



The Influence of Environmental Knowledge and Value on Environmental Behavior in Santri at Pesantren

Erni Suharini¹ Mohammad Syifauddin¹ Edi Kurniawan¹ Ervando Tommy Al-Hanif¹

¹Geography Department, Faculty of Social and Political Sciences, Universitas Negeri Semarang, Semarang 50229, Indonesia

erni.suharini@mail.unnes.ac.id

Abstract. The progressively severe environmental damage requires awareness of conservation efforts, one of which can be implemented through education. As a conservation university, the vision of Universitas Negeri Semarang (UNNES) to shape the pro-environmental academic community cannot be separated from the role of the surrounding pondok pesantren that also contribute to educating students to have an environmental character based on Islamic values. The presence of pondok pesantren is important to effectively internalize ecotheological teachings. Currently, there are not many studies that reveal the environmental character of the pesantren residents. Therefore, this study aims to analyze the effect of environmental knowledge and value on environmental behavior in santri of pesantren in the UNNES area. This is a quantitative study with a research sample covering 208 students from pesantren in the UNNES area—selected by stratified random sampling technique. The data collection method used was questionnaire. The data analysis applied included quantitative descriptive analysis and multiple linear regression analysis with F test, t-test, and determination coefficient analysis. The results point out that the environmental care character of santri in the UNNES area is in the very high category. This study shows that pesantren have a major contribution in developing environmental care character. Environmental knowledge and value simultaneously affect environmental behavior by 10.5% or are in a low category. Then, according to the t-test, only environmental value has a significant effect on environmental behavior. Meanwhile, environmental knowledge has no significant effect on environmental behavior. These results denote relevance to the planned behavior theory that environmental care behavior is more influenced by attitudes than knowledge, and other factors exist, namely social norms and behavioral control.

Keywords: *Ecological theology, environmental behavior, environmental knowledge, environmental value, pondok pesantren.*

1 Introduction

As one of the countries with the largest forest area in the world, Indonesia has actually been named the second-highest deforestation country [1][2][3]. Indonesia also faces the problem of poor waste management and has become the second largest contributor to

plastic waste in the world [4][5][6][7]. Population growth and economic development that are not environmentally sound, industrialization, deforestation, and land conversion have also made Indonesia one of the largest emitters of greenhouse gases [8][9]. The threat of biodiversity extinction is also quite severe [10].

As a response to environmental damage that occurs in the world, a concept of environmental education has been born through the International Conference on Environmental Education in Tbilisi which resulted in a formulation and endorsement of the goals, targets, and principles, and strategies of Environmental Education [93]. In addition, the issue of environmental conservation has also given birth to an agreement between countries in the world regarding sustainable development which is realized through the Sustainable Development Goals (SDGs) 2016-2030 [94]. Sustainable development provides a mechanism by which society can interact with the environment without risking damaging future resources. Sustainable development encompasses three interrelated sustainability domains or scopes that describe the relationship between environmental, economic and social aspects [95].

In line with the Sustainable Development Goals (SDGs), conservation and environmental education are considered the most effective and efficient to conserve the environment [11][12][13]. Environmental degradation is not only related to environmental problems, but also to a crisis of thought and understanding as it is closely related to issues of knowledge and education [14]. Environmental education can be instilled from an early age through formal, non-formal, and informal education channels to equip the younger generation with knowledge, awareness, attitudes, and behaviors of loving the environment through information dissemination [15][16][17][18].

In reference to this issue, UNNES declared itself a conservation university with a mission to become a conservation university with international reputation that is healthy, excellent, and prosperous [19][20]. The declaration has implications for UNNES efforts which always prioritize conservation principles in all tri dharma activities, namely education, research, and community service [21]. UNNES aspires to improve the attitudes, behavior, and participation of the entire academic community in building national character according to conservation principles [22][23]. However, the UNNES conservation vision has currently not been able to be fully fulfilled. Many conservation discourses have been developed and performed, yet there is no concerted effort to make it happen. These discourses also tend to be interpreted by many UNNES residents as a purely physically green campus. Ultimately, conservation is only seen from the physical environment aspect and has not been reflected in the attitude of campus residents to implement conservation principles and behavior seriously [24].

To realize its vision as a conservation university, the existence of UNNES cannot be separated from the surrounding environment [25]. One of the elements around UNNES that play an important role is pondok pesantren (Islamic boarding school). Currently, there are at least 11 pesantren around UNNES. Seven of them are located in Sekaran and Patemon Village—so they are very close to UNNES. The existence of these pesantren certainly cannot be taken for granted to achieve the UNNES conservation vision. This is because as an Islamic educational institution, pesantren not only teach Islamic religious knowledge, but also play an important role in integrating environmental conservation science and norms with the Islamic sharia approach [26][27][28][29].

They are also more potential in teaching environmental conservation science and norms as the santri live in there so that the implementation of the knowledge and norms can be directly applied in everyday life [30][31].

Environmental education in pesantren is a manifestation of Islamic ecotheology, a teaching that combines aspects of divinity with environmental aspects [32][33]. This ecological spiritual concept reflects the relationship between God, nature, and humans, as the modeling has been systematized in systems, methods, and even institutions (sharia) that preserve nature as part of God's creatures [34]. This is in line with articles from Morrison, Duncan, & Parton [35] and Vaidyanathan, Khalsa, & Ecklund [36], denoting that religion has an important role in shaping human beliefs, perceptions, attitudes, and behavior towards the environment. In particular, Islamic teachings have taught the obligation for humans to protect the environment and do no damage [37][38][39][40].

Therefore, this research is essential to be carried out to analyze the role of religion in shaping the environmental care character of santri in pondok pesantren in the UNNES area. This is because similar research is still rarely done as researches usually only focus on UNNES students in general and do not include religious indicators as measurement benchmarks. This is in line with the statement from Sukarsono [41] that currently, environmental literacy based on Islamic values is still not widely explored, either in pesantren or in madrasah (Islamic school). Studies on environmental literacy are mostly done at the high school and college levels [42]. Studies that discuss how fatwas and da'wah have an impact on positive changes in human behavior towards the environment are also still rarely executed [43]. For this reason, this study aims to analyze the influence of environmental knowledge and values on environmental behavior in santri at pesantren in the UNNES area.

2 Methods

This study is quantitative, proposing to analyze the environmental care character, namely the influence of environmental knowledge and values on environmental behavior in santri in the UNNES area. Here, the population consists of 900 santri with the status of UNNES students live at pondok pesantren in the UNNES area, namely seven pesantren in Sekaran and Patemon Village, Gunungpati Sub-district, Semarang City. The sample selection was carried out using a stratified random sampling technique with an error rate of 10%. The number of research samples obtained was 208 santri.

Here, the environmental care character variable refers to the theory of Kaiser, Wolfing, and Fuhrer [44], consisting of three variables, namely environmental knowledge, environmental value, and environmental behavior. This study is also divided into independent and dependent variables. The independent variables consist of environmental knowledge and values, while the dependent variable is environmental behavior.

Aspects of environmental knowledge and behavior are collaborated with the theory of the third UNNES conservation pillar indicator, namely the conservation of natural resources and the environment. The pillar indicators are (1) biodiversity and non-biological resources, (2) green architecture, (3) clean energy, (4) green transportation, (5) waste management, and (6) paperless [45]. Meanwhile, the environmental value aspect

is collaborated with Fazlun Khalid's ecotheological theory [46], consisting of (1) the principle of monotheism (tauhid), (2) the principle of Khalifah-Amanah, (3) the principle of Khalq, and (4) the principle of Mizan.

The data collection utilized the questionnaire method with the instrument validity testing method in the form of Product Moment correlation analysis. The instrument reliability testing method used Cronbach Alpha analysis. Data analysis techniques applied included quantitative descriptive analysis techniques and multiple linear regression analysis using the SPSS computer program. Prior to the multiple linear regression analysis, the researchers analyzed the classical assumption test which incorporated the normality test using the Kolmogorov-Smirnov statistical method, the multicollinearity test using the tolerance and VIF value analysis, and the heteroscedasticity test using the Glejser analysis method. Then, multiple linear regression analysis included the F test, t-test, and analysis of the coefficient of determination.

3 Results and Discussion

3.1 Levels of Environmental Knowledge, Environmental Value, and Environmental Behavior

This study analyzes the environmental care character in santri at pesantren in the UNNES area. The character used refers to the theory of Kaiser, Wolfing, and Fuhrer (1999), incorporating three variables, namely environmental knowledge, environmental value, and environmental behavior. Based on the research results, the average environmental care character of santri is in the "very high" category, namely 90.87 (84.13%). In detail, the average environmental knowledge is at a "very high" level, namely 27.56 (86.12%). Then, the average environmental value is also at a "very high" level, namely 35.48 (88.7%). In contrast to the environmental knowledge and environmental value variables, the average level of environmental behavior is at a "high" level, namely 27.82 (77.27%). The results of the analysis of the level of environmental care character in santri can be seen in Fig. 1 below.

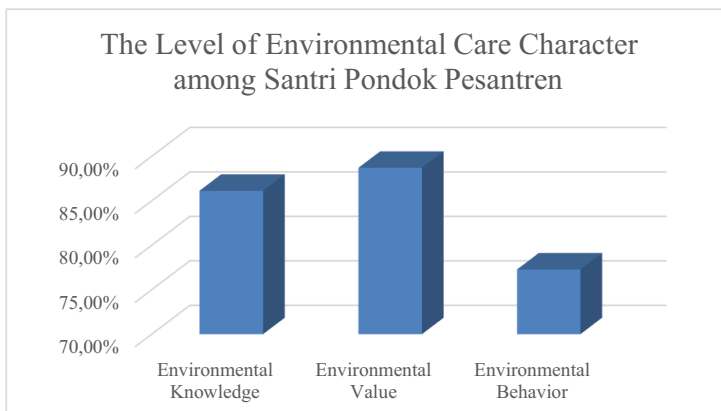


Fig. 1. The level of environmental care character in santri at pesantren in the UNNES area

Source: Data Analysis Results

The high environmental care character of santri shows that the pattern of education in pesantren has a positive impact on the formation of environmental care characters. Pesantren implement environmental education by combining spiritual and religious elements with environmental cognitive and psychomotor aspects to provide an empirical learning experience that can improve the ability of santri to manage the environment. Pesantren have a notable and strategic role in environmental protection and management that has been rooted since time immemorial because it is the oldest educational institution in Indonesia. Pesantren can combine religion, morals, ethics, and values so that they can create and transform noble characters in the younger generation, including the environmental care character [27][47]. They have a major contribution as educational institutions, religious broadcasters, and socio-religious movements. Pesantren are not only oriented to vertical (religious) matters but also horizontal (social and environmental awareness) [48]. Another study that reveals an important role in environmental conservation efforts based on Islamic values is the study of Diniyati, Fauziyah, & Achmad [49].

In general, the pattern of pesantren education in instilling environmental care character is through the learning process in the classroom using various books or other references, lectures or mauidzoh hasanah, good examples from kyai (cleric), habituation efforts, and also participatory activities [50][51][52][53][54]. Environmental learning in the classroom is carried out by integrating Islamic religious teachings with environmental teachings containing harmonization of the relationship between humans and nature based on religious values—or better known as ecological spirituality or ecological theology. This is taught to the students on various occasions in pesantren classrooms. Planting the teachings of ecological theology will allow santri to have attitudes and behaviors that reflect the environmental care character [52].

Instilling this teaching will also allow the formation of understanding among santri that maintaining ecosystem stability will have implications for improving their quality of life. Thus, they will be motivated to always preserve the environment [55]. As a religious educational institution, pesantren have more capabilities in conveying environmental values through a religious approach. Efforts to integrate religious values into conservation activities must be executed through educational activities from an early

age where the process will be more easily realized in pesantren as they have adequate knowledge in religious authorities [56].

Habituation efforts and participatory activities also have a major contribution in increasing environmental awareness and behavior among santri. In general, pesantren always require students to be disciplined in living their daily lives by carrying out picket cleaning activities to maintain the room and classroom environment, community service activities, the obligation to dispose of garbage properly and save energy, and not damage various facilities or infrastructure. Habituation emphasizes them to act, behave well, and take actions that do bring benefits and keep them away from madharat (harm). Its efforts will be able to shape the personality of the santri to be more concerned about the environment. In pesantren, they are accustomed to living disciplined in all things so as to create a structured pattern of behavior. Pesantren are places for them to study and live that contain complex life like a miniature of the social community [31][52].

This study denotes that pesantren have a major contribution in developing the environmental care character in santri. This is in line with studies conducted by Efendi et al. [57] and Husamah, Miharja, & Hidayati [42], pointing out that Islam contains values that are very pro-environmental so that it is effective in developing environmental literacy. Studies from Mangunjaya & McKay [43], Sukarsono & Utami [56], and Herdiansyah, Jokopitoyo, and Munir [47] also state the same thing.

Pesantren have great potential to solve socio-ecological problems. They can be an educational model that internalizes the normative values of religious ecology to develop self-awareness and concern for the environment [58]. The educational culture of pesantren has a positive contribution in preventing environmental damage. With Islamic education and life values, pesantren can form santri with good environmental care characters [26][50]. In fact, research by Diniyati, Fauziyah, & Achmad [49], Fawaid [59], and Muspiroh [60] resulted in the findings that pesantren are not only able to educate their students, but can also be a driving force for the surrounding community to participate in environmental conservation efforts.

A similar statement was also conveyed by Fua et. al. [52] that environmental education will be more successful if it involves religious institutions. This is because culturally, religious institutions have religious, charismatic, and highly respected leaders. Hungerford & Volk (2013) in Rahmawati et al. [61] state that some researches point out that the implementation of environmental education in schools has not been able to increase awareness and behavior readiness related to environmental care. For this reason, experts believe that there is a gap between cognitive aspects and behavioral patterns in humans. This denotes that the educational process has not been fully integrated and is still fragmented between cognitive, affective, and psychomotor aspects [61]. The presence of pesantren in developing the environmental care character through its curriculum and education pattern is considered effective for integrating the cognitive, affective, and psychomotor aspects through the integration of science with religious values.

Islam plays a major role in increasing awareness and environmental care behavior in the community. The integration of religious values in environmental conservation efforts has a very important urgency to be realized immediately. This effort is progres-

sively widespread and rapid as a response to dissatisfaction with the previously implemented method. Religion is new hope in conservation efforts that provide values and attitudes that change the concept of human nature which is reflected in previous religious ethics and practices in people's daily lives [56]. Rahman, Zabidi, & Halim [62] explain that integrating elements of monotheism in environmental education is an essential practice to change world views, ethics, spirituality, and behavioral attitudes towards environmental conservation. This is also supported by the results of a study conducted by Yusuf et al. [63], denoting that the level of environmental literacy in santri is higher than that of general school students.

The integration of Islamic values in conservation efforts exhibits that the case for the environment is not a secular matter and there is a great unexplored potential to integrate religious approaches into conservation practices [64]. Al Qardhawy [92] says that religion should indeed be a source of value in all aspects of development, including environmental conservation. Mangunjaya & Praharawati [65] reveal that there is substantially no separation between aspects of religious belief and the practice of environmental care because Islam is inherently an environmentalist religion.

The results of research from Rahman, Zabidi, & Halim [62] suggest that environmental care behavior in students should be improved even though they already have good knowledge and awareness. As a country with the largest Muslim population in the world, Indonesia must be a pioneer in realizing Green Islam. However, its realization should not only be limited to promises, but must be more grounded so that it is more contextual to be manifested [66]. Then, McKay et al. [64] also assert that instead of increasing general awareness regarding conservation issues, the results achieved in environmental education would be more effective if it is carried out through increasing Islamic awareness.

3.2 The Influence of Environmental Knowledge and Value on Environmental Behavior

To determine the influence of the independent variables (X) on the dependent variable (Y) simultaneously, the F test was carried out. It was performed using the Analysis of Variance (ANOVA) that was done using the SPSS program. The F test was carried out with a degree of confidence of 90% ($\alpha = 0.10$). The provisions applied to the F test are: if the p-value is less than 0.10, then there is a significant effect of the independent variables simultaneously on the dependent variable. Meanwhile, if the p-value is more than 0.10, then there is no significant effect of the independent variables simultaneously on the dependent one. After the F test was carried out using the SPSS program, the results were obtained as in Table 1 below.

Table 1. F test results with ANOVA

Test	Variables	F count	p-value	Conclusion
ANOVA	Environmental Knowledge and Environmental Value	12.066	0.000	There is significant effect

→ Environmental Behav-
ior

Source: Data Analysis Results

Based on the results of the F test analysis, it can be seen that the p-value is 0.00 which means < 0.10 . These results indicate that there is a significant effect of the independent variables simultaneously on the dependent variable. So, environmental knowledge and value have a significant effect on environmental behavior simultaneously.

The t-test is called the regression coefficient test, aiming to find out the presence of the effect of the independent variables (X) partially or individually on the dependent variable (Y). In this study, the t-test was performed using the SPSS program with a degree of confidence of 90% ($\alpha = 0.10$). The basis for the decision to perform the t-test is: if the p-value is less than 0.10 then there is a significant effect of the independent variables partially on the dependent one. Meanwhile, if the p-value is more than 0.10 then there is no significant effect of the independent variables partially on the dependent one. After the t-test was carried out using the SPSS program, the results were obtained as in Table 2 below.

Table 2. T-test results

Test	Variables	t count	p-value	Conclusion
T-test	Environmental Knowledge → Environmental Behavior	1.538	0.125	There is no significant effect
	Environmental Value → Environmental Behavior	3.091	0.002	There is significant effect

Source: Data Analysis Results

Based on the results of the t-test analysis, it is known that the p-value generated on the environmental knowledge variable is 0.125, which means > 0.10 . These results indicate that there is no significant effect of the environmental knowledge variable on environmental behavior partially. Meanwhile, the p-value of the environmental value variable is 0.002, which means < 0.10 . These results indicate that there is a significant effect of the environmental value variable on environmental behavior partially.

After the t-test analysis was carried out, the next step was to analyze the correlation coefficient and determination coefficient. After The correlation coefficient is used to determine the strength of the relationship between the independent variables and the dependent variable. The correlation coefficient points out how much the independent variables (X) used in the model can explain the dependent variable (Y). The coefficient of determination test is also called the R² test which serves to assign how far the independent variables (X) influence the dependent variable (Y). After analyzing R and R² using the SPSS program, the results were obtained as in Table 3 below.

Table 3. R and R² analysis results

Variables	R	R Square	Conclusion
Environmental Knowledge and Environmental Value → Environmental Behavior	0.325	0.105	Low relationship and low influence

Source: Data Analysis Results

Based on the Table 3, it can be seen that the R value is 0.325. Based on the criteria for the strength of the relationship in the correlation coefficient, this value indicates that the value obtained has a low relationship. This points out that there is a low relationship between environmental knowledge, value, and behavior. In contrast to the correlation coefficient shown by the R value, the coefficient of determination is indicated by the R Square value. Based on the table, it can be seen that the value of R² (R Square) obtained is 0.105 or 10.5%. It indicates that the percentage contribution of environmental knowledge and environmental value to environmental behavior is 10.5% while the remaining 89.5% is influenced by other variables outside of this study.

The results show that environmental knowledge and value have a significant effect on environmental behavior simultaneously. However, after partially analyzing the effect, it is known that only the environmental value variable has a significant effect on environmental behavior. Meanwhile, the environmental knowledge variable has no significant effect on environmental behavior.

As the results of other studies, the environmental value variable shows a significant influence on environmental behavior. On the other hand, there are not many studies that exemplify the insignificant effect of the environmental knowledge variable on environmental behavior. Several studies that reveal a correlation or influence between environmental knowledge and environmental value with environmental behavior include research from Zheng et al. [67], denoting that there is a positive relationship between environmental knowledge and environmental attitude with environmental behavior. Then, research from Kuswardinah & Wahyuningsih [68] also points out a significant influence between the value of conservation education courses and attitudes towards environmental awareness in Faculty Engineering (UNNES) students. Then, research from Sujana, Hariyadi, & Purwanto [69] and Rarasandy, Prasetyo, & Ngabekti [70] also indicate that there is a positive relationship between environmental attitude and environmental behavior.

Another study that reveals that there is an influence of environmental knowledge and environmental value variables on environmental behavior is research from Levine & Strube [71]. Then, research from Kusuma, Sulhaini, & Handayani [72] explains that environmental knowledge and environmental attitude have an effect on green purchase intention. Pothitou, Hanna, & Chalvatzis [73] says that knowledge about energy saving and greenhouse gas reduction has a positive relationship to energy saving and greenhouse gas reduction actions. Research by Geiger, Geiger, & Wilhelm [74] also shows that general knowledge and environmental knowledge have an effect on environmental care behavior. In addition, Meinhold & Malkus (2005) and Zarrantaj, Sharifah, & Binti Abdul (2011) in Heyl, Diaz y, & Cifuentes [75] reveal that students who have taken environmental subjects have good attitudes and behavior towards the environment than those who have not.

Research on pro-environmental behavior results in more findings that knowledge and values or attitudes affect environmental care behavior. However, several studies indicate that environmental knowledge has no effect or relationship with pro-environmental behavior. Some of these studies include research from Nugroho, Ismail, & Hariz [76] and Mangunjaya et al. [77]. Research conducted by Mangunjaya, et al. [77] points out there was no significant relationship between environmental education in schools and sustainability behavior, while Islamic education in pesantren showed a positive relationship with sustainability care. Research from Yusof, Singh, & Razak [78] denotes that environmental knowledge has no significant effect on perceptions of environmental advertising—that have no significant effect on purchase intentions of environment-friendly automobiles.

The results of other studies that are quite relevant include researches from Stern [79], Kaiser, Wolfing, & Fuhrer [44], and Thapa [80], stating that environmental information and knowledge only had a small impact or influence on environmental care behavior. According to Fliegenschnee & Schelakovsky (1998) in Kolmuss & Agyeman [81], environmental care behavior is not solely influenced by knowledge, but can be affected by situational and other internal factors. This result is supported by McGuire [82], pointing out that attitude has a greater influence on environmental care behavior compared to knowledge. This is because attitude is a factor that determines a person's desire to behave responsibly towards the environment.

This study refers to the theory of Kaiser, Wolfing, & Fuhrer [44] that environmental care behavior is influenced by environmental knowledge, value, and intention. However, the results of the study show that environmental knowledge does have a positive relationship with environmental behavior, but does not have a significant effect on environmental behavior. Then, the environmental value variable has a significant influence on environmental behavior. Meanwhile, the effect of environmental knowledge and value on environmental behavior is simultaneously 10.5%. This result is in line with what McGuire [82] says that psychological construction is very fundamental to human function as a person and is very complex in its operation and sensitive in its development. For this reason, the results of research in the field do not always match the theory used by the previous reference, but can shift to follow other theories.

As the results of this study, the theory of planned behavior from Ajzen [83] indicates that what influences environmental care behavior is not knowledge, but values. Planned behavior theory asserts that a person's behavior is largely determined by intentions, and intentions are influenced by three main determinants. The first determinant is the attitude towards behavior which refers to the extent to which a person judges the consequences of the behavior carried out, whether good or bad, whether beneficial or detrimental. The second determinant is social factors in the form of subjective norms which refer to social pressures in their environment to show or not show behavior. The third determinant is the perception of behavioral control which refers to a person's perception of whether it is easy or not to realize certain behaviors [83][84]. This theory has been widely used to understand how a person behaves in various fields [85].

The planned behavior theory is a development of the reasoned action theory of Ajzen and Fishbein, explaining that a person's behavioral intentions are determined by attitudes toward behavior and subjective norms. Then, it was developed by Ajzen [83] by

adding one determinant in the form of perceived behavioral control. The theory of planned behavior has a better advantage in explaining human behavior in a specific context where an individual has no control over his behavior. The determinants of perceived behavioral control consist of situational factors and the availability of opportunities and resources that reflect how far they control individual behavior [85][86].

In accordance with the theory of planned behavior, environmental behavior in santri in the UNNES area is not influenced by explicit knowledge, but is more affected by the attitude towards environmental behavior, subjective norms that develop at pesantren, campus, and community environment, and perceptions of behavioral control that santri possess. According to the theory of planned behavior, knowledge does not have an explicit effect, but it has an implicit effect as one of the predictor elements in the perception of behavioral control. Therefore, in this study, knowledge does not significantly influence the environmental behavior of santri.

The results of this study indicate that the influence of environmental knowledge and environmental value on environmental behavior is only 10.5% or is in the low category. These results denote that the value does not have a major effect on environmental behavior in students. This condition can be influenced by different levels of measurement, where values are measured at a general level while the behavior is measured at a specific one [87][88]. Then, Corraliza & Berenguer [89] say that one of the problems in the study of environmental behavior and the role of attitude as a predictor comes from the shortcomings of the study of situational variables and the conditions of interaction between situational factors and personal variables. Thus, environmental behavior depends on the relative value of personal variables and situational variables. Yoon et al. [90] also states that positive attitudes towards the environment can fail to influence behavior due to the mediating role of inhibiting the attitude-behavior relationship. So, attitudes towards the environment can have a high influence on environmental behavior if the inhibiting factor is low.

Reflecting on the explanation above, further research should involve more predictors or determinants in explaining environmental behavior. Studies to measure pro-environmental behavior appropriately require the involvement of more than one or two determinants that influence behavior. Predictor factors or determinants that affect pro-environmental behavior can consist of socio-demographic factors (personal abilities), attitude factors or psychological factors, habitual factors, and contextual factors whether individual, social, and institutional [91].

4 Conclusion

The level of environmental care character in santri at pesantren in the UNNES area is in the very high category. This study denotes that pesantren have a major contribution in developing the environmental care character in santri. Environmental learning there is carried out by integrating Islamic religious teachings with environmental teachings that contain harmonization of the relationship between humans and nature based on religious values—or better known as ecological spirituality or ecological theology—and the pattern or culture of pesantren life which requires santri to live together in a

disciplined and simple manner. Good examples from the kyai are also able to form santri with good environmental care characters.

Based on the results of the study, environmental knowledge and value simultaneously influence environmental behavior by 10.5% or are in the low category. Then, according to the t-test, only environmental values have a significant effect on environmental behavior, while environmental knowledge has no significant effect on environmental behavior. These results do not show relevance to the theory of Kaiser (1999) but rather point out relevance to Ajzen's (1991) theory of planned behavior. This theory states that a person's behavior is largely determined by intentions, and intentions are influenced by three main determinants, namely attitudes towards behavior, subjective norms, and perceptions of behavioral control.

The high environmental knowledge, value, and behavior of santri at pesantren in the UNNES area must be consistently improved. The results of their environmental behavior are not as high as the results of environmental knowledge and value. This condition indicates the need for improvement in environmental behavior in daily life. For further studies, we suggest other researchers produce better findings in studies on pro-environmental behavior. It is necessary to involve more predictor factors or determinants of pro-environmental behavior. Then, a better scale or level of measurement is needed so that it can produce more credible and accurate findings

Acknowledgments. We would like to thank all Islamic boarding schools in the Universitas Negeri Semarang area for their good cooperation in this research.

Disclosure of Interests. The authors have no competing interests to declare that are relevant to the content of this article.

References

- [1] Austin, K. G., Schwantes, A., Gu, Y., Kasibhatla, P. S.: What causes deforestation in Indonesia ? *Environmental Research Letters* 14, 1-9 (2019)
- [2] Nikonovas, T., Spessa, A., Doerr, S. H., Clay, G. D., Mezbahuddin, S.: Near-complete loss of fire-resistant primary tropical forest cover in Sumatra and Kalimantan. (2019)
- [3] Susanto, E., Lestari, N., Hapsari, M., Krisdyatmiko.: Driving factors of deforestation in Indonesia: A case study of central Kalimantan. *Jurnal Studi Pemerintahan* 9(4), 511-533 (2018)
- [4] Alam, A. S., Irwan, A. L., Haryanto.: Waste bank governance in local Indonesia: Problems and opportunities. *International Journal of Innovation, Creativity and Change* 10(12), 85-99 (2020)
- [5] Andarani, P., Puspandiyah, K. S. M., Budiawan, W., Purwaningsih, R., Samadikun, B. P., Rezagama, A.: Preliminary study on plastic waste handling in Semarang City – Indonesia: Estimated generation and existing management. *E3S Web of Conferences* 73, 07008, 1-5 (2018)
- [6] Hidayat, Y. A., Kiranamahsa, S., & Zamal, M. A.: A study of plastic waste management effectiveness in Indonesia industries. *AIMS Energy* 7(3), 350-370 (2019)
- [7] Jambeck, et. al.: Plastic waste inputs from land into the ocean. *Science* 347(6223), 768-771 (2015)

- [8] Hidayatno, A., Destyanto, A. R., Noor, S. T.: Conceptualizing Carbon emissions from energy utilization in Indonesia's industrial sector. *Energy Procedia*, 156, 139-143 (2019)
- [9] Sulistiawati, L. Y.: Indonesia's climate change national determined contributions, a farfetch dream or possible reality? *IOP Conf. Series: Earth and Environmental Science* 423 (2020) 012022,1-7 (2020)
- [10] Cleary, D. F. R., Devantier, L.: Indonesia: Threats to the country's biodiversity. DOI: 10.1016/B978-0-444-52272-6.00504-3, (2011)
- [11] Muranen, J.: The importance of out-of-school environmental education entities for integrating environmental education into school curriculum. Thesis: University of Tampere (2014)
- [12] Zaenuri, Sudarmin, Utomo, Y., Juul, E.: Habituation model of implementing environmental education in elementary school. *Jurnal Pendidikan IPA Indonesia* 6(2), 206-212 (2017)
- [13] Zakharova, E., Liga, M., Sergeev, D.: Constructing philosophy of environmental education in contemporary Russia. In *Procedia Social and Behavioral Sciences* 214, 1181-1185 (2015)
- [14] Valderrama-Hernandez, R. Alcantara, L., Limon, D.: The complexity of environmental education: Teaching ideas and strategies from teachers. *Procedia Social and Behavioral Sciences*, 237, 968-974 (2017)
- [15] Feszterova, M., Jomova, K.: Character of innovations in environmental education. *Procedia Social and Behavioral Sciences* 197, 1697-1702 (2015)
- [16] Eneji, C. O., Ogar, Akpo, D., Mbu, E. A., & Etim.: Historical groundwork of environmental education (fundamental and foundation of environmental education. *International Journal of Continuing Education and Development Studies (IJCEDS)* 3(1), 110-123 (2017)
- [17] Sukarjita, I. W. et al.: The integration of environmental education in science materials by using MOTORIC learning model. 8(1), 152-159 (2015)
- [18] Sya'ban M. B. A.: Tinjauan mata pelajaran IPS SMP pada penerapan pendidikan lingkungan hidup untuk peduli akan tanggung jawab lingkungan. *Jurnal Geografi, Edukasi, dan Lingkungan (JGEL)* 2(1), 32-44 (2018)
- [19] Retnoningsih, et. al.: *Konservasi Berkelanjutan Kampus UNNES 2019*. Universitas Negeri Semarang, Semarang (2019)
- [20] Rokhman, F. Retnoningsih, A., Pratama, H.: The Internalization of conservation mindset in disruptive era. *E3S Web of Conferences* 48, IWGM 2018, (2018)
- [21] Prihanto, T.: Green campus management based on conservation program in Universitas Negeri Semarang. *Engineering International Conference (EIC 2017)*, AIP Conf. Proc. 1941, (2018)
- [22] Khusniati, M., Parmin, Sudarmin.: Local wisdom-based science learning model through reconstruction of indigenous science to improve student's conservation character. *Journal of Turkish Science Education* 14(3), 16-23 (2017)
- [23] Sudarman, Djunaidi, Sutopo, Y.: The formation of conservation – based behavior of mechanical engineering students through contextual learning approach. *International Journal of Environmental & Science Education* 12(4), 617-627 (2017)
- [24] Kisworo, B., Muarifuddin.: Analisis implementasi 7 Pilar Konservasi Universitas Negeri Semarang di Fakultas Ilmu Pendidikan. *Journal of Nonformal Education* 1(1), 9-23 (2015)
- [25] Lestari, P., Tijan, Purnomo, A., Riyanto, B.: Social environment support in the realization of conservation spirit of "Arum Luhuring Pawiyatan Ing Astanira" in State University of Semarang. *Proceeding of ICESI 2019, July 18-19 2019, Semarang, Indonesia*. (2019)
- [26] Aulia, R. N., Mardhiah, I., Gunawan, A., Isnaini, D. E. N., Firdaus, M., Narulita, S.: Pesantren-based environmental management in Equatorial Areas. *The 9th International*

- Conference on Global Resource Conservation (ICGRC), AIP CPnf. Proc. 2019, 030015, pp. 1-5 (2019)
- [27] Bahri, S.: Pesantren and the development of living environment: The Study concept of Eco-Pesantren in Pondok Pesantren An-Nur HA Rambigundam Jember. *International Journal of Management and Administration Sciences* 5(10), 43-54 (2016)
- [28] Efendi, M. H., Irawan, M. H., Rohman, F., Gofur, A.: Islamic view of environmental conservation education in Pondok Pesantren Nurul Haramain Lombok Barat – Indonesia. *Journal of Education and Practice* 8(12), 137-140 (2017)
- [29] Nawawi, M., Gunawati, D., Sunarto.: Peningkatan sikap peduli lingkungan melalui Program Eco-Pesantren di Pondok Pesantren Nurul Haramain NW Narmada Kabupaten Lombok Barat. *Proceeding of Seminar Nasional Pendidikan Biologi dan Saintek II. Surakarta, 20 Mei 2017* (2017)
- [30] Aulia, R. N., Isnaini, D. E. N., Khumairoh, U.: Pengelolaan lingkungan berbasis pesantren (studi kasus di Pondok Pesantren Nurul Hakim Lombok NTB). *HAYULA: Indonesian Journal of Multidisciplinary Islamic Studies*, 1(2), 229-244 (2017)
- [31] Nisa', Z. K.: Pengembangan pendidikan lingkungan hidup di Pondok Pesantren Kabupaten Blitar. *Jurnal Brilliant* 4(1), 105-113 (2019)
- [32] Mardhiah, I., Aulia, R. N., Narulita, S.: Konsep gerakan Ekoteologi Islam Studi atas Ormas NU dan Muhammadiyah. *Jurnal Studi AL-Qur'an* 10(1), 83-99 (2014)
- [33] Mohamed, N.: Revitalising an eco-justice of Islam by way of environmental education: Implication for Islamic education. *Dissertation Presented for the Degree of Doctor of Philosophy (Curriculum Studies) at Stellenbosch University* (2012)
- [34] Asmanto, E.: Revitalisasi spiritualitas ekologi perspektif pendidikan islam. *Jurnal Tsaqafah* 11(2), 333-354 (2015)
- [35] Morrison, M., Duncan, R., Parton, K.: Religion does matter for climate change attitudes and behavior. *PLoS ONE* 10(8), 1-16 (2015)
- [36] Vaidyanathan, B., Khalsa, S., Ecklund, E. H.: Naturally ambivalent: Religion's role in shaping environmental action. *Sociology of Religion: A Quarterly Review* 2018, 1-23 (2018)
- [37] Mohamed, N.: Islamic education, eco-ethics and community. *Studies in Philosophy and Education* 32(6), (2013)
- [38] Rizk, R. R.: Islamic environmental ethics. *Journal of Islamic Accounting and Business Research* 5(2), 194-204 (2014)
- [39] Saniotis, A.: Muslims and ecology: fostering Islamic environmental ethics. *Cont Islam* 6, 155-171 (2012)
- [40] Sarvestani, A. A., Shahvali, M.: Environmental ethics: toward an Islamic perspective. *American-Eurasian Journal of Agriculture and Environmental Science* 3(4), 609-617 (2008)
- [41] Sukarsono.: Islamic values in the practice of natural conservation in Indonesia. *Advances in Social Science, Education and Humanities Research* 231, 624-627 (2018)
- [42] Husamah, H., Miharja, F. J., Hidayati, D. A.: Environmental literacy of Islamic boarding school students: Study in MA Bilingual-Sidoarjo, East Java, Indonesia. *Prisma Sains: Jurnal Pengkajian Ilmu dan Pembelajaran Matematika dan IPA IKIP Mataram* 8(1), 57-68 (2020)
- [43] Mangunjaya, F. M., McKay, J. E.: Reviving Islamic approach for environmental conservation in Indonesia. *Worldview Journal* 16, 286-305 (2012)
- [44] Kaiser, F. G., Wolfing, S., Fuhrer, U.: Environmental attitude and ecological behavior. *Journal of Environmental Psychology* 19, 1-19 (1999)

- [45] Rahmaningtyas, W., Purasani. H. N., Tusnayah.: Implementasi kaderisasi konservasi di perguruan tinggi. *Jurnal Pendidikan Ilmu Sosial* 27(1), 87-102 (2018)
- [46] Khalid, F. M.: Islam and the environment. *Social and Economic Dimensions of Global Environmental Change* 5, 332-339 (2002)
- [47] Herdiansyah, H., Sukmana, H., Lestari, R.: Ecopesantren as a basic forming of environmental moral and theology. *Jurnal Kalam* 12(2), 303-326 (2018)
- [48] Herdiansyah, H., Jokopitoyo, T., Munir, A.: Environmental awareness to realizing green Islamic boarding school (Eco-Pesantren) In Indonesia. *Journal of Earth and Environmental Science* 30, 1-6 (2016)
- [49] Diniyati, D., Fauziyah, E., Achmad, B.: Potensi dan peran pesantren sebagai lembaga pelaksana kegiatan rehabilitasi hutan dan lahan (RHL). *Jurnal Penelitian Sosial dan Ekonomi Kehutanan* 7(1), 41-54 (2010)
- [50] Aulia, R. N., Mardhiah, I., Gunawan, A., Isnaini, D. E. N.: Contribution of education culture in pesantren in tackling environmental damage in Indonesia. In *Proceeding International Conference on University and Intellectual Culture* 1, pp. 44-53 (2018)
- [51] Muhtarom, A.: Pembinaan kesadaran lingkungan hidup di pondok pesantren: Studi kasus di Pondok Pesantren Al-Mansur Darunnajah 3 Kabupaten Serang. *Jurnal Kebudayaan Islam* 12(2), 225-240 (2014)
- [52] Fua, J. L., Nurlila, R. U., Gunawan, F., Wekke, I. S.: Islamic education on formation of environmental awareness in pondok pesantren Indonesia. *Journal of Earth and Environmental Sciences* 156, 1-4 (2018)
- [53] Saprodi, E., Kastolani, W., Ningrum, E.: Integration of environmental education in eco pesantren Daarut Tauhid Bandung. *Advancing Scientific Thought for Future Sustainable Development*, 713-720 (2019)
- [54] Sudjak, Asiyah, U., Prasetyo, R. A.: The role of Islamic boarding school as socialization agent of ecological values (A case study in Salaf-Modern Islamic boarding school). *Wacana* 20(4), 9-17 (2017)
- [55] Muhardi, M., Nurdin, N., Irfani, A.: The role of knowledge-based ecological pesantren in environmental conservation. *IOP Conf. Series: Journal of Physics: Conf. Series* 1469 (2020) 012126, 1-5 (2020)
- [56] Sukarsono, Utami, U.: Knowledge system of religious communities in watershed conservation education: case study in Islamic Boarding School in East Java and West Nusa Tenggara, Indonesia. *IOP Conf. Series: Earth and Environmental Science* 314 (2019) 012057, 1-12 (2019)
- [57] Efendi, M. H., Irawan, M. H., Rochman, F., & Gofur, A.: Environmental conservation by applying Islamic values. *Journal of Education & Social Policy* 4(2), 180-186 (2017)
- [58] Mufid, M.: Grounding green pesantren: Revitalization of pesantren-based ecological scientific. *Didaktika Religia: Journal of Islamic Education* 7(2), 373-394 (2019)
- [59] Fawaid, A.: The environmental conservation: An Ecopedagogical approach practiced by Pesantren Annuqayah, Madura. *Dinika: Academic Journal of Islamic Studies* 1(2), 131-142 (2016)
- [60] Muspiroh, N.: Dakwah lingkungan oleh Pesantren Saung Balong Al-Barokah terhadap masyarakat untuk mengelola dan memanfaatkan limbah organik. *Orasi: Jurnal Dakwah dan Komunikasi* 7(1), 1-8 (2016)
- [61] Rahmawati, A., Supardi, K. I., Mulyani, S. E. S., Haryani, S.: Environmental-based education integrated Islamic values to cultivate environmental literacy and attitudes. *Advances in Social Science, Education and Humanities Research (ASSEHR)* 247, 70-74 (2018)

- [62] Rahman, N. A., Zabidi, F. N. M., Halim, L.: Integration of tawhidic element for environmental education from the teachers' perspectives. *Religions* 11, 394, 1-17 (2020)
- [63] Yusuf, R., Maimun, Sanusi, Fajri, I., Saputra, J.: A comparison of student environmental literacy: Public and Islamic Schools in Banda Aceh, Indonesia. *International Journal of Innovation, Creativity and Change* 12(9), 222-239 (2020)
- [64] McKay, J. E., Mangunjaya, F. M., Dinata, Y., Harrop, S. R., Khalid, F.: Practise what you preach: a faith-based approach to conservation in Indonesia. *Fauna & Flora International*, *Oryx* 48(1), 23-29 (2013)
- [65] Mangunjaya, F. M., Praharawati, G.: Fatwas on boosting environmental conservation in Indonesia. *Religious* 10(570), 1-14 (2019)
- [66] Fikri, I., Colombijn, F.: Is green Islam going to support environmentalism in Indonesia ? *Anthropology Today* 37(2), 15-18 (2021)
- [67] Zheng, Q. J., et al.: Correlation between the environmental knowledge, environmental attitude, and behavioral intention of tourist for ecotourism in China. *Applied Ecology and Environmental Research* 16(1), 51-62 (2017)
- [68] Kuswardinah, A., Wahyuningsih.: The influence of students' understanding in conservation characteristics and scientific attitude towards environmental care in Universitas Negeri Semarang. *International Conference Asosisasi Pendidikan Teknologi dan Kejuruan Indonesia (Aptekindo)* (2018)
- [69] Sujana, K., Hariyadi, S., Purwanto, E.: Hubungan antara sikap dengan perilaku peduli lingkungan pada mahasiswa. *Jurnal Ecopsy* 5(2), 81-87 (2018)
- [70] Rarasandy, L., Prasetyo, A. P. B., Ngabekti, S.: Student's conservation attitudes and behavior after conservation and environmental-courses. *Journal of Innovative Science Education* 9(2), 144-150 (2020)
- [71] Levine, D. S., Strube, M. J.: Environmental attitudes, knowledge, intentions and behaviors among college students. *The Journal of Social Psychology* 152(3), 308-326 (2012)
- [72] Kusuma, P. N. P. D., Sulhaini, Handayani, R. B.: The effect of environmental knowledge, green advertising and environmental attitude toward green purchase intention. *RJOAS* 6(78), 95-105 (2018)
- [73] Pothitou, M., Hana, R. F., Chalvatzis, K. J.: Environmental knowledge, pro-environmental behavior and energy saving in households: an empirical study. *applied energy*, (2016)
- [74] Geiger, S. M., Geiger, M., Wilhelm, O.: Environment-specific vs. general knowledge and their role in pro-environmental behavior. *Frontiers Psychology* 10(718), 1-12 (2019)
- [75] Heyl, M., Diaz E. M., Cifuentes, L.: Environmental attitudes and behaviors of college students: A case study conducted at a Chilean University. *Revista Latinoamericana de Psicología* 45(3), 487-500 (2013)
- [76] Nugroho, W. S., Ismail, Hariz, A. R.: Korelasi pengetahuan mahasiswa tentang pemanasan global terhadap perilaku peduli lingkungan sekitar. *Al-Hayat: Jurnal of Biology and Applied Biology* 1(1), 13-17 (2018)
- [77] Mangunjaya, F. M., et al.: Kesadaran lingkungan di kalangan santri terhadap pembangunan berkelanjutan. *Jurnal Media Konservasi* 18(3), 127-134 (2013)
- [78] Yusof, J. M., Singh, G. K. B., Razak, R. A.: Purchase intention of environment-friendly automobile. *Procedia – Social and Behavioral Sciences*, 85, 400-410 (2013)
- [79] Stern, P. C.: Information, incentives, and proenvironmental consumer behavior. *Journal of Consumer Policy* 22, 461-478 (1999)
- [80] Thapa, B.: The meditation effect of outdoor recreation participation on environmental attitude-behavior correspondence. *The Journal of Environmental Education* 41(3), 133-150 (2010)

- [81] Kollmuss, A., Agyeman, J.: Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research* 8(3), 239-260 (2002)
- [82] McGuire, N. M.: Environmental education and behavior change: an identity-based environmental education model. *International Journal of Environmental & Science Education* 10(5), 695-715 (2015)
- [83] Ajzen, I.: The theory of planned behavior. *Organizational Behavior and Human Decision Process* 50, 179-211 (1991)
- [84] Ajzen, I.: Perceived behavior control, self-efficacy, locus of control, and the theory of planned behavior. *Journal of Applied Social Psychology* 32(4), 665-683 (2002)
- [85] Sommer, L.: The theory of planned behavior and the impact of past behavior. *International Business & Economic Research Journal* 10(1), 91-110 (2011)
- [86] Macovei, O.: Applying the theory of planned behavior in predicting pro-environmental behavior: the case of energy conservation. *AUDCE* 11(4), 15-32 (2015)
- [87] Ajzen, I., Fishbein, M.: Attitudes and normative beliefs as factors influencing behavioral intentions. *Journal Of Personality And Social Psychology* 21(1), 1-9 (1972)
- [88] Ajzen, I., Fishbein, M.: Attitudinal and normative variables as predictors of specific behaviors. *Journal of Personality and Social Psychology* 27(1), 41-57 (1973)
- [89] Corraliza, J. A., Berenguer, J.: Environmental values, beliefs, and actions, a situational approach. *Environment and Behavior* 32, 832-848 (2000)
- [90] Yoon, J. I., et al.: Climate change and environmentally responsible behavior on the Great Barrier Reef, Australia. *Proceeding of the 2010 Northeastern Research Symposium*, pp. 231-238 (2010)
- [91] Blankenberg, A., Alhusen, H.: On the determinants of pro-environmental behavior: a literature review and guide for the empirical economist. *CEGE Discussion Papers*, no. 350, University of Gottingen, Center of European, Governance, and Economic Development Research (cege), Gottingen (2019)
- [92] Al-Qardhawi, Y.: *Islam Agama Ramah Lingkungan*. Pustaka Al-Kautsar, Jakarta (2002)
- [93] Koech, M. K.: Development and international environmental education. *The Comparative International Education Society Annual Conference*, 17-20 Maret 1988, Atlanta, georgia, USA (1988)
- [94] UNDP: *Sustainable Development Goals*, (2015)
- [95] Mensah, J.: Sustainable development: Meaning, history, principles, pillars, and implications for human action: Literature review. *Cogent Social Sciences* 5(1), 1-2 (2019)

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

