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A Study on the Responsibility of Environmental Ethics Among Secondary School Students in the 21st Century

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Abstract: In this study, we aimed to determine the extent to which secondary school students practise environmental ethics. To this end, we used a questionnaire-based survey to accomplish the purpose of the study. The study's variables included knowledge, value, care, and responsibility in environmental ethics. We selected a sample of 180 students using systematic random sampling from a population of 347 Form Four secondary school students studying geography in Papar, Sabah, Malaysia. The findings showed that all study variables, knowledge, value, care and responsibility were at high levels. Furthermore, a multiple regression analysis revealed that the value and care variable in environmental ethics influenced the responsibility variable which contributed 14.5% and 2.7%, respectively to student's environmental ethics. Based on the findings, we concluded that students who incorporate environmental ethics into their daily lives will successfully fulfil their environmental ethics responsibilities. The study's implications suggest that environmental education in schools exposes students to environmental ethics and helps them develop more ethical and disciplined attitudes towards the environment.

Keywords: *Education, environmental ethics, knowledge, responsibility, value.*

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Introduction

The formulation and implementation of the National Landscape Policy (NLP), which aimed to transform Malaysia into the Beautiful Garden Nation in 2020, enabled the country to make significant strides towards achieving a high quality and comprehensive living environment while accentuating Malaysia's robust and unique landscape identity (Ministry of Housing and Local Governance, 2019). Environmental education is a vehicle for disseminating information, developing skills, encouraging participation, and promoting positive biodiversity actions (Abd Aziz et al., 2016). Students are now learning about the environment, which can both instill in them a sense of responsibility and appreciation for the natural world and help prevent further degradation of the environment. Furthermore, environmental education fosters a direct connection to the environment and raises students' awareness of specific environmental issues (Alex et al., 2019). Therefore, Ministry of Education Malaysia has taken more progressive measures by emphasising environmental education in the elementary and secondary schools (Hanifah et al., 2015; Nur Khairani & Zanaton, 2017). This statement also shows that students can engage in specific practices, particularly those that benefit multiple parties. Environmental education, in general, emphasises six major domains related to environmental issues: awareness, knowledge, attitude, skill, ability to evaluate, and participation (Abd Aziz et al., 2016). Thus, regardless of grade level, every student should acquire a sense of empathy for the environment.

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Teachers in Malaysia have been tactically implementing, either directly or indirectly, environmental education to instill in their students a high level of awareness. Environmental education is not taught as a separate subject in secondary schools; rather, it is interwoven into other subjects such as geography, moral education, Islamic education, living skills, and science. However, geography has a distinct theme in the Form One to Form Three levels: environmental issues and management (Ministry of Education Malaysia, 2015). This element consolidates geographic knowledge with prudent and responsible resources and environmental management to determine the extent of students' exposure to environmental ethics.

Moreover, all students have environmental education deeply ingrained in their minds, whether they live in cities or in the countryside. Students in Malaysia can easily obtain an education and the opportunity to learn more about preserving and conserving the environment. Nevertheless, some developing countries struggle to obtain the education, resulting in a low level of environmental protection awareness. Human beings must implement environmental ethics because humans and the environment are inextricably linked, and the environment is crucial for future generations' survival (Hasimah et al., 2017). This ethics also demonstrates the dearth of environmental knowledge among those who do not receive a comprehensive education.

A person who is well-versed in environmental knowledge possesses an environmental ethics. Each school must set lofty goals to create a harmonious learning environment that has positive effects on students. Students who possess environmental ethics distinguish themselves from those who possess only environmental knowledge. However, the provided planning does not address all possible barriers to implementing ethical behaviour towards the environment. Numerous efforts, including both top-down and bottom-up approaches, have been made to educate community members about their responsibilities toward the environment (Abd Aziz et al., 2016). Hence, we aim to ascertain the extent to which students who have received formal exposure to environmental ethics and positive behaviour towards the environment understand these concepts.

Literature Review

Environmental ethics refers to efforts to justify human behaviour towards the environment—that is, to develop a value system that can guide humans' interactions with the environment based on noble values, and then to codify this system into environmental law and policy (Maharam, 2015). When such a value system is thus codified, individuals with environmental ethics can distinguish between right and wrong to ensure the environment is always protected. Additionally, environmental ethics is a theory and practice about the natural world's concerns, values, and obligations (Stockbridge & Dorward, 2015). Environmental ethics in practice means individuals perform environmentally conscious actions as part of their daily routine. Both in theory and practice, environmental ethics are intertwined to achieve positive outcomes especially in behaviour. Humans, thus, play a critical role in protecting the environment in their daily lives.

Moreover, environmental ethics consists of intrinsic values from the ecological sciences as its primary units of moral analysis (Kalpita Bhar, 2018). The theoretical basis of this definition is that all living things on this planet, not just humans, desire survival. With nature, the relationship between ecosystems and environmental ethics is explored in greater depth. According to Alex et al. (2019), environmental ethics means that humans are to act as environmental stewards. Responsibility, in this context, refers to people's attitude or inner personality towards nature.

Among the various efforts to measure such change, Riley Dunlap and colleagues at Washington State University developed an instrument they called the New Environmental Paradigm (sometimes called the original NEP), which they published in 1978 (Dunlap & Van Liere, 1978). Dunlap and Van Liere intended the NEP scale to improve upon the original state in several ways, including emphasising various aspects of an ecological worldview, providing a balanced set of pro- and anti-NEP items, and avoiding outdated terminology (Dunlap et al., 2000). In value-belief-norm theory, adherents use the NEP to quantify beliefs about human-environmental interactions. The NEP scale consists of fifteen items representing the five components of an ecological worldview: limits to growth, anti-anthropocentrism, the balance of nature, rejection of exemptionalism, and the possibility of an eco-crisis. Davis et al. (2011) positively correlated the NEP scale with environmental behaviour. Indeed, some environmental researcher use the NEP Model to predict a range of nuanced environmental attitudes, beliefs, and behaviours. In this study, we examined students' environmental ethics using the NEP model policy. Figure 1 depicts the relationship between the environmental ethics variables that aim to shape responsibility towards the environment. Knowledge, value, and care are three variables in environmental ethics that shape one's responsibility towards the environment.

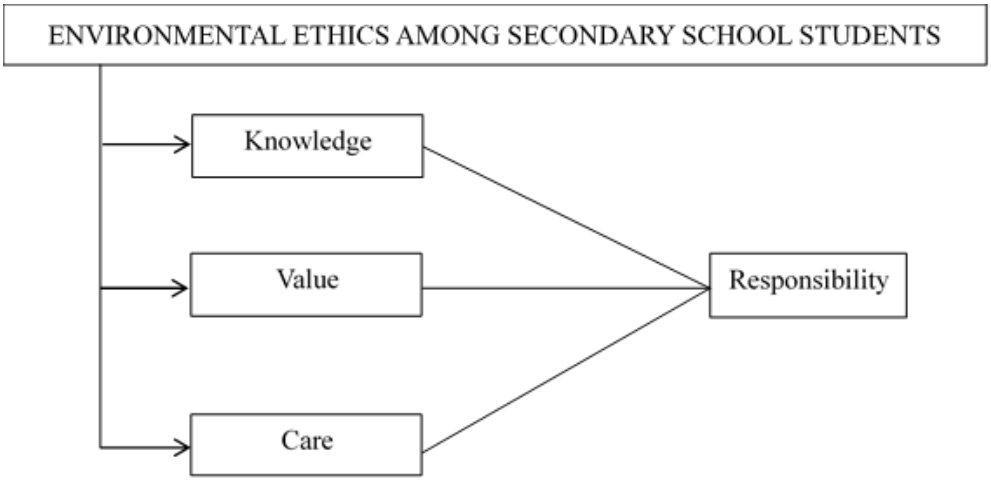

Figure 1. The Relationship of Environmental Variables That are Affecting the Responsibility Towards the Environment

Knowledge about environmental ethics encompasses all environmental issues. Nowadays, information about environmental ethics is accessible via a variety of media, including classroom instruction, family upbringing, social media, and community exposure, among others. School-based learning is an essential medium for exposing students to the environmental ethics. Their acquisition of new knowledge, in a broad sense, begins at school, apart from students' parents. The surrounding society, and notably individuals who are committed to environmental ethics and who can help prevent harmful environmental activities can influence students' knowledge, and students can learn environmental ethics anywhere. In their study conducted in Beijing on environmental literacy, Cheng et al. (2020) discovered that those with high and moderate environmental literacy scores were more interested in ecological science knowledge, whereas those with low scores were more interested in environmental factors and environmental ethics. Environmental ethics shifts the human role from one of conqueror to one of defender of the planet. Our responsibility is to care for the world and not merely use it for our own benefit before discarding it. According to ethics, those who live on earth serve environment and are responsible for keeping it protected. The inherent guarantee for appropriate interaction with other organisms and preventing them from harming it is present when people have sound environmental ethics. As a result, environmental ethics places a strong emphasis on raising morally upright individuals (Abedi Sarvestani & Shah Vali, 2009).

On the other hand, Cheng et al. (2020) also claimed that an environmental value is a critical indicator and standard for how one should approach the relationship between humans and the ecological environment. People who can control their emotions in environmental ethics demonstrate their high level of rational value. Such control is also evidence that they can distinguish between right and wrong. In a roundabout way, one learns how to teach oneself how to live an environmentally ethical existence. Nor Aznan et al. (2006) used questionnaires in conducting a preliminary study on environmentally friendly lifestyle practices among trainee teachers and found that the personal dimension associated with the value of self-confidence influenced their participants' commitment to eco-friendly lifestyle practices. This study also clearly showed that the participants with a high sense of self-worth were not ashamed to do good and enjoy a comfortable and prosperous quality of life.

Maharam (2015) discovered that indigenous people in Sarawak engaged in ethical interactions with nature to protect the environment. They demonstrated that these indigenous people's nature was to value a harmonious relationship with the environment in their daily lives. In this text-based study, Maharam (2015) described these people interacting with their environment, their conceptions of the spirit, and their God, while also respecting their ancestral cemeteries and the surrounding community. Their environmental ethics were thus shaped by the practices, beliefs, and way of life. In her text-analysis study on environmental ethics and responsibility in Brazil, Rouanet (2015) emphasised that the primary causes of environmental problems, aside from natural factors, were institutional development practices and citizens' behaviour towards the environment. Durairaj et al. (2016) also investigated the level of environmental education awareness and habits among Form Four science students. Durairaj et al. included items related to practices and responsibilities towards the environment in the study, as mentioned earlier, to examine gender differences and the relationship between environmental education and the science stream. They found no significant differences in awareness and practice between environmental education and the science stream and gender; therefore, all students who adhered to environmental ethics felt some responsibility for the environment. Even though we are now facing global threats such as climate change and natural disasters, we cannot avoid the ethical quandary of necessary moral compromise (Rouanet, 2015). In this article, we will discuss environmental ethics focusing on secondary school students in Malaysia's Sabah district of Papar.

Methodology

Research Design

This study uses a quantitative study design by using a questionnaire as a research instrument. A major benefit of using quantitative data is its objectivity. It relies on concrete numbers and fewer variables. This can help in removing biases from the study and improve the reliability of the results. Another advantage is that getting big sample sizes is frequently simpler.

Sample and Data Collection

The study sample was drawn from a district located in Sabah's West Coast Division, Papar. Papar is 38 kilometers south of Kota Kinabalu, the state capital of Sabah. It is a satellite city of Kota Kinabalu, which is included in the Metropolitan Kota Kinabalu area. The Papar district is known as the West Coast's education hub, as it houses various facilities ranging from primary education institutions to skill centres for Malaysian Education Certificate a high school graduate. We chose Papar as the education hub due to its strategic location for collecting face-to-face data before the COVID-19 outbreak in February 2020. We conducted the study in four secondary schools in Papar, Sabah, which included SMK Majakir and SMK ST Joseph in urban areas and SMKA Kimanis and SMK Bongawan II in rural areas (Figure 2).

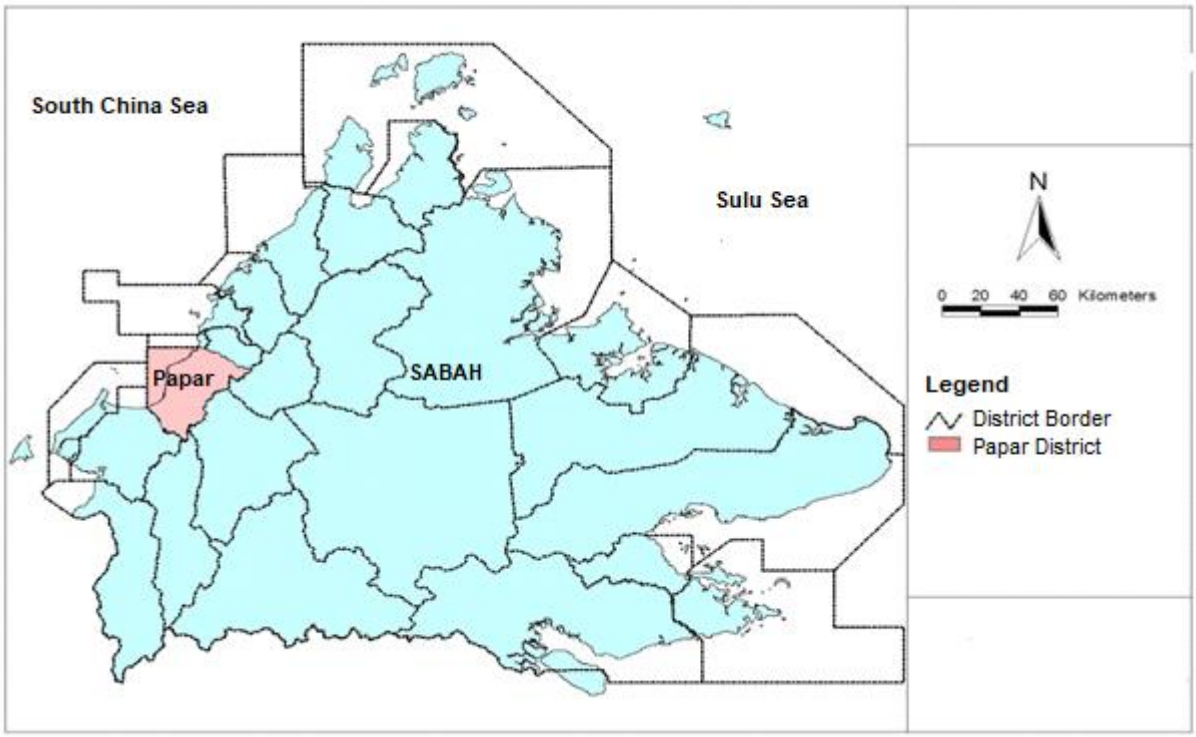

Figure. 2. Map of the Study Sample in Papar, Sabah

Study Population and Study Sample

We used probability sampling, with a predetermined number of random and systematic sample selections and Krejcie and Morgan's (1970) table as a guide to determine the sample size. The study population consisted of Form Four secondary school students from both urban and rural areas of Sabah's Papar district. The study population consisted of 347 individuals, and a total of 180 respondents participated. Two schools represented each category: urban and rural schools. Figure 1 depicts the sample size for selected Form Four students who met the study criteria from SMK Majakir, SMK ST Joseph, SMKA Kimanis and SMK Bongawan II, all of which are in Papar, Sabah. The sample size for each selected school is listed in Table 1.

Table 1. Sample Size for Selected Schools in the Study

School's Name	Number of Respondents (Population)	Number of Respondents (Sample)
SMK Majakir	54	28
SMK ST Joseph	169	88
SMKA Kimanis	42	22
SMK Bongawan II	82	42
Total	347	180

Information on Participants

The demographic information in Table 2 includes the respondents' gender, school name, school location, and religion. Seventy-five male students (41.7%) and 105 female students (58.3%) participated in this study. One hundred and sixteen (64.4%) students represented the urban schools, namely SMK Majakir and SMK ST Joseph. In comparison, 64 respondents (35.6%) were from rural schools, specifically SMKA Kimanis and SMK Bongawan II.

Table 2. Respondent's Background

Respondent's Background		Frequency	Percentage (%)
Gender	Male	75	41.7
	Female	105	58.3
Location	Urban	116	64.4
	Rural	64	35.6
School's Name	SMK Majakir	28	15.6
	SMK ST Joseph	88	48.9
	SMKA Kimanis	22	12.2
	SMK Bongawan II	42	23.3
	Total	180	100

Questionnaire Instrument

We divided the questionnaire into six sections. We asked respondents to complete Section A to obtain information about their background: gender, religion, ethnicity, school name, and school location. Section B consisted of ten questions designed to elicit responses from respondents regarding their knowledge of environmental ethics. Section C focused on the value of environmental ethics. We measured the values using two variables: concern and emotion. Section D comprised ten items about care for environmental ethics. Section D included two sub-variables that quantified the environmental and social factors. Section E contained ten items for the dependent variable. This section addressed the students' responsibility for environmental ethics. Sections B, C, and D used a five-point Likert scale: 1= Strongly Disagree, 2= Disagree, 3= Unsure, 4= Agree, and 5= Strongly Agree. Section E used a five-point scale: 1= Never, 2= Rarely, 3= occasionally, 4= Often, and 5= Very Often. We developed all the items based on previous studies, such as Hamidah et al.'s (2011) on environmental values and Durairaj et al.'s (2016) on environmental care aspects. We also conducted a pilot study. Cronbach's alpha coefficient for each variable was greater than .70 (Table 3).

Table 3. The Reliability Value of the Pilot Study Attractive

Part	Variable	Number of Items	Alpha Cronbach Value
Part B	Environmental Ethics Knowledge	10 items	.723
Part C	Environmental Ethics Value	10 items	.719
Part D	Environmental Ethics Care	10 items	.718
Part E	Environmental Ethics Responsibility	10 items	.873
Total		40 items	

Data Analysis

A descriptive analysis was used for the purpose of describing and summarizing the information from the sample. A descriptive analysis can interpret the data or information by summarizing several sets of data or information in various media, such as tables and diagrams. For purposes of classifying responses according to levels, Landell (1997) was used as a benchmark. This consisted of a low level (mean score 1.00-2.33), a moderate level (mean score 2.34-3.66), and a high level (mean score 3.67-5.00). Multiple linear regression was used to analyse the effects of knowledge, value, and care on the responsibility of secondary school students in environmental ethics. Multiple regression is a frequently used statistical method for analyzing data when there are multiple independent variables. While it can be used in place of analysis of variance, it is most commonly used in the associational approach. The normality test has been passed for all data, and all data are distributed normally. Additionally, all outliers were eliminated.

Results

Levels of Knowledge, Value, Care, and Responsibility in Environmental Ethics

We conducted the descriptive analysis to determine the levels of knowledge, value, care, and responsibility in environmental ethics, and determined the frequency, the percentage (%), the mean score, the standard deviation (SD), and the level for each variable. We classified the score value of each variable into three levels: low, moderate, and high.

We also used cut-off points to interpret the level, as recommended by Best (1977), namely low level (score of 1.00-2.33), medium level (score of 2.34-3.66), and high level (score of 3.67-5.00).

Table 4 shows the levels of the respondents' knowledge, value, care, and responsibility in environmental ethics. Overall, these students demonstrated a high level of knowledge about environmental ethics (Mean=4.50, SD=0.25), and the level of value in environmental ethics was high (Mean=4.42, SD=0.47).

Next, the level for the care variable related to environmental ethics was equal to the level of the knowledge variable. The students demonstrated a high level of care for environmental ethics (Mean=4.48, SD=0.26). Following that, the variable related to the level of students' responsibility in environmental ethics revealed that four students (2.2%) were at a low level, 47 students (26.1%) were at a moderate level, and 129 students (71.1%) were at a high level. Overall, these findings indicate that the respondents had a high level of responsibility (Mean= 3.80 and SD= 0.516).

Table 4. Levels of Knowledge, Value, Care, and Responsibility in Environmental Ethics

Variable	Low Level		Moderate Level		High Level		Mean	SD	Mean Level
	N	%	N	%	N	%			
Knowledge	0	0	0	0	180	100	4.50	0.25	High
Value	2	1.1	8	4.4	170	94.4	4.42	0.47	High
Care	0	0	0	0	180	100	4.48	0.26	High
Responsibility	4	2.2	47	26.1	129	71.1	3.80	0.56	High

The Effects of Knowledge, Value, and Care on the Responsibility of Secondary School Students in Environmental Ethics

As Table 5 indicates, the value variable had the greatest impact on the responsibility (dependent) variable in environmental ethics. The value variable had a significant value of p=.00 (p<.05), indicating an effect on secondary school students' responsibility in environmental ethics. The beta (B) value was 0.38 in the value of the independent variable with β= 0.33, t= 4.64, and p<.05. The contribution of the value (independent) variable to the responsibility (dependent) variable was 14.5%.

Next, the care (independent) variable contributed 2.7% to the responsibility (dependent) variable in environmental ethics. The B-value for the care variable was 0.33 with β= 0.15, t= 2.22, and p<.05. The significant value was .02, which is less than .05, indicating an effect in the responsibility variable in environmental ethics.

Table 5. The Effects of Knowledge, Value, and Care towards the Responsibility in Environmental Ethics

Independent Variable	Dependent Variable Environmental Ethics Responsibility		t	p	Contribution
	B	β			%
Constant	-0.060		-0.069		
Environmental Ethics Value	0.389	0.330	4.643	.000*	14.5
Environmental Ethics Care	0.334	0.159	2.225	.027	2.7
Environmental Ethics Knowledge	0.144	0.066	0.947	.345	No Contribution
R= 0.420	F= 12.584				
R^2 = 0.177	Sig F= .000				
*Significance: p<.05					

In this study, the knowledge variable had no significant value of .34, which is lower when compared to other variables and shows that the knowledge variable had no effect on the responsibility variable because it exceeded the value of .05. The B-value for the knowledge variable was .14, with β= .06, t= .94, and p>.05.

Discussion

The study findings revealed that students had high levels of knowledge, value, care, and responsibility in environmental ethics. Therefore, the knowledge components acquired in schools and through other mediums such as family upbringing, local community, and reading materials contributed to environmental stewardship. The role of educators indirectly diversified the techniques and tools used in environmental education, which had a significant impact on educator-student relationships, student-student relationships, and instructional materials (Sumarni & Zamri, 2018). Furthermore, the respondents provided positive feedback on the value of environmental ethics in their own lives. The findings of this study can also be compared to those of Hanifah et al. (2015) who found that primary school students had a moderate level of practice in environmental care. The age of the respondents is a factor that might explain this

level difference. Secondary school students would have more experience and exposure to environmental stewardship and ethics than would primary school students. Thus, secondary school students must set a good example for the younger generation by serving as positive role models to be emulated. Additionally, the findings indicate that the responsibility variable in environmental ethics was high. The respondents recognised the importance of ethically carrying out their environmental stewardship responsibilities. The results of this study were consistent with the findings of Durairaj et al. (2016) who discovered that Form Four students in the science stream had a high level of environmental awareness. In short, these students were aware of their responsibility in ensuring that environmental ethics were followed to maintain the best possible quality of the environment. Participation, organisation, education, and human empowerment are essential to growth. Development that is socially sustainable puts the needs of its citizens before those of production. Sustainable development must be appropriate not only to the environment but also to the culture, history and social systems of the place where it is to occur. Development must be just and equal. Development entails the constant balance of opposites and the removal of obstacles and divisions between freedom and order, people and organisations, labour and play, settlements and nature.

In this study, however, none of the independent variables influenced the dependent variable. The knowledge variable had a significant value of 0.34, which is high when compared to other variables and shows that the knowledge variable had no effect on the responsibility variable because it exceeded the value of 0.05. The B-value for the knowledge variable was 0.14, with $\beta = 0.06$, $t = 0.94$, and $p > 0.05$. This result shows that respondents were able to evaluate the critical actions of protecting and caring for the environment. It also indicates that the value and care variables that influenced the responsibility in environmental ethics could have a positive impact on the environment (Karataş, 2014). Balundė et al. (2019) also emphasised that environmental problems could be reduced if society became more environmentally conscious. The quality of the environment was dependent on human behaviour (Shafiei & Maleksaeidi, 2020; Tyas & Dian, 2018).

Conclusion

As demonstrated in this article, environmental ethics are concerned with the relationship between humans and the environment. Humans have a responsibility to prevent further environmental degradation through environmental ethics. Numerous perspectives on environmental ethics were elicited from community members. Regardless of one's standpoint or perception, the end goal will always be the same: safeguarding the environment from pollution. Having a healthy environment is of utmost importance when considering the significance of humans as the objective of growth, on the one hand, and the environment as the bed for human activity, on the other hand. The most important topic for discussion, and the importance of environmental education as the attention was given to an essential tool for realising human growth. Thus, environmental ethics must begin in elementary school to ensure that the younger generation is educated about environmental protection. Furthermore, this study showed how environmental education in school benefits students by developing their environmental ethics. Sixteen-year-old students' actions and thoughts are rational enough to judge what constitutes a good or bad environmental act, and they are constantly monitored and guided by adults. The study's value component indicates that a person who has been exposed to environmental factors can carry out appropriate environmental obligations. Mentoring and exposing students to environmental ethics will directly improve their behaviour and discipline, ultimately leading to the development of ethical individuals.

Recommendations

Future researchers and practitioners are encouraged to include a skill variable in their research on the Responsibility of Environmental Ethics among Secondary School Students in the Twenty-First Century. The study also employs qualitative methods, such as questionnaire techniques, to supplement the quantitative research findings. Therefore, the ethics must be improved in order to create a balance between people, the environment, and education. The following concerns are suggested in this regard:

- Outlining ethical and proper environmental conduct.
- Reassessing environmental education strategies.
- Taking into account the state of the educational system and the resources available in the environmental knowledge textbooks.
- Considering extracurricular environmental activities.

Limitations

The research was restricted to one of Malaysia's states. The study can be expanded by involving the entire country and students of all ages in the school.

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Authorship Contribution Statement

Mahat: Drafting manuscript, design, analysis. Norkhaidi: Statistical analysis, formatting. Saleh: Reviewing, design. Hashim: Writing, formatting. Nayan: Reviewing, theory. Mat Said: Reviewing. Matnoor: Writing. Hamid: Translating

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