

Research Article

Naturalist intelligence and personality: An understanding students' responsible environmental behavior

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ABSTRACT

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Notwithstanding that many efforts to overcome environmental problems have been carried out by several parties, yet the issues still occur. Improving students' responsible environmental behavior (REB) can be an alternative to solve environmental problems. This study aimed to analyze the relation between the both variables (i.e. naturalist intelligence and personality) and students' REB at SJHS 51 of Bandung. The research was carried out using quantitative descriptive method through a correlational approach. Naturalist intelligence, personality, and REB data were collected using questionnaires. The research data were analyzed using multiple linear regression at $\alpha = 0.05$. The research results showed that there was a relation between: (1) naturalist intelligence and REB; (2) personality and REB; and (3) the both predictor variables and REB. Therefore, empowering the both competencies (naturalist intelligence and personality) is the essential step to improve students' REB.



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INTRODUCTION

Environmental problems are the main issues faced by humans in the last few decades. Various environmental damage is also indicated to occur more frequently from one year to the next (Alam, 2014; Ray & Ray, 2011). This condition is exacerbated by the loss of biodiversity (Smeti et al., 2019), water contamination (Liyana & Yamada, 2017), and global climate change (Vlek & Steg, 2007). Therefore, environmental damage can increase natural disasters.

Environmental problems occur in many countries, such as India (Bhattacharyya et al., 2015), China (Aregay, Zhao, Li, Xia, & Chen, 2016), Vietnam (Nguyen, Lin, & Chan, 2019), and Indonesia. One city that has environmental problems in Indonesia is Bandung (Septian, Ruhimat, & Somantri, 2016). The city is capable of producing waste up to 1500 tons/day, and its groundwater has decreased by 14.4 m/year. Water quality in

Bandung has also decreased due to the pollution of water bodies by garbage and waste (Jatnika & Rahardyan, 2015). The city has also not been able to provide enough clean water for the local population (Hasbiah & Kurniasih, 2019). Pollutant levels in the air are also reported to increase every year (Gunawan, Bressers, Mohlakoana, & Hoppe, 2017).

Environmental problems are generally caused by the behavior of people who are less aware of the environment (Jena & Behera, 2017). This behavior is also observed in the school environment. Some students are reported to have no desire to protect their environment from damage. Some students still like to litter and leave the lights on even though they are no longer used (Septian et al., 2016). The results of interviews with junior high school teachers in Bandung also illustrate similar conditions. The results of the observation also informed the low awareness of students to maintain the environment. The presence of garbage in the classroom and around the school and lack of discipline in cleaning up the classroom clarifies the low awareness of students about their environment. Humans, as leaders on earth, must have a responsibility to manage and nurture nature.

Responding to the increasing number of environmental problems, the effort to improve the responsible environmental behavior (REB) needs to be done (Akpofure, 2018). Someone who has an REB will feel that their environment is their responsibility (Akintunde, 2017). They will act actively to protect the environment in their daily lives (Pan, Chou, Morrison, Huang, & Lin, 2018). Therefore, empowering REB in the school environment is a crucial step in minimizing the increasing environmental damage.

Empowerment of REB can be optimally pursued if someone has naturalist intelligence (NI). This intelligence is related to one's ability to connect with nature (Barbiero & Berto, 2018). A person with good NI will have good environmental awareness (Ningrum, Soesilo, & Herdiansyah, 2018). Their attitude of caring for the environment will also be better (Hartika, Diana, & Wulan, 2019). Moreover, students with high NI will have a better ability to solve environmental problems. Students with good NI can also increase their role in environmental sustainability (Derakhshan & Faribi, 2015). Therefore, learning in schools must be designed to be able to empower student NI optimally.

Besides NI, REB is also indicated to be influenced by students' personality. Personality arises from patterns, emotions, and behaviors that arise from someone (Colquitt, LePine, & Wesson, 2012). Personality is considered capable of influencing a person's actions, including their actions towards the environment (Pan et al., 2018). Someone with a good personality will have many actions that can protect the environment around them (Abdollahi et al., 2017). Unfortunately, not all students have good personalities because of the differences in psychological characteristics of students will produce differences in personality.

Based on the background that has been conveyed, REB plays an essential role in addressing various environmental problems. Furthermore, both NI and students' personality have been reported could influence REB level. The importance of environmental issues also encourages research that examines the profile of REB and NI, although it is still rarely found. Some of the research studying students' REB profile (Ntanos, Kyriakopoulos, Arabatzis, Palios, & Chalikias, 2018; Pan et al., 2018) and some researchs are studying students' NI profile (Raskanda, Suwama, & Liliawati, 2018; Şener & Çokçalışkan, 2018). Unfortunately, studies that examine student personality profiles are difficult to find.

Moreover, research examining the profiles of these three parameters at the same time is still difficult to find. The seriousness of environmental problems in Bandung directs the importance of research that examines student profiles in all three parameters. Therefore, the purpose of this study was to examine REB, NI, and personality of junior high school students in Bandung. Furthermore, the relationship between NI and personality to REB was also examined to see what factors were most correlated to student REB. Such information will be valuable information for educators. The information can be used as a primary reference for empowering students in Bandung to be more responsible for their environment. Teachers and schools will be able to compile the educational process based on which factors correlate with the level of student responsibility for their environmental conditions.

METHOD

The method used in this study was quantitative descriptive research through a correlational approach to see the relationship between predictor (NI and personality) and criterium variable (REB). The population in this study were all eighth-grade students of junior high school 51 Bandung, whereas the number of the sample consisted of 220 students. Sampling was done by simple random sampling technique. The method used for sampling using the McClave formula. This research was conducted in mid-September to early October 2018. Data was collected for three weeks.

There was three instruments used while collecting research data, i.e., REB, NI, and a personality questionnaire. The REB questionnaire consists of 68 statements with answer categories consist of five scales: a) always, b) often, c) sometimes, d) rarely and e) never. The instrument measured four dimensions of REB, namely political actions, consumer actions and economy, persuasion, and eco-management. The legal action dimension was not used because the dimension is a legal action taken to strengthen or change laws relating to the environment. The dimension is considered less suitable to be applied at the junior secondary level.

NI questionnaire used to consist of 60 statements. Scoring uses a Likert scale, with three alternative answers to each statement. The instruments measuring ten NI aspects, i.e., a) having sensitive sensory abilities; b) ready to use five sensory abilities to identify or classify things from nature; c) being interested in and caring for living things; d) often identifying something in the environment; e) making or maintaining or owning collections, journals, natural objects, pictures, photographs, and specimens; f) very interested in television shows, videos, books, or objects about nature; h) showing awareness and focus of high attention on the environment for environmental problems; i) showing awareness and focus on high attention to the environment for the problem of threatened species; and j) easily learn the characteristics, names, categorizations, and data about objects or species found in nature. On the other hand, the questionnaire to measure students' personality consists of 80 claims. Each answer consists of five alternative answers, which are very accurate, somewhat accurate, accurate, not accurate, and very inaccurate. The personality dimensions measured consist of four dimensions, namely openness, conscience, extraversion, and stability emotional.

The instruments were first validated by the validator before being used in data retrieval. Then, the instruments trial was conducted. Thirty-two eighth grade junior high school students were involved in instruments trial process. Pearson product-moment and Cronbach-alpha were used as validity and reliability test for all instruments. The results, 43 statements of NI items, 58 statements of personality, and 50 items of REB were valid and can be used to measure those three aspects, The reliability test results of NI, personality, and REB instruments were 0.881; 0.914, and 0.902, respectively. Therefore, all instruments were declared reliable to measure those three variables.

After the research data were collected, multiple linear regression was chosen as the data analysis technique. Before the analysis was conducted, two assumption tests were performed. Kolmogorov-Smirnov test was performed to analyze the distribution of the data, and the Bartlett test was performed to analysis homogeneity of the variances. The test was carried out at $\alpha = 0.05$ using the SPSS 24.0 program.

RESULTS AND DISCUSSION

NI, personality and REB are three factors that indicated can influence students perspective on their environment. The profile of students' NI, personality, and REB collected in this study were shown in [Table 1](#), [Table 2](#), and [Table 3](#), consecutively. At NI variables, the highest frequency was in the range of 80-85 with a relative frequency of 24.10%. The score that has the lowest frequency was in the range 50-55, which is have a relative frequency of 1.36%. In personality variables, as many as 28.18% of students have scored in the range of 70-75. Scores that have the lowest frequency were in the range of 94-99, which was as many as one students with a relative frequency of 0.45%. Then, in REB variables, the highest frequency is in the range of 64-68, which have a relative frequency of 21.36%. Scores that have the lowest frequency are in the range of 49-53, which was as many as three students with a relative frequency of 1.36%.

Table 1. Frequency distribution of naturalist intelligence

No.	Score Range	Absolute Frequency	Relative Frequency (%)
1.	50-55	3	1.36
2.	56-61	12	5.45
3.	62-67	26	11.82
4.	68-73	38	17.27
5.	74-79	52	23.64
6.	80-85	53	24.10
7.	86-91	24	10.91
8.	92-97	12	5.45

Based on [Table 1](#), the highest value of NI was 97, and the average NI value was 76.43. From the data from the research results obtained, it shows that the NI scores obtained by students vary. Variations in scores obtained by students influenced by several factors. Several factors influencing NI are informed by [Gangadevi and Ravi \(2014\)](#). Gangadevi and Ravi informed that the level of intelligence depends on experience, culture, and motivation experienced by students. The results of this study also in line with [Derakhshan and Faribi](#)

(2015) that explain that there are students who can develop NI to an optimal level, but there are also students who will have difficulty developing their naturalist intelligence. This condition makes each student have different abilities to manifest the level of their intelligence.

Some student has a low level of NI. NI is an important parameter that needs to be empowered in students because this parameter describes the engagement of students with the environment around them (Barbiero & Berto, 2018). NI is also an indicator of students' attitudes towards changes in the environment around them. So, efforts need to be made to improve the NI of each student (Hartika et al., 2019). These efforts, such as inviting students to recognize nature to provide experiences to students in maintaining the environment; cultivating students to protect the environment; motivating students to maintain the environment; and developing naturalist intelligence abilities from an early age. Designing learning based on the empowerment of multiple intelligence is also another alternative that is recommended to be implemented (Gökhan, 2010; Liliawati, Purwanto, Zulfikar, & Kamal, 2018).

Table 2. Frequency distribution of personality

No.	Score Range	Absolute Frequency	Relative Frequency (%)
1.	53-58	5	2.27
2.	58-63	21	9.55
3.	64-69	53	24.09
4.	70-75	62	28.18
5.	76-81	46	20.91
6.	82-87	24	10.91
7.	88-93	8	3.64
8.	94-99	1	0.45

Based on Table 2, it can be seen that the highest score of personality variables was 95, while the lowest score was 53. The average personality score was 73.01. Some students have a high score, and the others have a medium and low score. The factors that cause student personality are different, because of the personality characteristics one person with the other is different. The difference in personality scores is due to several factors. Several factors that influence personality were heredity, environment, and situation. Furthermore, one's culture also plays an important role in personality types (Wong & Li-Fang, 2013). The differences in personality possessed by students are also explained by Pervin and Cervone (2018), that personality is an essential aspect of human life that can distinguish one individual from another.

Based on the results of the study, it can be seen that there are still many students who have low personality scores. Personality will determine students' actions towards the environmental conditions around them (Pan et al., 2018). Furthermore, the personality level will determine students' steps in maintaining a sustainable environment (Abdollahi et al., 2017). In dealing with this condition, efforts need to be made through the fulfillment of factors that affect personality, such as civilizing students to maintain and be responsible for their environment. This can be done both to shape the culture of protecting the environment carried out in the family, in the school and the environment around the student's residence.

Besides, there were variations in students' NI and personality; there are also variations in students' REB (Table 3). The students who have a high score REB were expected have good behaviors that are responsible for the surrounding environment, such as maintaining the cleanliness of the class and their surrounding environment. However, some students have a low score of REB. The data indicates that there are still many students who do not have responsible behavior towards their environment. Efforts can be made in overcoming these problems. One effort, such as implementing learning activities make students interact directly with nature and by integrating environmental education in subjects so that students can understand and have a good view of the environment.

Table 3. Frequency distribution of students' REB

No.	Score Range	Absolute Frequency	Relative Frequency (%)
1.	49-53	3	1.36
2.	54-58	18	8.18
3.	59-63	33	15.00
4.	64-68	47	21.36
5.	69-73	42	19.10
6.	74-78	40	18.18
7.	79-83	26	11.82
8.	84-87	6	2.73
9.	88-93	5	2.27

After all the research data were obtained, then assumption tests were performed. The results of the normality test and homogeneity test are shown in Table 4 and Table 5, respectively. Based on Table 4, the three variables have Sig. value greater than 0.05. Therefore, all variables were declared normally distributed. Then, based on Table 5, all test also produces Sig. value greater than 0.05. Thus, all variables also declare to have a homogenous variance.

Table 4. Normality test results

Variables	Statistic	Sig.
NI	0.058	0.069
Personality	0.053	0.200
REB	0.047	0.200

Table 5. Homogeneity test results

Variables	Sig.
NI with REB	0.180
Personality with REB	0.077
NI and personality with REB	0.097

After the data is declared normal and homogeneous, a correlation test is carried out. The results of the correlation test are presented in Table 6. Based on Table 6, both NI and personality partially have a significant relationship with REB (Sig. <0.05). On the other than, the results of the correlation test of the two predictor variables simultaneously have an R-value of 0.648. The results of the correlation test are presented in Table 7. Furthermore, the results of the multiple regression test presented in Table 8 inform that the regression equation obtained is $Y = 12.465 + 0.308X_1 + 0.463X_2$. Through this equation, it can be interpreted that if there is an increase in one naturalist intelligence score (X1) and personality (X2) it will be followed by an increase in responsible environmental behavior of 0.308 and 0.46 in the constant 12.465 through the regression model. Then, through a significance test obtained a significance value smaller than alpha, so it can be concluded that the regression equation model is significant.

Table 6. Pearson Product Moment Correlation test

Predictors	REB	
	Pearson Correlation	Sig. (2-tailed)
NI	0.495	< 0.05
Personality	0.563	< 0.05

Table 7. Pearson Product Moment correlation results test

Model	R
1	0.648

Table 8. Multiple linear regression model on NI and personality with REB

Model	Unstandardized Coefficients B
(Constant)	12.465
NI	0.308
Personality	0.463

REB is considered as the primary provider of a student to be an individual who is responsible for their environment (Akintunde, 2017). They will try to maintain their environmental conditions while doing daily activities (Pan et al., 2018). The existence of REB is also considered capable of minimizing environmental damage (Lee, Fen-Hauh Jan, & Chung-Cheng Yang, 2013). REB is considered a predictor in various environmental studies in various countries, such as in Australia (Yoon, Kyle, van Riper, & Sutton, 2010) and China (Li, 2018). Therefore, various factors capable of predicting or correlating with REB levels need to be identified.

Based on the results of the analysis, NI correlates with REB. These results indicate that NI owned by students can support students' awareness to be responsible for environmental conditions. This statement is in line with Derakhshan and Faribi (2015), which explains that students who have good NI can increase their sense of responsibility towards the environment. Students who have NI will also have the ability to interact with their environmental conditions (Gohar & Sadeghi, 2015). These students also can solve environmental problems (Suhairman, 2017).

The results of data analysis also inform that personality correlates with REB. The results of this study are also in line with several previous studies in different subjects and research locations (Abdollahi et al., 2017; Pan et al., 2018). Personality is one of the factors that determine a person's behavior. Personality also has an essential role in shaping students' attitudes towards the environment (Kvasova, 2015). Personality is also closely related to student awareness of the surrounding environment (Abdollahi et al., 2017). Awareness of the environment is also indicated to be able to influence students' perspectives on changes that occur in the environment around them.

Besides NI and personality partially able to influence the level of REB, both of these variables also simultaneously correlate with the level of students' REB. The results of this study illustrate that schools can optimize students' REB through NI empowerment and their students' personality enhancements. Both the teacher and the school must be able to identify how to realize this target. One way is to implement various learning activities that could to increase the level of NI and the personality of students.

CONCLUSION

The results of the present study informed that the level of students' NI, personality, and REB were varied. Several students have a high level, whereas the other has a low level. The research also informed that there is a relationship between 1) students' NI and REB; 2) students' personality and REB; and 3) both variables (NI and personality) and REB. Therefore, it was suggested that school and learning activity should be designed to can improve students REB through empowering students' NI and improving students' personality. This effort needs to be conducted because a good REB will direct students to be better maintain their environment.

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