Environmental awareness at senior high school in Jakarta

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Abstract. The relationship between humans and nature tends to exploit nature or the environment on a large scale. Cultivating awareness that cannot be separated from the world of education must be ensured at the beginning of schooling regarding improving perceptions of things that affect them. The emergence of environmental awareness is based on environmental ethics, which states that environmental awareness consists of environmental behavior, perceptions, and attitudes. This research was conducted to answer how students, exceptionally high school students possess environmental awareness and aimed to analyze environmental awareness that has been applied mainly at the high school level. The research was conducted by giving questionnaires to 353 students from two Adiwiyata recipient schools in DKI Jakarta. Analytical descriptive is used to analyze the results of this research. The results show that the respondents have adequate knowledge and attitudes but have good environmentally friendly behavior. The descriptive-analytical results obtained indicate that excellent results are obtained for the knowledge aspect. Good results are obtained for the attitude aspect, but the results are sufficient for the behavioral part. The impact of this research can be used as a benchmark for evaluating the Adiwiyata program related to environmental sustainability awareness.

1. Introduction

The relationship between humans and nature has become an existential and philosophical issue in humanity's history [1]. Natural resource utilization tends to exploit nature or the environment on a large scale [2]. To prevent the reduced function of nature, humans must have environmental awareness and concern. Awareness is instilled from an early age to become a habit and culture for long-term life. Cultivating awareness from an early age is one of the efforts that cannot be separated from the world of education [3]. Proper understanding and knowledge of the environment around them will be ensured at the beginning of education. This knowledge must be useful for improving perceptions of things that affect the environment [4]. One of the successes of education for sustainable development is the cultivation of environmental awareness from an early age, especially at school. Environmental awareness is a concern for the environment, shown by knowledge, attitudes, and behavior following environmental ethics to contribute to a better living environment. The school curriculum must regulate and include environmental awareness because environmental rights and responsibilities must be exercised in schools followed by practices for environmental attitudes and behaviors [5], and must be started from the elementary level through education [6]. This is in line with Hanifah et al. The education system needs to be reoriented to increase environmental awareness and incredibly sustainable living behavior by teaching a good school community [7].
Students' environmental awareness has emerged as a factor influencing their epistemological beliefs [8]. Paramita & Yasa states that without having environmental ethics, environmental awareness will not be realized and carried out well [9]. Browne et al. in Macnaughton et al. [10] states that environmental awareness is an understanding related to environmental attitudes, beliefs, and behavior. The opinion of Browne et al. in Macnaughton et al.[10], in line with Du et al., inside and outside classroom activities such as field trips as a pedagogical strategy that integrates outdoor activities in the curriculum to meet the need for real experiences [11]. It helps achieve certain cognitive levels at a more abstract level to encourage the relationship with the environment and promote pro-environmental behavior [12]. The author's explanation of Heras is defined as environmental awareness consisting of environmental knowledge, environmental attitudes, and environmental behavior. Asilsoy et al. state that environmental awareness can determine responsive behavior in ecology, which the authors interpret as environmentally friendly behavior [13]. Mei et al. argued that environmental awareness could be predicted by environmental awareness even though environmental awareness and behavior do not positively correlate, namely, high environmental awareness does not indicate better environmental behavior [14]. Descriptions of Mei et al. [14] not following Macnaughton et al. [10], which states that environmental awareness is significantly related to physical activity attitudes, which the author defines as behavior. Du [11] mentioned that environmental behavior is included in environmental awareness, but Mei et al. argued that environmental behavior is not environmental awareness [14].

Environmental knowledge is general knowledge about environmental problems faced by humans [15]. It consists of six indicators, namely knowledge of the causes of environmental issues, knowledge of environmental problems prediction, knowledge of the impact of environmental issues, knowledge of solutions to environmental issues, knowledge of environmental issues in life. Daily knowledge of human dependence both individuals, communities, and the environment, as well as environmental management at the local and global levels [16]. Environmental attitude is the process of evaluating individuals to do something that can result in an advantage or disadvantage to the environment. Attitudes to the environment are essential to improve environmental quality [17]. Environmental behavior is an action that contributes to environmental preservation and environmental conservation [18]. It means that environmental behavior can be influenced by factors from the individual itself and the environment. Environmental care behavior consists of six indicators, namely water management, energy management, transportation use, waste management, natural disaster mitigation, caring for the surrounding environment related to environmental pollution prevention [19-21].

In Indonesia, the government has created Adiwiyata, which aims to help raise environmental awareness and support sustainable development. The school that implements the Adiwiyata program has several advantages related to the environment. The school has environmentally-friendly facilities and infrastructure, an integrated environment-based curriculum, and cooperation with parties outside the school in developing environmental awareness [22]. Schools have made efforts to increase students' environmental awareness in various ways, including integrating environmental insight into subjects and habituation to be environmentally friendly. Pro-environmental activities are also held inside and outside schools in partnership with other institutions and organizations, as will be explained in interviews with teachers and school leaders. The study conducted by Rahmadiani et al. shows that the ecological literacy aspects of knowledge and attitudes in Adiwiyata schools are better than in non-Adiwiyata schools. There is no difference in the aspect of student skills in preventing environmental damage [23]. To find out how environmental awareness in senior high school, the authors researched to analyze environmental awareness that has been applied mainly at the high school level and answer questions about it.

2. Method
Based on the theory of environmental awareness mentioned in the previous section, the authors summarise it into one definition of environmental awareness, namely concern for the environment, which is shown by knowledge, attitudes, and behavior that are following environmental ethics to
contribute to a better environment. The author uses the school environment as a boundary for collecting data on implementing education for sustainable development in senior high schools, with the research object being students. The author uses knowledge, attitudes, and behavior to measure environmental awareness at Adiwiyata recipient high schools in Jakarta. Adiwiyata recipient schools were chosen as research locations because the authors considered that Adiwiyata recipient schools had better environmental aspects to be used as a benchmark. The target population for the research is all the eleventh graders of both high schools. The research was conducted by giving questionnaires to 353 students from two Adiwiyata recipients schools in DKI Jakarta. Each school's total sample size is 160 students for school A and 193 students for school B. The number of items for each aspect is seven knowledge aspect questions, six attitude statements, and nine behavior statements. Besides, the authors also made brief observations in both schools to support the data in the questionnaire. The author encountered obstacles when conducting this research, including limited research time and permission from the school. Only two schools allowed their students as respondents to this study.

3. Results and discussion
Research data obtained from questionnaires to students who have been processed then analyzed using descriptive statistical analysis methods. This analysis was used to analyze data to get a description of each variable [24]. In the knowledge aspect, respondents were asked seven questions related to environmental knowledge in general, namely: 1) What does the SDGs stand for?; 2) How many goals are there for the SDGs?; 3) What is the meaning of climate?; 4) The direct causes of climate change are?; 5) Floods are one of the natural disasters that are very detrimental to humans, below which are not the direct causes of floods are?; 6) What does BNPB stand for?; 7) One of the greenhouse gases is carbon dioxide gas, one way of reducing the supply of carbon dioxide gas in the air is? Question 1 and Question 2 are questions given to respondents regarding their knowledge of the SDGs. Based on the questionnaire results mentioned in table 4.10, for Question 1, most of the respondents, or as many as 77.6% of respondents, answered correctly in the Good category. Still, for Knowledge 2, only 46.7% of respondents answered correctly in the Enough category. Respondents for this, grade 11 students already know about the SDGs, namely Sustainable Development Goals. However, when asked questions about the number of goals or the number of SDGs goals, many respondents still gave incorrect answers. The questions given to the respondents for Question 3 and Question 4 are questions related to the concept of climate. The concept of climate and weather at the high school level is taught in grade 10 on Atmospheric Dynamics and Its Impact on Life. The definition of climate by definition when viewed based on the results of the questionnaire in Question 3, most respondents already know the concept of climate by definition. However, some respondents still have the wrong perception between the definition of climate and the definition of weather. According to what was mentioned in the previous section, the question about the causes of climate change is directly answered correctly by 93.8% of respondents. This shows that the knowledge of the causes of climate change directly caused by global warming and greenhouse gases is already known to most respondents, namely eleventh-grade students.

The questionnaire related to the concept of disaster is a question about what is not the cause of flooding for Question 5, and BNPB stands as Question 6. Knowledge about disasters is contained in Geography grade 11 on the topic of Disaster Management. Questionnaire Question 5, there are 94.3% of respondents answered correctly, namely excessive use of electricity. For this question, the authors expect 100% of respondents to answer correctly. Respondents who chose other answers were considered not to have paid attention to the questions carefully because the questions provided were those that were not the direct cause of the flood disaster, so the answers given by several respondents were not correct. Question 6 is a question about the extension of BNPB, namely the ‘Badan Nasional Penanggulangan Bencana. This question is intended to test students' knowledge regarding institutions that are often involved in natural disasters in Indonesia. According to what has been mentioned above, the results of the questionnaire for Question 6 get the results that 93.5% of respondents answered correctly. Respondents' knowledge of flood disasters and institutions often involved in disaster
management proves that respondents, as students at Adiwiyata recipient schools, know disaster response. The topic of disaster management is also taught in grade 11 as a separate topic. Besides, knowledge about disasters is supported by interviews with teachers and school leaders in the previous section with schools that have established partnerships with related institutions for disaster response education. The questionnaire results for Question 7 show that most respondents (89%) already know that using public transportation for their daily activities is one way to reduce the supply of carbon dioxide gas as a motor vehicle exhaust gas. The questionnaire results on the aspects of knowledge in terms of each individual showed that 334 people had good knowledge categories and 19 people had inadequate knowledge. Therefore, for this research's knowledge aspect, most respondents have high knowledge with an average value of 82%.

In the attitude aspect, respondents were given six statements regarding their attitudes towards environmental activities and cases. The statements given are 1) illegal logging and hunting of wild animals are carried out to balance the natural ecosystem; 2) farmers need the use of chemical fertilizers in agriculture in Indonesia; 3) In my opinion, opening a tourist location in a protected forest area or a protected marine park is okay; 4) Earth hour movement (e.g., turning off lights at certain hours) is a good thing; 5) Campaign on climate change is needed in Indonesia; 6) anyone must do Energy-saving movements (for example: turning off class electronic equipment when it is not in use).

The attitude of respondents in statement 1 regarding illegal logging and hunting of wild animals is carried out to balance the ecosystem; respondents who choose to disagree are considered to have a caring attitude towards the surrounding environment and understand that illegal logging and hunting of wild animals, instead of balancing the ecosystem, can be a source of disaster one of which is flooding and loss of a function of the food chain. The illegal logging mentioned in this statement contrasts with the reforestation activities carried out in the respondent's school. The school seeks to provide an appeal to care for and maintain plants in the surrounding environment so that the stimulus fosters an attitude that illegal logging can balance the natural ecosystem. Respondents' attitude towards hunting wild animals is influenced by several protected endangered species' status, including those that are vulnerable, critical, or extinct. The increasing number of animal lovers' activities and campaigns on social media has also influenced respondents' attitudes to this statement. The respondent's attitude in statement 2 needs attention because, based on the questionnaire results, it shows that 168 respondents chose a doubtful attitude more than those who chose to disagree, namely 153 respondents.

The author realizes that statement 2 on this questionnaire is less clear because the author intends to use factory-made chemical fertilizers or artificial fertilizers. Therefore, chemical fertilizers in this statement are considered factory-made fertilizers. Respondents who choose to disagree are assumed to see that chemical fertilizers will harm the surrounding environment. Respondents who choose a hesitant attitude can assume that they see the advantages and disadvantages of using chemical fertilizers, namely that it can increase production yields and damage the environment if the use is too excessive. The number of respondents who chose an attitude of doubt was more significant than those who chose to disagree. Opening tourist locations in protected forest areas or protected marine parks is a statement given to respondents regarding their attitude about this phenomenon. The disagreement given by 181 respondents indicated that respondents chose to leave protected forests and marine parks protected to their original functions and without human interference. Respondents who choose an attitude of doubt can be interpreted as being neutral between supporting the environmental preservation of protected forest areas and protected marine parks with human needs for tourism and developing the potential of the area concerned.

Statement 4 regarding the movement earth hour is a good thing related to statement 6: anyone must do energy-saving movements (e.g., turning off class electronic equipment when it is not in use). One of the factors related to the respondent's attitude to this statement is the school's efforts to aggressively carry out energy-saving campaigns by putting up posters and appeals to save energy in schools and the surrounding environment. The stimulus from outside, namely the success of the movement campaign earth hour, carried out in various parts of the world, including the one in Jakarta every year, is considered to have influenced students' attitudes towards this statement. The attitude shown by
respondents regarding the climate change campaign in Indonesia shows a good attitude. This attitude arises because respondents get a stimulus from the climate change campaign movement, the campaign to save the earth (save our earth), which is often carried out by environmental organizations both through activities at school, through print and electronic media, including social media. This attitude is good because, with this attitude, respondents, in this case, high school students, will have a sense of alertness to the symptoms of climate change and, at the same time, appreciate the sustainability of living things against climate change. The questionnaire results on the aspects of attitude in terms of each individual showed that as many as 298 people had a good attitude category, 53 people had a good attitude, and two people had a bad attitude. This research's attitude aspect is that most respondents have a positive tendency with an average value of 88%.

In the behavioral aspect, respondents were given nine statements related to daily behavior related to the environment 1) I carry out environmentally friendly activities (for example recycling used goods, turning off electronic equipment when not in use, reducing waste production, etc.); 2) I carry my shopping bag when I go shopping; 3) I use public transportation (bus, KRL, MRT, angkot, etc.) for my daily activities. NB: Online ojek or base ojek are not included; 4) I remind others to dispose of trash in their proper place; 5) I am actively conducting campaigns or appealing for energy-saving movements; 6) I do greening activities in my neighborhood (home, school, etc.); 7) I bring my drinking place to school; 8) I use plastic in my daily life; 9) I hold dialogues or discussions with fellow friends, school officials, parents and the surrounding community regarding the environment. In statement 1, the respondent is given a general statement regarding the respondent's behavior in carrying out environmentally friendly activities. The questionnaire results described in sub-chapter 4.2.3 show that most respondents have made efforts to behave in an environmentally friendly manner even though the distribution of respondents' behavior mostly Sometimes chooses (38.5%) and Often (41.6%). Behavior 2 is the behavior of respondents to carry their shopping bags when they go shopping. The largest percentage of respondents chose answers sometimes. The results for statement 2, of course, cannot be used as justification that respondents who answered never, and rarely were respondents who did not behave in an environmentally friendly manner. The behavior of respondents for the use of public transportation such as buses, KRL, MRT, public transportation, etc. (motorcycle taxis online and offline motorcycle taxis are not included) is statement 3 which the author's hope in this questionnaire is that respondents are many respondents who choose answers often or always. However, respondents who chose the most answers rarely use public transportation, while respondents who choose answers sometimes rank second.

Field observations show that the school does not provide parking for students, but some students still bring private motorized vehicles but use parking facilities outside the school environment. The observations also showed that students used online motorcycle taxi modes of transportation (two wheels or four wheels). The author considers that online motorcycle taxi transportation modes are still categorized as private transportation. This is considered to be one of the factors that influence the results of the statement questionnaire 3. The most accessible public transportation mode to be reached by respondents from the research location is public transportation. In contrast, for bus, commuter trains, and Integrated Moda Raya, bus stops and stations' locations cannot be reached conveniently. Directly by the respondent. Statement 4, the respondent is stated behavior to remind others to throw garbage in its place. The school has made suggestions and recommendations to dispose of garbage in a place according to the type of waste, supported by the availability of trash cans according to its type. The school has also implemented a waste bank and composting program. The school's efforts regarding waste management can be a stimulus to encourage respondents to have a caring attitude towards cleanliness both in the school environment and outside the school. Active behavior of conducting campaigns or appealing for energy-saving movements on the questionnaire

Statement 5 gets the questionnaire results described in the previous section, with most respondents choosing never to carry out campaign actions or calling for energy-saving movements, and the second choice most chosen by respondents is rarely doing. This result is considered not yet reflective of the energy-saving behavior carried out in schools where the appeal to use energy efficiently in schools is
supported by the implementation of energy-saving movements in the research location, with examples of budget absorption for energy resources in one of the research locations reaching 51% according to described in the previous section. However, the budget absorption is for electricity consumption and other energy such as water and office stationery. The school's efforts are also due to regulations that oblige students to turn off lights and air conditioners in class when they are no longer in use.

The respondent's behavior in carrying out reforestation activities in the surrounding environment, for example, at home, school, and other places, resulted in the answer that was mostly chosen by the respondent was sometimes. The second choice that was chosen was rarely made. Limited time for activities and land in schools for reforestation can influence respondents in choosing the answers to this questionnaire. One of the reforestation activities in schools is carried out collectively by donating plants to schools and is carried out successfully. Statement 7 is the respondent's behavior to bring his drinking place to school. The behavior to bring their drinking place to school has become a culture and has been done by most school residents. Factors that influence respondents' behavior on this questionnaire are the existence of rules that encourage students to bring their drinking bottles from home and are prohibited from carrying and using single-use plastic bottles. The provision of drinking water refilling facilities at several points in the research location is also an effort of the school to familiarize students with bringing their drinking places. Respondents who choose the answer occasionally, rarely, or choose the answer cannot be considered not having environmentally friendly behavior. The author gives the author that they do not bring their drinking place to school because it is enough to buy drinks in the school canteen. After all, the school canteen in the research location sells drinks with reusable glass or glass containers and can be lent to students to refill bottled water. The school canteen may lend a glass to collect drinking water from the school's refilling drinking water facility. Statement 8 is negative, namely the behavior of using plastic in everyday life. The respondents' answer choices in Statement 8 were that respondents sometimes used plastic in their daily life, and the second choice was frequent use. The choice of answer chosen by this respondent is influenced by environmental factors where the respondent carries out his daily activities. When carrying out activities at school, the use of single-use plastics is limited, but it is not confident that respondents reduce plastic use outside of school.

The school's appeals not to use plastic with one of its agendas is to prohibit canteens from selling food and drinks in single-use plastic packaging. The observations made in the canteen of the research location show there are still food and beverages with the single-use plastic packaging that are sold in the canteen. The statement on the behavior of using plastic in everyday life in this questionnaire is intended to be an appeal for single-use plastic packaging so that it will increase the generation of plastic waste so that when seen in this questionnaire, respondents have made efforts to reduce plastic use, but it is not optimal. Dialogue or discussion with fellow friends, school authorities, parents, and the surrounding community regarding the environment is one of the participatory activities that students can use to increase environmental insight and exchange information and knowledge. This behavior is also intended to get to know the surrounding environment better, build relationships and partnerships with other people, and determine whether the respondent is initiating dialogue or discussion with other people. Respondents chose the answer the most sometimes, and the choice of the answer was rarely the answer choice that was chosen the next most by the respondent. Discussions or dialogue activities related to the environment have been carried out with intermediaries from schools and related institutions by conducting outreach or counseling at schools or other places. Based on the results obtained in this questionnaire, the respondents as a whole have not maximally had the initiative to carry out dialogues or discussions with fellow friends, schools, parents, and the surrounding community regarding the environment. The questionnaire results on behavioral aspects in terms of each individual showed that two people had good behavior categories, 64 people had pretty good behavior, 223 people had good attitudes, and 64 people had poor behavior. The behavior of respondents in this research has a positive tendency with an average value of 63%.
To enrich the research results, the authors also compared the environmental awareness of the two schools. In this comparison of environmental awareness, the authors use the \textit{z-score} value. The \textit{z-score} for the two schools shown in Table 1.

\begin{table}[h]
\centering
\caption{The \textit{Z-score} values of environmental awareness.}
\begin{tabular}{|l|c|c|}
\hline
Environmental awareness aspects & Senior High School A & Senior High School B \\
\hline
Knowledge & $1.8 \times 10^6$ & $-1 \times 10^6$ \\
Attitudes & $-2.2 \times 10^6$ & $-47 \times 10^6$ \\
Behavior & $-8.1 \times 10^7$ & $-52 \times 10^7$ \\
\hline
\end{tabular}
\end{table}

The results in both schools for the knowledge aspect show that the \textit{z-score} of Senior High School A is positive, which means that the school's knowledge aspect is above the average, namely $1.8 \times 10^6$. In contrast, Senior High School B for the \textit{z-score} is obtained is negative, which means that it is below the average, namely $-1 \times 10^6$. These results indicate that environmental awareness for the knowledge aspect of Senior High School A is better than Senior High School B. The \textit{z-score} for the attitude aspect at Senior High School A is $-2.2 \times 10^6$, while at Senior High School B, it is $-47 \times 10^6$. This shows that the environmental awareness of the attitude aspect of the two schools is below the average. Still, the attitude aspect at Senior High School A is better than in Senior High School B. The \textit{z-score} for environmental awareness of the behavioral aspect for Senior High School A is $-8.1 \times 10^7$, while for Senior High School B, it is $52 \times 10^7$. These results indicate that environmental awareness for behavioral aspects in both schools is below average. Still, environmental awareness for behavioral aspects in Senior High School A is better than in Senior High School B. The \textit{z-score} results in Table 4.11 show that Senior High School B as an Adiwiyata Mandiri recipient school in 2018 has a lower environmental awareness aspect than Senior High School A as a 2013 National Adiwiyata recipient school. Status as an “Adiwiyata Mandiri” recipient, which is the highest award. What a school in the environmental sector gets should make Senior High School B get a \textit{z-score} for environmental awareness better than Senior High School A.

The change of school principals that occurred at Senior High School A since being granted the status as an “Adiwiyata Nasional” recipient school in 2013 proves that the school can demonstrate environmental awareness as an Adiwiyata recipient school despite the change of school principals. Although the \textit{z-score} of environmental awareness at Senior High School A is higher, based on the author's observations, Senior High School B tends to have the potential to maximize environmental awareness. This is supported by the support of the school environment, one of which is the location of Senior High School B, which is inside the Military Air Force complex so that there is a tendency for students to behave more disciplined than Senior High School A.

Based on the results of the questionnaire calculation, it shows that the respondents have adequate knowledge and attitudes but have good environmentally friendly behavior. It does not fully support Asilsoy et al.'s statement that environmental awareness has the potential to be responsive to ecology, which the authors associate as environmentally friendly behavior [12]. Asilsoy states that environmentally friendly behavior results from environmental awareness. The author is in line with Du et al., which states that environmental behavior is a component of environmental awareness [10]. When viewed from Asilsoy's opinion, the results of this research, where the behavioral aspects are separated from the knowledge and attitude aspects as components of environmental awareness, the knowledge and attitude factors that get good results should the behavior that results from the questionnaire assessment also get good results.
4. Conclusion
As an Adiwiyata recipient school, the authors hope that environmental awareness in the two schools, primarily the sample studied, will get good results. The results obtained indicate that for the knowledge aspect, good results are obtained. For the attitude aspect, good results are obtained, but the results are sufficient for the behavioral part. Therefore, environmental awareness at the school used as a research location can be said to be not optimal, especially in behavior aspects, and is influenced by many factors. Based on the Adiwiyata program objectives, it was stated that school members had to be responsible for environmental protection and management. It should not yet be shown based on the values found in Adiwiyata's assessment if the assessment is only done once, it is done at the beginning of the process, and verification is carried out quickly. Should Adiwiyata assessments are carried out periodically (at the beginning and in the middle of the process implementation) and awards for schools that deserve Adiwiyata given to schools that can implement the four components Adiwiyata standards, as well as showing consistent environmental awareness. Murdani et al. also stated that the Adiwiyata program was considered competition and a burden on educators and schools. Perception Adiwiyata as competition is not one of the factors the school does consistently in the implementation of Adiwiyata [19]. The enthusiasm of the school community for Adiwiyata only occurs during the assessment and field verification process. After the school received the Adiwiyata award, consistency in environmental awareness is reduced.
Adiwiyata recipient schools, in collaboration with other school members, must evaluate the implementation of Adiwiyata to maintain consistent environmental awareness. Environmental awareness research should be carried out periodically over a certain period to get maximum results, and researchers must conduct participatory observations for aspects of attitudes and behavior. Besides, environmental awareness research needs to be done where the research was conducted in non-Adiwiyata recipient high schools and other schools with an equivalent level.

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References
[1] M. Pavlova 2011 ESD through Technology Education: Contextualisation of Approaches African Journal of Research in Mathematics, Science and Technology Education 15 41–55
[2] S. R. A. Hutagalung 2010 Pengelolaan Lingkungan Untuk Keberlanjutan Pengembangan Ekonomi Lokal di Sentra Industri Penyamakan Kulit Garut Journal of Regional and City Planning 21 1-18
[3] I. N. Siregar 2015 Konsep Pendidikan Untuk Pembangunan Berkelanjutan Dalam Perspektif Pendidikan Islam, Universitas Islam Negeri Sunan Kalijaga, Yogyakarta Thesis
[4] O.C. Adejoke, A. Mji, M.S. Mukhola 2014 Students’ and Teachers’ Awareness of and Attitude towards Environmental Pollution: A Multivariate Analysis Using Biographical Variables Journal of Human Ecology 45 167–175
[5] A. Altin, S. Tecer, L. Tecer, S. Altin, and B.F. Kahraman 2014 Environmental Awareness Level of Secondary School Students: A Case Study in Balıkesir (Türkiye) Procedia - Social and Behavioral Sciences 141 1208–1214
[6] G. Gopinath 2014 A Study on The Environmental Awareness Among Secondary School Students in a District of Kerala State International Journal of Education and Psychological Research (IJEPR) 3 2
[7] M. Hanifah, I. Shaharudin, H. Mohmadisa, N. Nasir, and S. Yazid 2015 Transforming Sustainability Development Education in Malaysian Schools through Greening Activities Review of International Geographical Education Online 5 77-94
[8] Y. Zhu 2019 How Chinese students’ scientific competencies are influenced by their attitudes? *International Journal of Science Education* **41** 2094–2112

[9] N. D.Paramita, and N. K.Yasa 2015 Sikap Dalam Memediasi Hubungan kesadaran Lingkungan Dengan Niat Beli Produk Kosmetik Ramah Lingkungan *Jurnal Manajemen Dan Kewirausahaan* **17** 177-185

[10] J.F.P. Macnaughton, E.P. Walker, S.E. Mock, and T.D. Glover 2018 Social capital and attitudes towards physical activity among youth at summer camps: a longitudinal analysis of personal development and environmental awareness as mediators *World Leisure Journal* **61** 3–16

[11] Y. Du, X. Wang, D. Brombal, A. Moriggi, A. Sharpley, and S. Pang 2018 Changes in Environmental Awareness and Its Connection to Local Environmental Management in Water Conservation Zones: The Case of Beijing, China *Sustainability* **10** 2087

[12] R. Heras, R.M. Medir, and O. Salazar 2019 Children’s perceptions on the benefits of school nature field trips *Education - Social and Behavioral Sciences* **222** 668–675

[13] B. Asilsoy, S. Laleci, S. Yildirim, K. Uzunoglu, and Ö. Özden 2017 Environmental Awareness and Knowledge among Architecture Students in North Cyprus *International Journal of Educational Sciences* **19** 136–143

[14] N.S. Mei, C.W. Wai, and R. Ahamad 2016 Environmental Awareness and Behaviour Index for Malaysia *Procedia - Social and Behavioral Sciences* **222** 668–675

[15] K. Lee 2010 The Green Purchase Behavior of Hong Kong Young Consumers: The Role of Peer Influence, Local Environmental Involvement, and Concrete Environmental Knowledge, *Journal of International Consumer Marketing* **23** 21–44

[16] Y.G. Septian, M. Ruhimat, and L. Somantri 2017 Eco-Friendly Behavioral Of High School Students In Bandung *Jurnal Geografi Gea* **17** 71

[17] A. Adil 2015 Pengaruh Pengetahuan Tentang Lingkungan, Sikap pada Lingkungan, dan Norma Subjektif Terhadap Niat Pembelian Green Product *Jurnal Ekonomi dan Kewirausahaan* **15**

[18] L.J. Axelrod, and D.R. Lehman 1993 Responding to environmental concerns: What factors guide individual action? *Journal of Environmental Psychology* **13** 149–159

[19] Badan Pusat Statistik 2015 Indikator Perilaku Peduli Lingkungan Hidup 2014 *Badan Pusat Statistik*

[20] S. Ito 2019 A Polycentric Waste Management System in The Kathmandu Valley, Nepal. *Journal of Environmental Science and Sustainable Development*, 2(1). https://doi.org/10.7454/jessd.v2i1.30

[21] Zakianis, P. Koesoeawardani, S. Fauzia, M.M. Asror, E. Ferliana 2018 The citizens’ participation of household solid waste management and monitoring of household solid waste separation in Kelurahan Abadijaya, Kecamatan Sukmajaya, Depok. *ASEAN Journal of Community Engagement*, 2(2). https://doi.org/10.7454/ajce.v2i2.141

[22] D. Murdani, A. Hakim, and B. Yanuwiadi 2018 Strategies of Regency Adiwiyata (Green) School Management at Secondary Education Level in Sintang Regency. *Jurnal Pembangunan Dan Alam Lestari* **9** 102-110

[23] R. Rahmadiani, S. Utaya, and S. Bachri 2019 Ecological Literacy Siswa SMA Adiwiyata dan Non Adiwiyata *Jurnal Pendidikan: Teori, Penelitian, dan Pengembangan* **4** 499-503

[24] Yunus 2011 Hubungan Hasil Pelatihan, Bantuan Modal, dan Pendampingan Program Microfinance Syariah Berbasis Masyarakat Dengan Kemandirian Ekonomi Mustahik: Studi Tentang Lembaga Amil Zakat Nasional Dompet Peduli Ummat Daarut Tauhid Bandung Jawa Barat, Universitas Pendidikan Indonesia *Thesis*