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Assessment of environmental attitudes and behavior of secondary school students in Sri Lanka

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ABSTRACT

Implementing effective environmental education strategies in schools is essential for nurturing young individuals with a sense of responsibility for sustainability. Knowledge regarding environmental attitudes and behaviour of school-aged children in Sri Lanka is limited. This study aimed to assess the level of environmental awareness, attitudes towards recovery and recycling, environmental behaviour, and overall awareness, alongside evaluating the impact of demographic parameters on these variables of secondary school students in Sri Lanka. A questionnaire-based survey with a quantitative approach (using a 35-item scale) was used in assessing 972 Sri Lankan secondary school students. The study revealed that students exhibit a moderate level of EA, attitude, and behavior, with greater familiarity when taught in school. Gender, school environment society membership, and student grade/type of school significantly affected the investigated socio-environmental aspects. Family income and residence type had no notable impact. The findings of this study offer important insights for creating focused interventions and educational strategies aimed at fostering a more sustainable, environmentally responsible younger generation within the distinct socio-cultural landscape of Sri Lanka.

Keywords: Asia, demographics, environmental awareness, environmental education, environmental impact, young generation

INTRODUCTION

Sri Lanka possesses abundant natural resources including land, biodiversity, forests, minerals, and water resources. The country's natural forest resources exhibit the highest density of species diversity in Asia and are recognized as one of the region's significant biodiversity hotspots (Sarathchandra et al., 2021; Sohail et al., 2021). Despite these favorable conditions, Sri Lanka faces notable environmental challenges, such as land degradation, improper waste disposal, inland water pollution, biodiversity loss, and depletion of coastal resources (Manage et al., 2022). With the country's recent shift from an agricultural to an industrial economy, Sri Lanka is expected to encounter various environmental issues associated with industrialization in the future (Geekiyanage & Vithanage, 2015; Kuruppuarachchi et al., 2021). Nonetheless, preserving the environment is crucial to ensure a conducive living environment, as a healthy and productive ecosystem is indispensable for the sustainability of all organisms (Lu et al., 2015).

The environmental impact of individuals, regardless of their social, economic, and educational backgrounds, can be significant. Although the impact of an individual's behavior may appear small, when a large group of people consistently engage in the same behavior, it can have a significant environmental impact. The development of a society with positive attitudes and behavior towards the environment is a great challenge, requiring effective and efficient environmental education strategies within schools (Larson & Larson, 2011). It is the responsibility of school education to ensure that the younger generation acquires the knowledge, attitudes, and skills necessary to demonstrate environmentally responsible behavior. Understanding the environmental attitudes and skills of young individuals is important as they will encounter environmental issues and need to possess positive attitudes and problem-solving skills to address these challenges (Bradley et al., 1999; Ernst et al., 2017). Accordingly, environmental education can be designed to foster favorable attitudes and environmentally friendly behavior in children. In line with these perspectives, school education should emphasize authentic learning styles as a holistic approach to address complex environmental issues, moving beyond traditional written assessment methods.

The capacity of individuals to embrace positive attitudes, habits, and behavior instilled during their youth plays a vital role in attaining a sustainable future (Larson & Larson, 2011). However, environmentally responsible behavior is intricate. Various causal

variables impact environmental behavior (EB) in diverse ways, and sometimes the influence arises from the interplay of multiple variables (Stern, 2000). Responsible EB is influenced by a range of variables, with no direct correlation observed among them (Hines et al., 1987). Environmentally significant behavior emerges as interactive outcomes stemming from attitudinal variables and contextual factors within individuals (Guagnano et al., 1995). Hence, relying solely on attitude as a solitary factor cannot accurately depict behavior.

Furthermore, in EB research, emphasis has been placed on considering the influence of multiple variables rather than relying solely on a single variable, aiming to enhance the reliability of findings (Ajzen, 1991; Hrubes et al., 2001). Hungerford and Volk (1990) have discussed the traditional model of EB, which suggests that knowledge increases individuals' awareness of their environment and its problems, ultimately motivating them to engage in responsible actions regarding environmental issues. However, there is a dearth of research evidence in Sri Lanka pertaining to the assessment of environmental attitudes and behavior among school-aged children. This study investigated the environmental attitudes and behaviors of secondary school students in Sri Lanka, targeting to assess the extent of their engagement in eco-conscious actions and identify influential factors. By exploring the depth of environmentally friendly attitudes and behaviors, and analyzing the impact of educational, familial, and societal factors, the research seeks to provide a nuanced understanding of the environmental consciousness among secondary school students in Sri Lanka. This exploration is crucial for developing targeted interventions and educational strategies to cultivate a more sustainable and environmentally responsible younger generation in the unique socio-cultural context of Sri Lanka. The study was conducted with the aim of achieving the following specific objectives;

1. To assess the level of environmental awareness (EA), attitudes towards recovery (AR1), attitude towards recycling (AR2), EB, and overall awareness, attitudes, and behavior (AB) of students.
2. To evaluate the effect of demographic variables on environmental attitudes and behavior in terms of EA, AR1, AR2, EB, and overall AB.

METHODOLOGY

Research Design

This study employed a quantitative research method to measure the level of overall AB of secondary school students towards the environment and its various dimensions. Additionally, the study investigated the impact of students' grade, gender, membership in the school environment society, type of school, residential area, and family income on their levels of EA, AR1, AR2, EB, and overall AB. The scores obtained from the scale developed by Ugulu et al. (2013) were utilized to analyze these variables.

Survey Instruments

A scale composed of 35 self-assessment items developed by Ugulu et al. (2013) was used to quantify the secondary school students' attitudes and Behavior towards the environment. The scale has four dimensions; EA, AR1, AR2, and EB. There are 15, 8, 5, and 7 items under each dimension, respectively in the original scale.

Items in EA dimension are on purpose of tree planting, importance of bio-diversity, protection of forests and national parks, right to make changes in nature, and environmental economy. The second dimension, AR1 represents items regarding the reuse of household stuff, unconscious consumption, and saving energy. The items in the third dimension covers recycling activities namely, the importance of educating people on recycling, separation of waste materials and encouraging eco packaging. The fourth dimension explores the performance in environment friendly activities namely, choosing ecofriendly products, engaging in environmental projects, sacrificing voluntarily for protecting the environment and encouraging others to be ecofriendly.

A five-point Likert type range (strongly disagree–1 point, disagree–2 points, undecided–3 points, agree–4 points, strongly agree–5 points) was used under each item to measure students' level of EA, AR1, AR2, EB, and overall AB. Several items of the questionnaire were assessed using a reversed score.

The internal consistency of four dimensions of the original scale was tested by calculating Cronbach's alpha. Three dimensions; EA, AR2, EB have acceptable level of statistics calculated for Cronbach's alpha while AR1 requires adjustments in way the internal consistency is established. As a result, three items from AR1 dimension were removed and the total number of items in the scale became 32.

Prior to using the original questionnaire for the study, authors' consent was obtained to use it. The original questionnaire, which is available in English, was translated into Sinhala medium. In the process of translation, English fluent Sinhala native speaker translated the questionnaire into Sinhala. The translated version was again back-translated to English by an English and Sinhala language expert who was unseeing the original English version. The original English version and the back translated English versions were compared. To make items compatible with the local context and to ensure language clarity, minor changes were made to the Sinhala version of the scale. A panel of three senior environmental experts of the National Institute of Education, Sri Lanka, evaluated the content validity of the Sinhala version of the questionnaire. The content validated questionnaires was administered to 50 Sinhala medium students of grade 8 and grade 10 in a pilot study. According to the data collected by pilot study, the reliability of EA, AR1, AR2, and EB of Sinhala medium questionnaire was determined in terms of Cronbach's alpha. The Cronbach's alpha values for each dimension EA, AR1, AR2, and EB were 0.8, 0.6, 0.6, and 0.7, respectively.

Sample of the Study

The population of interest was the secondary level Sri Lankan public school students. Students who were studying in grade 8 and grade 10 in 2022 across the country were selected as a representative group. Sample population was selected from 21 randomly selected educational zones, representing eight provinces of the country (**Table 1**).

Table 1. Geographical distribution of sampled students across the provinces in Sri Lanka

Province	Number of students	Percentage (%)
Western	63	6.5
Southern	138	14.2
Central	414	42.6
North-Central	34	3.5
North-Western	33	3.4
Sabaragamuwa	104	10.7
Uva	77	7.9
Eastern	109	11.2
Total	**972**	**100**

The sample included a total of 972 students. Out of these students, 510 were female, while 462 were male. The administration of questionnaires took place during regular school hours, with participants evaluating themselves within the classroom setting. The instructions given to the participants were to indicate their level of agreement or disagreement with each item on the scale by placing a tick in the appropriate box. Through their responses, it was anticipated that the students' underlying attitudes and behavior regarding the environment would be revealed. The demographic profile of the students who participated in the study is provided in **Table 2**.

Table 2. The demographic profile of the selected student sample

Variable	Description	Number of students	Percentage (%)
Gender	Male	462	47.5
	Female	510	52.5
Grade	8	580	59.7
	10	392	40.3
Membership of the school environment club	Member	137	14.1
	Non-member	835	85.9
Monthly family income (USD)	Above 750 (high)	72	7.4
	250-750 (medium)	334	34.4
	Below 250 (low)	566	58.2
Residence	Urban	45	4.6
	Semi-urban	285	29.3
	Rural	642	66.0
Type of school	Type 1AB	880	90.5
	Type 1C	59	6.1
	Type II	33	3.4

Analysis of Data

Data gathered by administering the questionnaire were analyzed using SPSS for Windows version 26. Data collected through a pretested questionnaire were organized and analyzed to identify the level of awareness, attitudes and behavior of students in grade 8 and grade 10 and the effect of demographic factors on the dimensions and overall AB, in a way the dimensions get a single ordinal value. Scores for the dimensions are summation of ranks of items belongs to respective dimensions while the score for overall AB is the summation of all thirty-two items of the scale. The level of awareness, attitudes and behavior was determined based on the following coding criteria (**Table 3**).

Table 3. Score classification used to interpret the levels of EA, AR1, AR2, EB, and overall AB

Dimensions	Score	Level
Environmental awareness (EA)	15-29	Very low
	30-44	Low
	45-59	Moderate
	60-75	High
Attitudes towards recovery (AR1)	5-9	Very low
	10-14	Low
	15-19	Moderate
	20-25	High
Attitudes towards recycling (AR2)	5-9	Very low
	10-14	Low
	15-19	Moderate
	20-25	High
Environmental consciousness and behaviour (EB)	7-13	Very low
	14-20	Low
	21-27	Moderate
	28-35	High
Overall awareness, attitudes and behaviour (overall AB)	32-63	Very low
	64-95	Low
	96-127	Moderate
	128-160	High

Non-parametric statistical tests, Mann Witney U test and Kruskal Wallis test were applied to determine the effects of demographic factors on EA and behavior of grade 8 and grade 10 students.

RESULTS AND DISCUSSION

Level of Awareness, Attitudes, and Behavior Towards Environment

Results indicated that students have a moderate level of awareness, attitude and behavior towards the environment (**Table 4**). The mean and median values of the four dimensions and the overall score remained at a moderate level. Students earned the highest and the second highest mean scores for EA and EB dimensions while AR1 and AR2 dimensions earned the lowest and the second lowest mean scores.

Table 4. Students' level of EA, AR1, AR2, EB, and overall AB and mean and median score

	Number of students	Number of items	Mean	Standard deviation	Median	Interpretation
Environmental awareness	972	15	57.18	7.47	58.00	Moderate
Attitude towards recovery	972	5	18.91	3.44	19.00	Moderate
Attitude towards recycling	972	5	18.93	3.62	19.00	Moderate
Environmental consciousness and behavior	972	7	25.25	4.92	26.00	Moderate
Overall score	972	32	120.28	15.71	121.00	Moderate

A study conducted by Sachithra and Kaluarachchi (2018) revealed that Bachelor of Commerce undergraduates in state universities of Sri Lanka had a low level of environmental literacy. Similarly, Koruoglu et al. (2015) reported low levels of attitudes towards the environment among Turkish high school students. The findings from the present study indicate that students displayed a higher level of familiarity with concepts such as the significance of preventing environmentally destructive behavior and the importance of sustaining all living beings on earth. These topics are frequently addressed in the school curriculum. However, the students expressed little interest in recognizing the economic importance of environmental protection.

The findings suggest that students grasp environmental concepts more easily when they are taught rather than when they attempt to learn about them independently. As a result, it is advisable to incorporate essential environmental concepts into the school curriculum across all grades and subjects. In Sri Lanka, the emphasis in school education is primarily placed on national examinations, prioritizing knowledge acquisition and cognitive memory components of the curriculum. Additionally, it is important to note that environmental education is not offered as a standalone subject in the current Sri Lankan curriculum. Instead, environmental education concepts have been integrated into other subjects, such as science and social sciences, for many years. Students acquire environmental knowledge pertaining to local and global issues through various subjects within the school curriculum. However, within the existing education system, there is a lack of strategies to assess students' real-world involvement in environmental activities.

Effect of Gender on Environmental Awareness, Attitudes, and Behavior of Students

The study further revealed that gender has a significant (p-value < 0.05) effect on the level of EA, AR2, EB, and overall AB (**Table 5**). However, the effect size of all three tests is at 0.1 significant level, which indicated the weak effect of gender on dependent variables; EA, AR2, EB, and overall AB.

Table 5. Comparison of overall attitude and behaviour and its' dimensions towards environment in relation to gender

Dimension	Gender	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)	Effect size
Environmental awareness	Male	462	15	459.87	0.001*	-0.104
	Female	510		510.63		
Attitude towards recovery	Male	462	5	480.74	0.501	-0.022
	Female	510		491.71		
Attitude towards recycling	Male	462	5	450.77	0.000*	-0.134
	Female	510		518.87		
Environmental consciousness and behavior	Male	462	7	467.87	0.027*	-0.071
	Female	510		503.38		
Overall score	Male	462	32	465.75	0.008*	-0.086
	Female	510		505.30		

Note. *p < 0.05

Since many decades, the performance differences of male and female students in Sri Lanka have been reported (National Education Research and Evaluation Center [NEREC], 2022). Female students had higher performances than male students in overall AB and three dimensions investigated in this study namely, EA, AR2, and EB. Consistent with these findings, prior studies have also indicated that female students exhibit higher levels of environmental attitudes and behavior compared to male students (De Alwis & De Silva, 2020; Koruoglu et al., 2015). Additionally, Nunez and Clores (2017) reported that female students demonstrate a higher degree of environmental sensitivity, environmental attitudes, and EB when compared to their male counterparts.

In Sri Lanka, girls are traditionally taught to support their family members, practice resource conservation, and maintain cleanliness within the home environment, which may contribute to their higher levels of environmentally friendly attitudes and behavior compared to boys. Conversely, male commerce undergraduates in Sri Lanka from a previous study exhibited better performance in environmental activities than their female counterparts (Sachithra & Kaluarachchi, 2018). The focus on female students as agents of change in promoting positive EB among their peers appears to be advantageous. However, a different approach should be considered for male students to increase their awareness and foster changes in their attitudes and behavior towards the environment.

Effect of Being a Member at Environment Society on Environmental Awareness, Attitudes, and Behavior of Students

There was a significant effect of being a member of the environment society for two dimensions; AR1, EB, and overall AB (**Table 6**). The members of school environment club had higher levels of AR1, EB, and overall AB than their non-member counterparts. The students who are the members of school environment club have more opportunities to enjoy natural environment, participate in EA programs in the school as well as outside the school and perform individual and group environmental projects than their counterparts. The results indicated that students' performance in the school environment club enhance the development of their environmental attitudes and behavior. Therefore, students should be encouraged and offer them more chances to enjoy natural environment and participate in environmental activities in the school and outside the school to develop their environmental attitudes and behavior. Even though school environmental club members had a significantly higher EB than their counterparts, they did not have significantly higher EA and AR2 compared to non-members. The results suggest that the higher level of EB they perform is not due to gaining a higher level of environmental knowledge or awareness through club activities.

Table 6. Comparison of students' environmental awareness, attitudes and behaviour in relation to being a member at environment society

Dimension	Member of the environment society or not	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)	Effect size
Environmental awareness	Member	137	15	505.35	0.33043	-0.031
	Non-member	835		483.41		
Attitude towards recovery	Member	137	5	537.19	0.011*	-0.080
	Non-member	835		478.18		
Attitude towards recycling	Member	137	5	509.57	0.251	-0.036
	Non-member	835		482.72		
Environmental consciousness and behavior	Member	137	7	549.77	0.001*	-0.102
	Non-member	835		476.12		
Overall score	Member	137	32	524.27	0.038*	-0.066
	Non-member	835		480.30		

Note. *p < 0.05

According to Hungerford and Volk (1990), a high level of environmental knowledge does not directly impact environmental attitudes, but rather it is through the transformation of attitudes that EB is shaped. Chawla and Cushing (2007) further stated that students' interaction with the environment enhances their environmental sensitivity, fosters environmental values, and subsequently promotes the development of environmentally friendly behavior. Similarly, Arnon et al. (2014) argued that EB is primarily influenced by environmental values and attitudes rather than mere knowledge. The establishment of environment societies at the school level has been identified as a successful approach and a commendable practice. Educational authorities should encourage school administrators to adopt and replicate such initiatives in their schools, while also exploring innovative ways to enhance their effectiveness.

Effect of the Grade the Students Are Studying on Environmental Awareness, Attitudes, and Behavior of Students

Level of EA, AR1and the overall AB, toward the environment are significantly affected by the grade of the student. Grade 8 students have more awareness, better attitude and behavior towards environment than the students in grade 10 (**Table 7**).

Table 7. Comparison of overall attitude and behaviour and its' dimensions towards environment with regard to grade

Dimension	Grade	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)	Effect size
Environmental awareness	8	580	15	500.90	0.026*	-0.072
	10	392		465.19		
Attitude towards recovery	8	580	5	509.27	0.001*	-0.109
	10	392		452.81		
Attitude towards recycling	8	580	5	509.57	0.885*	-0.005
	10	392		482.72		
Environmental consciousness and behavior	8	580	7	487.47	0.105*	-0.052
	10	392		485.07		
Overall score	8	580	32	497.20	0.002*	-0.101
	10	392		470.67		

Note. *p < 0.05

Upon examining AR2 and EB, no significant difference was observed between grade 8 and grade 10 students, indicating that a two-year age gap (13 and 15 years of age) does not affect AR2 and EB. However, Veisi et al. (2018) reported a statistically significant impact of age on the environmental sensitivity of university students. This suggests that the influence of age difference on environmental sensitivity in early adolescence may be smaller compared to that observed in young university students.

Effect of the Type of the School on Environmental Awareness, Attitudes, and Behavior of Students

The effect of the type of school on four dimensions and the overall AB was tested by performing Kruskal Wallis test. The type of the school significantly affects the EA, AR1, EB, and overall AB (**Table 8**).

Table 8. Comparison of environmental awareness, attitudes and behaviour of students with regards to the type of school

Dimension	Type of school	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)	Effect size
Environmental awareness	1AB	880	15	491.95	0.000*	0.051
	1C	59		306.32		
	II	33		663.42		
Attitude towards recovery	1AB	880	5	491.20	0.000*	0.018
	1C	59		366.99		
	II	33		574.83		
Attitude towards recycling	1AB	880	5	487.40	0.811	0.000
	1C	59		467.03		
	II	33		497.38		
Environmental consciousness and behavior	1AB	880	7	493.88	0.000*	0.020
	1C	59		349.46		
	II	33		534.74		
Overall score	1AB	880	32	488.17	0.000*	0.026
	1C	59		381.57		
	II	33		629.58		

Note. *p < 0.05

According to the preliminary report of the 2016 school census in Sri Lanka, there are four types of schools: 1AB, which are schools with advanced level science stream classes; type 1C, which are schools with advanced level classes but no science stream; Type II, which are schools with classes only up to grade 11; and type 3, which are schools with classes up to grade 5 (Ministry of Education, Sri Lanka [MOE], 2016). For this study, students were selected exclusively from 1AB, 1C, and type II schools. Notably, students from type II schools demonstrated significantly higher levels of EA, AR1, EB, and overall AB compared to students from type 1AB and type 1C schools. This finding presents an opportunity for researchers to investigate the factors contributing to the superior performance of type II schools in terms of students' behavior towards the environment and identify best practices in this regard.

Effect of the Family Income Level on Environmental Awareness, Attitudes, and Behavior of Students

Family income level did not significantly affect on EA, attitudes and behavior of students (**Table 9**). This aligns with the results of De Alwis and De Silva (2020) study, which also found no effect of family income on the EA, attitudes, and behavior of grade 12 students. Similar findings were reported by Kuruppuarachchi et al. (2023) in their study for school children in Sri Lanka. However, another study conducted for university students in Sri Lanka indicated that family income level had an impact on EA, attitudes, and behavior (Kuruppuarachchi et al., 2021). Additionally, it is worth noting that previous research has reported a positive correlation between higher income and individuals' environmental attitudes and awareness (Franzen & Meyer, 2010; Levy et al., 2016).

Table 9. Comparison of environmental awareness, attitudes and behaviour of students in relation to family income

Dimension	Family income level	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)
Environmental awareness	High	72	15	533.76	0.213
	Medium	334		487.40	
	Low	566		479.96	
Attitude towards recovery	High	72	5	533.82	0.244
	Medium	334		486.47	
	Low	566		480.50	
Attitude towards recycling	High	72	5	478.93	0.545
	Medium	334		475.33	
	Low	566		494.06	
Environmental consciousness and behavior	High	72	7	513.53	0.635
	Medium	334		484.28	
	Low	566		484.37	
Overall score	High	72	32	515.70	0.529
	Medium	334		482.54	
	Low	566		485.12	

Effect of the Residence Area: Urban, Semi-Urban, and Rural on Environmental Awareness, Attitudes, and Behavior of Students

According to the Kruskal-Wallis test statistics, the type of residence had no effect on EA, AR1, AR2, EB, or overall AB (**Table 10**). The study included three groups of students based on their place of residence: rural, semi-urban, and urban. Weeraratne (2016) reported three factors—population density, dependence on firewood, and dependence on well water—that were considered in the residential area categorization process.

Table 10. Comparison of environmental awareness, attitudes and behaviour of students with respect to residence area

Dimension	Residence	Number of students	Number of items	Mean rank	Asymptotic significance (2-tailed)
Environmental awareness	Urban	45	15	494.49	0.460
	Suburban	285		471.33	
	Rural	642		492.68	
Attitude towards recovery	Urban	45	5	493.77	0.631
	Suburban	285		474.39	
	Rural	642		491.37	
Attitude towards recycling	Urban	45	5	538.16	0.054
	Suburban	285		459.37	
	Rural	642		494.92	
Environmental consciousness and behavior	Urban	45	7	523.60	0.451
	Suburban	285		475.52	
	Rural	642		488.77	
Overall score	Urban	45	32	553.34	0.110
	Suburban	285		475.57	
	Rural	642		486.67	

The findings of the current study indicate that the type of residence does not have a significant impact on students' attitudes and behavior towards the environment. This aligns with the results reported by Sachithra and Kaluarachchi (2018), who found no significant effect of residential area on the EB of commerce undergraduates in Sri Lanka. However, in contrast, De Alwis and De Silva (2020) reported that grade 12 students from rural areas in Sri Lanka displayed higher levels of EA, attitudes, and behavior compared to students from urban areas. The lack of significance regarding the type of residence and family income level suggests that students are more influenced by their school environment in shaping their attitudes and behavior towards the environment.

CONCLUSIONS

In conclusion, this study revealed that secondary school students in Sri Lanka possess a moderate level of environmental awareness, attitudes, and behavior, with higher familiarity regarding the significance of preventing environmental degradation and supporting all living beings. This finding implies that educational authorities should prioritize the integration of environmental concepts across all subjects in the curriculum to enhance understanding and engagement among students. Notably, gender differences were evident, as female students consistently outperformed male students across various dimensions of environmental attitudes and behavior. This suggests that targeted interventions may be needed to promote environmental consciousness among male students, ensuring that they receive adequate support and encouragement to engage in environmentally friendly behaviors.

Membership in environmental societies positively impacted students' attitudes toward recovery and overall environmental behavior, emphasizing the need for increased opportunities for engagement in environmental activities. Schools should consider establishing more environmental clubs and programs that encourage student participation, fostering a sense of community and

shared responsibility for environmental issues. Additionally, students in Grade 8 exhibited superior environmental awareness compared to their Grade 10 peers, indicating that earlier exposure to environmental education may be beneficial. Educational strategies should focus on reinforcing environmental concepts throughout the educational journey to maintain and enhance awareness as students progress through their grades.

The type of school attended influenced environmental awareness and attitudes, particularly in favor of Type II schools. This finding implies that successful practices from Type II schools should be analyzed and potentially replicated in other school types to improve overall environmental engagement among students. Lastly, the lack of significant effects from family income and residential area on environmental attitudes or behavior suggests that the school environment plays a critical role in shaping students' perceptions. Therefore, schools should strive to create inclusive and supportive environments that promote environmental education regardless of students' socioeconomic backgrounds or residential contexts. Overall, these findings highlight the importance of enhancing environmental education strategies in schools to cultivate a more environmentally responsible younger generation.

Recommendations

The research findings suggest that in order to enhance the awareness, attitudes, and behavior of secondary level school students towards the environment, it is important to develop and implement methods that are engaging, attractive, interactive, gender-sensitive, and inclusive. These methods should be designed to capture the attention and interest of students, making the learning experience more enjoyable and effective. Additionally, interactive elements such as simulations, experiments, and group discussions should be incorporated to encourage active participation and hands-on learning. Gender sensitivity and inclusivity are crucial aspects that should be considered, ensuring that educational materials and activities are accessible and relevant to students of all genders and backgrounds. Furthermore, when designing these applications, it is essential to consider new developments and emerging disasters related to the environment. By staying up-to-date and addressing current environmental challenges, such as climate change and pollution, students can gain a comprehensive understanding of the issues and develop the necessary skills to contribute towards a more sustainable future.

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