

ENVIRONMENTAL AWARENESS AND BEHAVIORS IN OUTDOOR PHYSICAL ACTIVITY: PERSPECTIVES OF HIGH SCHOOL STUDENTS

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Abstract

Environmental degradation (climate change) continues to endanger ecosystems – making it important to understand how students; in particular, at high schools in Slovakia, view roles (their) in environmental conservation, while participating in outdoor physical activity; therefore, study (our) aims at exploring intersections of environmental awareness and behaviors in outdoor physical activity from the perspectives of high school students. 3-item survey (instrument) was carried out 4 months (September 1 – December 24, 2024), targeting 1619 (100%) students at high schools (45.03% of boys and 54.97% of girls), aged 16.60 ± 1.20 years. 51.14% (828, n) of students believed that environmental awareness in outdoor physical activity is important in terms of environmental conservation ($p < 0.01$). 67.63% (1095, n) of students reported doing best (their) to leave as little impact on environments as possible by disposing of trash, while participating in outdoor physical activity ($p < 0.01$). 648 (40.02%) students reported using apps (basic) that help to improve environmental awareness in outdoor physical activity ($p < 0.01$). Students ($\geq 75\%$) recognize the importance of environmental awareness and adopt behaviors – sustainable, in outdoor physical activity; however, there remains needs for further educational interventions to encourage wider adoption of technology-driven environmental awareness tools.

Key words: awareness, behaviors, physical activity, students

Introduction

As the global community grapples with escalating environmental challenges, including climate change, the need to cultivate sustainable behaviors in youth becomes increasingly urgent. High school students, in particular, are at a formative stage where environmental attitudes and behaviors are shaped. Understanding how these students perceive their role in environmental conservation, especially in the context of outdoor physical activity, is important. Outdoor physical activity not only fosters health but also offers unique chances for deepening environmental awareness through direct interaction with nature (Puhakka, 2021).

Research suggests that outdoor physical activity correlates positively with pro-environmental attitudes and behaviors. For instance, outdoor education has been shown to foster stronger connections to nature and civic environmental actions among high school students (Hoover, 2020). Participation in outdoor physical activity was found to enhance both environmental attitudes and social awareness through structured educational interventions (Brooks et al., 2022). Research also shows that outdoor environments in physical education significantly increase students' environmental sensitivity compared to indoor settings (Pasek, 2021) and that physical outdoor activity reinforces behaviors that mitigate pollution exposure (Pasek, Mytskan, 2022). Educational programs linking adventure activity with environmental education have proven effective in promoting sustainable thinking (Thomas, 2005).

This study aims at exploring intersections of environmental awareness and behaviors in outdoor physical activity from the perspectives of high school students. Building upon existing literature that highlights how school environments, curriculum design, and sensory experiences affect students' ecological consciousness (Fang et al., 2017), this research seeks to uncover student perceptions that can inform educational strategy for cultivating environmentally responsible future citizens.

Materials and Methods

In terms of study aim (see *Introduction*), the target population comprised a total of 1,619 adolescents (100%) (aged 16.60 ± 1.20 years.), including 45.03% of boys and 54.97% of girls, enrolled in the first and second years of Slovak high schools (Table 1). The research sample was selected using convenience sampling methods and recruited through the EduPage platform (Adamčák et al., 2023). Data collection was conducted over a 4-month period (September 1 – December 24, 2024) using a structured survey instrument consisting of 3 questions. A purposive sampling approach was employed to ensure proportional representation based on gender and year of study.

The research adhered strictly to the ethical principles outlined in the Declaration of Helsinki (1964) and its subsequent amendments, as well as comparable institutional and national ethical standards. Prior to participation, all respondents (1,619; 100%) provided written informed consent (Harriss et al., 2020).

Tab. 1: Demographic data (1,619, 100%)

Demographic data		
Boys	Age	16.80 ± .20 years
Girls		16.40 ± .40 years
Boys	Gender	729, 45.03%
Girls		890, 54.97%

To facilitate the examination of intersections of environmental awareness and behaviors in outdoor physical activity from the perspectives of high school students, a structured survey instrument consisting of 3 targeted questions was developed. The instrument was divided into two main sections:

1. **Demographic Information** – This section collected basic participant data, including age, gender, and year of study (see *Table 1*).
2. **Survey Items** – The core of the instrument comprised 3 structured questions delivered via an online platform (Microsoft Forms, Office 365), as shown in Tables 2-4. The decision to employ a concise, 3-item survey was based on considerations of cost-effectiveness, accessibility, and time efficiency (Adamčák et al., 2023).

A total of 1,619 student responses (representing 100% of the sample) were collected and organized using a structured database design. Each of 3-survey items was subjected to analysis and comparative evaluation using the Tap3 Software developed by Gamo, Banská Bystrica (Azor et al., 2023). To interpret the data, both descriptive statistics (arithmetic mean, \bar{x} ; percentage, %) and inferential statistics (chi-square test, χ^2) were employed, with significance thresholds set at $p < .01$ and $p < .05$. Particular attention was given to gender-based comparisons between 729 adolescent boys (45.03%) and 890 girls (54.97%) (Singhal, Rana, 2015).

Results

Among the 1,619 Slovak high school students surveyed, 51.14% (828 students) reported that they believe environmental awareness is very important when engaging in outdoor physical activity. Another 32.24% (522 students) said that while environmental awareness is needed, it doesn't influence their decisions. Meanwhile, 7.23% (117 students) felt it had little or no effect, 3.27% (53 students) didn't think it was needed, and 6.11% (99 students) had never encountered environmental awareness in outdoor physical activity (Table 2). These results show generally positive attitudes toward the importance of environmental education among the Slovak high school students, with statistically significant differences by gender ($P = 3.04 \text{ E-}48$; $\chi^2_{(4)} = 228.32$)

Tab. 2: Importance of environmental education and awareness in outdoor physical activity (1,619, 100%)

Question 1			
Answers	Boys	Girls	Boys + Girls
1.	50.62%	17.19%	32.24%
2.	40.74%	59.66%	51.14%
3.	2.47%	11.12%	7.23%
4.	1.23%	4.94%	3.27%
5.	4.94%	7.08%	6.11%

$P = 3.04 \text{ E-}48$; $\chi^2_{(4)} = 228.32^{}$**

1. It's needed, but doesn't affect my decisions about outdoor physical activity. 2. It's very important for nature and outdoor physical activity. 3. It has little or no effect on my outdoor physical activity. 4. I don't think it's needed for outdoor physical activity. 5. I've never come across it in outdoor physical activity. ** - $p < .01$.

In terms of environmental behaviors, the majority of students demonstrated eco-conscious actions in outdoor physical activity. 67.63% (1,095 students) stated that they always take their waste and try to reduce their environmental impact. Another 23.35% (378 students) said they usually take their waste but don't always think about the environmental consequences. A smaller group, 8.34% (135 students), claimed they don't create any waste, while only .68% (11 students) admitted they don't think about

waste at all. These results again showed significant differences across groups ($P = 8.36 \text{ E-}10$; $\chi^2_{(4)} = 45.20$), highlighting that the majority of students are making conscious efforts to act sustainably.

Tab. 3: Waste in outdoor physical activity (1,619, 100%)

Question 1			
Answers	Boys	Girls	Boys + Girls
1.	4.94%	11.12%	8.34%
2.	.27%	1.01%	.68%
3.	29.63%	18.20%	23.35%
4.	65.16%	69.66%	67.63%
P = 8.36 E-10; $\chi^2_{(4)} = 45.20^{**}$			

1. I don't create any waste in outdoor physical activity. **2.** I don't think about waste in outdoor physical activity. **3.** I usually take my waste, but I don't always think about the environmental impact. **4.** I always take my waste and try to reduce my environmental impact. ****** - $p < .01$.

Regarding the use of applications (apps) in outdoor physical activity, the responses showed varied levels of technological engagement. About 40.02% (648 students) reported using only basic navigation apps such as maps. In contrast, just 11.67% (189 students) said they regularly use apps in outdoor physical activity, and 17.79% (288 students) stated they rarely use any. 23.29% (377 students) reported not using any apps at all, while 7.23% (117 students) expressed no interest in environmental apps. These differences were also statistically significant ($P = 1.84 \text{ E-}23$; $\chi^2_{(4)} = 112.80$), suggesting gaps between general environmental awareness and adoption of environmental technology.

Tab. 4: Applications in outdoor physical activity (1,619, 100%)

Question 1			
Answers	Boys	Girls	Boys + Girls
1.	22.22%	24.16%	23.29%
2.	11.11%	4.04%	7.23%
3.	28.40%	49.55%	40.02%
4.	13.58%	10.11%	11.67%
5.	24.69%	12.13%	17.79%
P = 1.84 E-23; $\chi^2_{(4)} = 112.80^{**}$			

1. I don't use any apps in outdoor physical activity. **2.** I'm not interested in environmental apps in outdoor physical activity. **3.** I only use basic navigation apps to help me find my way in outdoor physical activity. **4.** I regularly use apps in outdoor physical activity. **5.** I rarely use any apps in outdoor physical activity. ****** - $p < .01$.

Discussion

This study highlights Slovak high school students' generally positive attitudes and behaviors toward environmental awareness in outdoor physical activity. Over half of respondents emphasized the importance of environmental awareness, and a majority reported sustainable habits such as consistently managing waste. These findings align with previous literature suggesting that outdoor experiences foster ecological consciousness (Brooks et al., 2022; Pasek, 2021).

Despite high self-reported awareness, only 11.67% of students actively used dedicated environmental or outdoor apps, and nearly a quarter reported not using any digital tools. This suggests gaps between environmental values and technological engagement (Andrade-Arenas et al., 2024). While students understand their environmental responsibilities, they may lack exposure to or motivation for using tools that support sustainable practices. This reflects findings from Hoover (2020), who emphasized the need for structured environmental education to bridge knowledge and behavior.

Gender differences were statistically significant across all questions, with girls generally reporting higher environmental sensitivity and responsible behaviors. This trend supports earlier research showing that adolescent girls are more likely to exhibit pro-environmental attitudes (Hunter et al., 2004; Fang et al., 2017). The relatively low usage of environmental apps presents a clear opportunity for educational interventions. Schools should integrate user-friendly technology into outdoor programs to enhance environmental engagement (Novo et al., 2024). Initiatives could include app-based challenges, environmental tracking tools, and peer-driven content creation, aligning with Thomas's (2005) call for experiential learning in nature-based education.

Conclusion

Slovak high school students demonstrate a strong awareness of environmental issues and engage in sustainable behaviors during outdoor physical activity, particularly in waste management. However, there are gaps (notable) between their environmental values and the use of digital tools that could enhance eco-conscious practices. Gender differences favoring girls in environmental sensitivity were significant ($p > .01$). These findings underscore the need for educational interventions that integrate environmental technologies into outdoor activities to foster deeper, more actionable engagement.

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Souhrn

Studie se zaměřuje na to, jak slovenští středoškoláci vnímají environmentální povědomí a jak se chovají při venkovních pohybových aktivitách. Dotazníkového šetření se zúčastnilo 1 619 studentů, z nichž 51 % považuje environmentální uvědomění za velmi důležité. Až 68 % respondentů uvedlo, že při venkovních aktivitách vždy odnášejí svůj odpad, aby minimalizovali dopad na životní prostředí. Jen 12 % studentů pravidelně využívá environmentální nebo navigační aplikace. Statisticky významné rozdíly se objevily mezi pohlavími ($p < 0,01$) dívky projevily vyšší citlivost vůči přírodě. Studie zdůrazňuje potřebu zapojení moderních technologií do environmentální výchovy.

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