Public Health. Sweden: Swedish National Institute of Public Health. http://www.fyss.se/wp-content/uploads/2018/01/fyss_english.pdf Accessed June 28, 2018

WHO Guidelines on Physical Activity and Sedentary Behaviour. Geneva: World Health Organization; 2020. PMID: 33369898. Retrieved from https://www.who.int/publications/i/item/9789240015128