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Analysis of Students' Sustainability Awareness of the Environment

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Abstract: This study aims to analyze the sustainability awareness of students at SMAN 1 Ciasem, Subang, West Java which is adjusted to environmental pollution material. The method used in this research is descriptive method with a quantitative approach. This research was conducted at SMAN 1 Ciasem with a total sample of 30 students. The instrument used in this study was a questionnaire consisting of 20 statements consisting of 10 positive statements and 10 negative statements. The results in this study include the average value and percentage of students' awareness of sustainability in general, based on indicators, and gender. The mean value for positive statements of students' awareness of sustainability is 3.14 and for negative statements, it is 1.89 in the high category. In addition, this study also produced data in the form of differences in sustainability awareness based on gender. The average percentage of male students' sustainability awareness in positive statements was 77.19% and that of women was 78.86%. The conclusion in this study is that students' awareness of sustainability has a high category. This indicates that students carry out habits that always pay attention to sustainability awareness. Based on their gender, female are more aware of sustainable environmental sustainability than male.

Keywords: Awareness of sustainability; Gender; Quantitative approach

Introduction

In the last decade, technological developments have had a positive impact on humans and the environment in the form of sophisticated equipment that can help human performance in everyday life and can change human thinking to become more advanced (Ghany, 2018; Kharolinasari et al., 2023; Yulianti et al., 2023). In technological development, humans have an important role in developing technology (Cropley, 2020). Apart from that, the role of humans cannot be replaced by machines because it is humans who create and operate machines (Efendi et al., 2023). Therefore, humans are the main actors responsible for maintaining environmental conditions.

Apart from having a positive impact, technology also has a negative impact on humans and the environment in the form of misuse of sophisticated equipment which results in moral disturbances, environmental degradation, deforestation, exploitation of natural resources, unstable environment and environmental pollution (Fitriandari & Winata, 2021; Ghany, 2018; Muhsin et al., 2023; Sutanto, 2017). The main perpetrator of environmental instability is irresponsible human behavior in maintaining environmental conditions (Suryanegara et al., 2023). Unstable environmental conditions can give rise to disease germs that can attack various groups, especially the elderly. This is because the elderly are vulnerable to disease (Syahrir et al., 2023).

A dynamic concept that can solve these problems is the Sustainable Development Goals (SDGs), one of which is Education for Sustainable Development (ESD) (Fitriandari & Winata, 2021; Putri et al., 2023). The ESD concept is a concept initiated by UNESCO which aims to form a society with a sustainable mindset and is based on educational aspects (Hsieh, 2020). Education for Sustainable Development (ESD) emphasizes aspects of

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planning, program implementation, courses, teaching, learning, evaluation, and administration (Bezeljak et al., 2020; Hsieh, 2020) which are in accordance with the foundation of Indonesia's national education goals. The application of ESD to learning is very important and can be integrated well. Education for Sustainable Development (ESD) can be integrated into science learning, including Biology Learning (Baierl et al., 2021; Bezeljak et al., 2020). Based on UNESCO, ESD content can be integrated with Biological concepts in the form of materials on the environment, health, and sustainable urbanization (Baierl et al., 2021).

The environment is an important aspect in ESD development (NCCA, 2018). A well-maintained environment will support better conditions for future generations and if it is not maintained it will experience pollution (Ghany, 2018). Environmental pollution occurs due to irresponsible human activities, such as excessive use of pesticides and unwise use of plastic, resulting in microplastics being difficult to decompose (Kurniawan et al., 2021; Zhou & Li, 2021). The impacts that can arise due to environmental pollution are global warming, biodiversity crisis, ozone layer depletion, and climate change (Saptaji et al., 2020). This environmental pollution occurs due to a lack of development of sustainability awareness regarding environmental preservation (Ghany, 2018).

Sustainability awareness has a correlation with one of the ESD competencies, namely self-awareness and means all efforts made to improve environmental problems with personal awareness (NCCA, 2018; Saptaji et al., 2020). Sustainability awareness aims to protect the environment from environmental pollution and prepare students to contribute to sustainable development in the 21st century (Rini & Nuroso, 2022; Saptaji et al., 2020). Sustainability awareness is implemented effectively in educational environments (Atmaca et al., 2019; Clarisa et al., 2020). Education contributes greatly to the formation of students' sustainability awareness (Saptaji et al., 2020).

Indonesian Education Goals according to Law no. 20 of 2003 which is to produce dignified students in order to educate the nation's life and social justice. Based on this, education is one of the main foundations in developing students' sustainability awareness in Indonesia. Based on Permendikbudristek No. 5 of 2022, the curriculum implemented in Indonesia is the Independent Curriculum which has competency standards for graduates in the form of loving themselves, others and preserving the environment. Educational Goals and Competency Standards Indonesian student graduates are in line with sustainability awareness competency goals (Frank & Stanszus, 2019; Giangrande et al., 2019; Kurnia et al., 2020).

Continuous awareness needs to be developed in learning because it can produce individuals who are confident and able to solve problems well (Amin et al., 2023; Hidayat, 2023). This is because sustainability awareness has the same application as self-awareness. Apart from that, good self-awareness can make someone able to solve problems effectively (Shamdas, 2023). Therefore students' awareness of sustainability needs to be analyzed to produce learning that is able to protect the environment and can also be used to develop technology.

Based on the explanation above, this research was carried out to analyze the sustainability awareness of students at SMAN 1 Ciasem which was adjusted to environmental pollution material. In addition, this study also aims to determine differences in students' sustainability awareness based on gender.

Method

This research was conducted at SMAN 1 Ciasem in April 2023. The research method used is a descriptive method with a quantitative approach. The descriptive method contains an overview of the phenomena that occur in research. The data in this study came from a sustainability awareness questionnaire (Rini & Nuroso, 2022). The population in this study included all class X of SMAN 1 Ciasem. The sample in this study consisted of 30 respondents in one class. The following is the classification of the sample used Table 1.

Table 1. Demographics of research sample

Class	Gender		Frequency
	Male	Female	
X-9	8	22	30

The instrument used in this study was a slightly modified sustainability awareness questionnaire (Rini & Nuroso, 2022). The questionnaire consists of 20 statements adjusted for sustainability awareness indicators (Hassan et al., 2010). The statements in the questionnaire are arranged on positive and negative statements. This is done to measure the consistency of students' answers (Rini & Nuroso, 2022). The following is a table of sustainability awareness indicators and a sustainability awareness questionnaire.

The research was conducted by distributing sustainability awareness questionnaires to students to obtain data on students' sustainability awareness. Students fill in independently and the results will be collected again. After students fill out, an analysis of the questionnaire that has been filled in by students is carried out. These results are in the form of quantitative data which will then be interpreted descriptively.

Table 2. Indicators of Sustainable Awareness

Indicator of Sustainable Awareness	Item Number	
	Positive	Negative
Behavioral and Attitude Awareness	1, 6, 15	3, 7, 10
Emotional Awareness	2, 4, 9, 16	8, 17, 18
Sustainability Practice Awareness	5, 12, 19	11, 13, 14, 20

Source: (Hassan et al., 2010)

The data obtained from the sustainability awareness questionnaire will be analyzed descriptively by adjusting to the sustainability awareness category (Rini & Nuroso, 2022). The data that has been generated is measured by the average value using the formula:

$$\text{Mean} = \frac{\text{Total Score Obtained}}{\text{Total Score}} \text{ x } 4 \quad (1)$$

The mean scores for positive and negative statements have opposite interpretations (Taluke et al., 2019). This is to adjust the meaning of each statement. The following are the categories of student sustainability awareness, after measuring the average value:

Table 4. Categories of Students' Sustainability Awareness

Mean	Category	
	Positive	Negative
1.00 – 2.00	Low	High
2.01 – 3.00	Medium	Medium
3.01 – 4.00	High	Low

Source: (Rini & Nuroso, 2022)

Then make a percentage and adjust it to the category of percentage awareness of sustainability Hassan et. al. (2010). The percentage is the same as the average value, the interpretation of positive and negative statements has the opposite meaning.

$$\text{Percentage (\%)} = \frac{\text{Total Score Obtained}}{\text{Total Score}} \text{ x } 100\% \quad (2)$$

The following is the interpretation of the presentation on negative and positive statements:

Table 5. Interpretation Percentage of Sustainable Awareness

Percentage	Interpretation	
	Positive	Negative
0.00% - 39.9%	Hated habits to do	Always a habit
40.0% - 69.9%	Habits that have been done / are happening	Habits that have been done / are happening
70.0% - 100%	Always a habit	Hated habits to do

Source: (Hassan et al., 2010)

Result and Discussion

Based on the results of the sustainability awareness questionnaire, quantitative data was generated. The data is categorized based on sustainability awareness indicators which include Behavioral and attitude awareness, Emotional awareness, and Sustainability practice awareness. Each indicator consists of positive and negative statements. This aims to see the consistency of students' sustainability awareness. The following are the results of the research that has been done:

Table 6. Positive Statement of Student's Sustainability Awareness

Statement	Mean	Category	Percentage	Interpretation
Behavioral and Attitude Awareness				
Statement 1	2.93	Medium	73.30	Habits that have been done
Statement 6	3.50	High	87.50	Always a habit
Statement 15	1.70	Low	42.50	Habits that have been done
Emotional Awareness				
Statement 2	2.23	Medium	55.80	Habits that have been done
Statement 4	1.47	Low	36.70	Hated habits to do
Statement 9	3.33	High	83.30	Always a habit
Statement 16	2.20	Medium	55.00	Habits that have been done
Sustainability Practice Awareness				
Statement 5	1.30	Low	32.5	Hated habits to do
Statement 12	2.60	Medium	65.00	Habits that have been done
Statement 19	3.13	High	78.30	Always a habit
Total	3.14	High	78.40	Always a habit

Based on the results of the questionnaire analysis in Table 6 and Table 7, students' sustainability awareness is included in the high category with an average value of 3.14 and a percentage of 78.4% in positive statements. In negative statements, the average value of students' awareness of sustainability is 1.89 which is classified as a high category and has a percentage of 47.2%. This proves that the sustainability awareness of students at

SMAN 1 Ciasem is classified as high and students have carried out activities that are in accordance with the competency awareness of sustainability.

Table 7. Negative Statement of Student's Sustainability Awareness

Statement	Mean	Category	Percentage	Interpretation
Behavioral and Attitude Awareness				
Statement 3	3.20	Low	80.00	Hated habits to do
Statement 7	3.00	Low	75.00	Hated habits to do
Statement 10	3.13	Low	78.30	Hated habits to do
Emotional Awareness				
Statement 8	2.40	Medium	60.00	Habits that have been done
Statement 17	3.07	Low	76.70	Hated habits to do
Statement 18	2.07	Medium	51.70	Habits that have been done
Sustainability Practice Awareness				
Statement 11	1.70	High	42.50	Always a habit
Statement 13	1.60	High	40.00	Always a habit
Statement 14	3.47	Low	86.70	Hated habits to do
Statement 20	2.20	Medium	55.00	Habits that have been done
Total	1.89	High	47.20	Habits that have been done

The highest average score of respondents responding to positive statements is in the statement "I realize the importance of discussing environmental pollution with friends" with an average value of 3.50 and a percentage of 87.5%. The highest average score of respondents responding to negative statements is in the statement "Reducing the use of goods containing CFCs (chlorofluorocarbons) as an effort to tackle global warming is a waste" with an average value of 1.60 and a percentage of 40.0%. The lowest score of respondents responding to positive statements is in the statement "I feel the need to discuss environmental issues with my friends with an average score of 1.30 and a percentage of 32.5%. The lowest score of respondents responding to negative statements was in the statement "I feel that we have no obligation to take care of the surrounding environment" with an average value of 3.47 and a percentage of 86.7%.

Based on the average value of sustainability awareness, some students have implemented sustainability activities well such as discussing environmental pollution issues and reducing the use of goods containing CFCs. But there are still students who do not care about environmental problems and feel they have no obligation to protect the environment. Based on observations, this phenomenon can occur because the environment of SMAN 1 Ciasem is still not familiar with the concept of sustainability. This is a note for educators to be able to foster a spirit of sustainability awareness among students. Apart from being seen from the statement items above, the assessment of students' sustainability awareness can be seen based on the indicators in Figure 1.

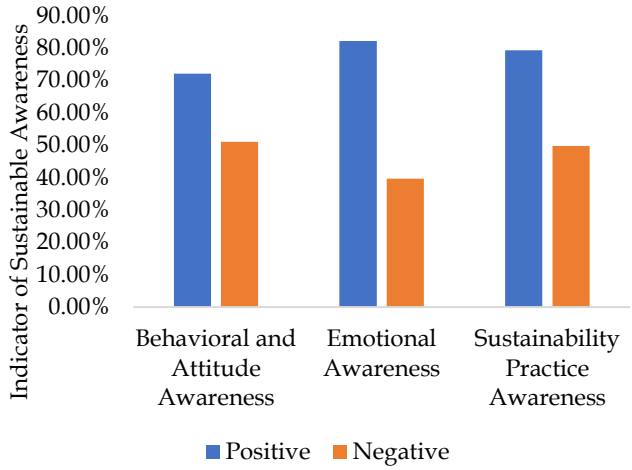

Figure 1. Indicator of Sustainable Awareness Graphic

Based on the picture above, the Behavioral and Attitude Awareness indicator has an average percentage of 72.22% with the caption "Habits that are always done" in positive statements. This indicates that most students care about the environment. However, there are still some students who have not maximally implemented an attitude of caring for the environment. This can be seen from the average percentage of students in negative statements, which is 51.11%. The dominant attitude of caring for the environment is that students always discuss environmental problems with friends, but do not want to save water properly.

The Emotional awareness indicator has an average percentage of 82.30% with the description "A habit that is always done" in positive statements. Students' emotional awareness of the environment is higher than other indicators (Agusti et al., 2019; Rini & Nuroso, 2022). This indicates that students have positive

emotions in preserving the environment. On the other hand, some students have negative emotions towards environmental sustainability with a percentage of 39.72%. Students' positive emotions towards the dominant environment are students caring about environmental problems around their homes, while negative emotions are in the form of not wanting to inform friends and family about the importance of protecting the environment.

On the Sustainability practice awareness indicator, it has an average of 79.44% with the statement "A habit that is always done" in a positive statement. This indicates that students have a sensitivity to environmental problems. The Sustainability practice awareness indicator has the second highest value after Emotional awareness. This is contrary to the research of Ridwan et al. (2021), which states that the Sustainability practice awareness indicator has the lowest average percentage compared to other indicators. On the other hand, some students are still not sensitive to environmental problems with an average score of 49.79% in negative statements. Measurement of sustainability awareness can be adjusted according to gender. Here's the review:

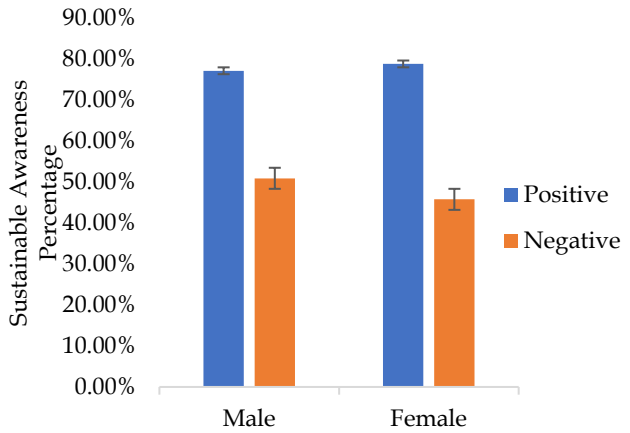

Figure 2. Sustainability Awareness Graphic Based on Gender

Based on Figure 2, the sustainability awareness of male students is lower than that of female students. The average percentage of male students' awareness of sustainability in positive statements was 77.19% and that of women was 78.86%. On the other hand, the average awareness of the sustainability of male students is higher than that of female students in negative statements of 50.94% and 45.80%. This is in accordance with the research of Ridwan et al. (2021) dan Rini (2022), which state that male students' awareness of sustainability is lower than female students. Based on this, female students are more aware of sustainable environmental sustainability than male students.

Conclusion

Based on the results of the study it can be concluded that student participation has a high category. This indicates that students do habits that always pay attention to awareness of participation. The highest average presentation is found in the Emotional awareness indicator and Behavioral and attitude awareness is the lowest indicator. Based on their gender, female are more aware of sustainable environmental sustainability than male.

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Zulkarnaen: wrote the article draft, revised and edited the final article. Riandi: revised and developed the draft article. Amprasto: revised and developed the draft article.

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There is no conflict of interest.

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