

The Role of Ecotheology in Cultivating Environmentally Caring Character as a Mandate in Islamic Junior High Schools

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Abstract:

This study aims to analyze the role of ecotheology education in fostering environmental awareness in Islamic Junior High Schools (Madrasah Tsanawiyah). One of the programs implemented is Asih Putera Ecoschool, an educational approach that instills values of environmental sustainability grounded in faith and piety. The study was conducted at MTs. Asih Putera in Cimahi City used a mixed-methods approach, employing data collection techniques such as questionnaires and interviews. The research sample consisted of purposively selected students, teachers, parents, and alumni. The results showed that 78% of students had good environmental awareness, while 22% still needed further understanding. From the teacher's perspective, 85% had implemented Ecoschool principles in their teaching, while 15% still encountered obstacles to implementation. From the parents' and alumni's perspectives, Ecoschool plays an important role in shaping students' character to care for and love the environment. The main factors supporting the successful implementation of Ecoschool are the availability of supporting facilities (72%), the integration of an environmentally based curriculum (68%), and school support (81%). However, several challenges were also identified, including a lack of specific teaching materials (60%) and minimal teacher training on Ecoschool (55%). This study concluded that ecotheology education at MTs Asih Putera in Cimahi City helps foster environmental

awareness, although several challenges remain. Key recommendations include improving teacher training, developing environmentally based teaching materials, increasing student engagement, and collaborating with parents and alumni on sustainable environmental programs.

Keywords: ecological school; environmental care; teaching materials; trust fund.

INTRODUCTION

Ecoschool is an educational paradigm that emphasizes environmental challenges while empowering students to actively engage in solving ecological problems. This form of education operates with the strategic intention of cultivating students' character in promoting environmental sustainability through entrepreneurial initiatives, thereby contributing to the emergence of a generation equipped to preserve environmental conditions while effectively managing available resources to improve the quality of life. Empirical evidence from various countries shows that the implementation of green education has facilitated beneficial transformations in ecological systems. School programs based on environmental principles significantly support efforts directed at environmental conservation (Amrullah & Herdiansyah, 2019).

Secondary school students tend to exhibit high levels of motivation when actively involved in various environmental conservation-oriented initiatives. This involvement not only fosters increased ecological awareness but also strengthens a sense of personal and collective responsibility for environmental sustainability. Participatory environmental programs, such as waste management, reforestation activities, and school cleanliness campaigns, foster a sense of ownership and concern for the surrounding environment in students. Furthermore, direct involvement in real-world actions provides contextual and meaningful learning experiences, making it easier for students to internalize environmental values. This high level of motivation is also influenced by teacher support and a conducive school environment that facilitates practice-based learning. Therefore, student participation in environmental conservation initiatives has the potential to be an effective means of fostering environmental awareness and a proactive attitude toward future ecological issues (Xiong et al., 2025).

The Qur'an, which serves as a moral compass for believers, offers numerous insights related to environmental management and natural disasters, which are fundamentally linked to human actions. Referring to Surah Ar-Rum, verse 41 of the Qur'an, manifestations of degradation of terrestrial and aquatic ecosystems, such as environmental pollution and ecological damage, are considered to originate from human actions. The concluding section of this verse articulates that it is divine will that they return to the right path. Consequently, human resource training has emerged as a crucial effort to foster a comprehensive understanding of environmental issues through both religious and secular frameworks.

Strengthening the quality of human resources plays a strategic role in fostering and maintaining a behavioral ethos that supports environmental sustainability. In this context, educational institutions function as facilitators, actively developing the character of students who demonstrate a sustainable concern for the environment. The implementation of a green education framework not only positively contributes to ecosystem balance and

sustainability but also encourages the internalization of Islamic values. These values include individual and social piety, trustworthiness, religiosity reflected in actions, discipline, and responsibility in environmental management and preservation (Marwiji et al., 2024; Muhaimin, 2020; Yamin et al., 2022).

Research conducted by Husin et al. has shown that green education progressively facilitates the creation of a sustainable and pristine educational environment (Husin et al., 2025). This development significantly contributes to the creation of a more conducive, organic, and enjoyable learning atmosphere for students. Such a learning environment not only supports cognitive processes but also strengthens the affective and social dimensions of education. Based on the background and literature review outlined previously, this study formulates two main issues that are the focus of the study. First, efforts to foster attitudes of environmental management and concern, with a particular emphasis on the role of educational institutions and the communities in which students interact and grow. Second, the instillation of Islamic virtues in students through various programs designed to build an appreciation for the environment, which is understood as a shared and collective responsibility. The originality of this research is summarized in the effort to combine Islamic character principles with initiatives for environmental appreciation. This research aspires to make a significant contribution to the fields of environmental theory, ecological literature, and character education theory, and to inspire various stakeholders to actively engage in environmental preservation as a mandate from Allah SWT.

Islamic education has a significant responsibility in shaping the character of students to have good morals and care for the environment (Hermawan et al., 2025; Pamuji & Mulyadi, 2024; Ramadhani et al., 2024; Safwannur et al., 2023; Sugiana et al., 2025). One relevant approach in environmental education is the Ecoschool concept, an educational model that instills awareness, concern, and responsibility for the environment in an integrated manner throughout the learning process. From an Islamic perspective, the principle of preserving the environment has been emphasized in the Qur'an and Hadith, which position humans as caliphs on earth with a mandate to care for and not damage God's creation. MTs Asih Putera Cimahi has adopted the Ecoschool concept through various learning programs and school activities, such as KuPiMan, Zero Waste, and the Tree Planting Movement. These programs are designed to foster environmentally friendly behavior while instilling moral and religious values of responsibility. However, the extent to which the implementation of the Ecoschool program influences the development of environmentally conscious character as an Islamic mandate has not been systematically studied. Therefore, this study aims to explore the role of Ecoschool in shaping and strengthening environmentally conscious character in students.

LITERATURE REVIEW

The Concept of Ecotheology

The concept of ecotheology generally stems from the theological awareness that the ecological crisis is not merely a technical or economic problem, but a spiritual and moral one. Since the 1960s, environmental theology has developed in the West in response to the global ecological crisis, which is considered rooted in the dominance of the Western anthropocentric worldview. Lynn White Jr., in his article **The Historical Roots of Our Ecological Crisis**, asserted that the roots of modern ecological problems stem from

religious interpretations that place humans as absolute rulers over nature (White, 1967). He proposed a more ecological reformulation of theology, which later became known as ecotheology. Nasaruddin Umar's concept of ecotheology emphasizes that environmental preservation is part of worship, not merely a social activity, because protecting the environment is part of worship. He views nature as a divine trust. The earth is not to be exploited but to be protected, as religious people are invited to read God's verses, not only in the mushaf (the book of the Quran), but also in leaves, mountains, rivers, and all of creation (Ruswanda, 2025).

In his ideas, he introduced an ecotheology based on the Asma'ul Husna, emphasizing that approximately 80% of Allah's names in the Asma'ul Husna have feminine nuances, such as Ar-Rahman and Ar-Rahim. For example, Ar-Rahman is mentioned 57 times and Ar-Rahim 114 times. Therefore, theology, which has been considered masculine, needs to be reformed to be softer and focus on divine compassion. This approach aims to foster humanity towards nature based on mercy, not domination (Maslani, 2023). Nasaruddin Umar also encouraged the integration of ecotheology into religious and religious education at all levels, making understanding nature an integral part of religious learning. He hopes this concept will become a holistic approach in the Indonesian religious education system, so that students and Islamic boarding school students not only study religious texts but also understand the universe as part of their faith. He brought this concept to the realm of religious policy and institutions: the Minister of Religious Affairs requested that ecotheology and environmental conservation be included in the religious and religious education curriculum in the 2025 National Working Meeting on Islamic Education. He mentioned three main focuses of religious education going forward: environment, tolerance, and nationalism, with ecology being one of the main pillars. In the realm of religious academia, he encouraged PTKIN (State Islamic Religious Colleges) campuses to develop ecotheology in various aspects of the relationship between the campus and the surrounding environment as a green campus. The concept has also been raised in international seminars when the Ministry of Religious Affairs finalized the idea of the Love and Ecotheology Curriculum as the basis for future implementation movements (Ruswanda, 2025).

The Concept of Environmental Care in Islamic Education

The environment plays a crucial role in the sustainability of human life and that of other living things. Law No. 32 of 2009 on Environmental Protection and Management defines the environment as a spatial entity encompassing all objects, forces, conditions, and living things, including humans and their behavior, that influence the continuity of life and well-being. This definition emphasizes that the environment is not limited to physical aspects, but also encompasses social and cultural aspects that contribute to the sustainability of ecosystems (Macpherson et al., 2010). Therefore, environmental management requires a holistic and sustainable approach to maintain ecosystem balance. Emil Salim, an Indonesian environmental expert, explains that the environment is a combination of physical conditions, such as land, water, solar energy, minerals, and flora and fauna, with institutional aspects that encompass human decisions in utilizing these resources. This perspective underscores the importance of a balance between the utilization of natural resources and the policies that govern them. For example, in sustainable development policies, the government implements the concept of a green

economy that emphasizes resource efficiency and reducing environmental impacts in industrial development. One example is the implementation of Government Regulation No. 46 of 2017 concerning Environmental Economic Instruments which aims to encourage economic incentives for business actors who implement environmentally friendly practices (Shaw et al., 2009).

Lawrence Green views the environment as everything around humans that influences their growth, development, and survival. In Green's view, the environment encompasses not only physical factors such as water and air, but also social aspects such as education and the economy. This understanding aligns with the concept of human ecology, which emphasizes the reciprocal relationship between humans and their environment. For example, in environmental education in schools, an experiential learning-based approach can be applied to raise students' awareness of the importance of preserving ecosystems. Programs like *Adiwiyata*, developed by the Ministry of Environment and Forestry, are concrete implementations of this thinking, where schools are encouraged to become institutions that care about and cultivate an environmental culture (Friedel et al., 2011).

On the other hand, MacKinnon defines the environment as a unit consisting of interacting living and non-living things. This perspective is closer to the ecosystem approach, which emphasizes the interdependence between biotic and abiotic components within an environment. In practice, this approach is widely used in environmental conservation policies, such as the establishment of protected areas and national parks to maintain ecosystem balance. For example, the management of Ujung Kulon National Park, which aims to preserve the Javan rhinoceros, an endangered species, demonstrates how the interaction between the environment and conservation policies can support each other in efforts to preserve biodiversity (Nissanke & Thorbecke, 2010).

Based on the various theories presented, the concept of the environment can be understood as a comprehensive construct, encompassing not only physical ecological aspects but also social, cultural, economic, and public policy dimensions. The variety of perspectives offered by experts demonstrates that the environment cannot be viewed partially or separately from human life. Therefore, environmental management and preservation efforts require a multidimensional approach that considers the interrelationships between these factors. This holistic understanding emphasizes that successful environmental management depends heavily on the integration of scientific knowledge, social awareness, and the support of sustainable and equitable policies (Khan et al., 2013).

In Islam, preserving the environment is not just a physical activity, but also part of worship and the implementation of the values of monotheism, trustworthiness, and *ihsan*. Several verses in the Qur'an, such as QS. Al-A'raf: 31 and QS. Al-Baqarah: 205, emphasize the importance of maintaining environmental balance and avoiding damage. The Qur'an emphasizes the importance of maintaining environmental balance and avoiding damage to the earth, as stated in several verses, such as QS. Al-A'raf: 31 and QS. Al-Baqarah: 205. In QS. Al-A'raf: 31, Allah says: "O children of Adam! Wear your beautiful clothes at every mosque, and eat and drink, but do not be excessive. Indeed, Allah does not like those who are excessive." This verse teaches the principle of balance in life, including in the consumption and utilization of natural resources (Al-Qur'an, 2019). Excessive consumption of anything, whether food, energy, or other natural resources, can lead to exploitation that disrupts the balance of the ecosystem. Therefore, the Islamic concept of

wasathiyah (moderation) can be applied in everyday life to create environmentally responsible consumption patterns (Burke, 2013).

Meanwhile, in QS. Al-Baqarah: 205, Allah warns about those who cause corruption on earth: "And when he turns away (from you), he seeks to cause corruption on earth, destroying crops and livestock, and Allah does not like corruption." This verse is relevant to current environmental issues, where various human actions such as deforestation, pollution, and excessive exploitation of resources cause the destruction of ecosystems. This verse emphasizes that destroying the environment is an act that is disliked by Allah, so that humans as caliphs on earth have a responsibility to maintain the balance of nature (Palmer, 2014).

In the context of environmental policy, the teachings of the Qur'an can serve as a foundation for building ecological awareness based on Islamic values. For example, the Islamic concept of *rahmatan lil 'alamin* (blessing for the universe) can be applied in sustainable development policies that are oriented not only toward economic profit but also toward environmental and social well-being. Programs such as eco-Islamic boarding schools and environmental-based schools that teach Islamic values about responsibility for nature are concrete examples of the implementation of these principles in everyday life (Ghosh, 2015). Thus, Islamic teachings on environmental balance emphasize that preserving nature is not merely an ecological obligation but also a form of worship and moral responsibility that must be realized through concrete actions by every individual and society.

Building Environmentally Caring Characters through Ecoschool

The Islamic character expected to develop through the implementation of Ecoschools includes the values of responsibility, discipline, social awareness, and a love for the environment. Several previous studies have shown that schools that integrate the Ecoschool concept with an Islamic-based approach are able to increase students' ecological awareness while strengthening their spiritual dimension. Through structured environmental learning and activities, students are not only encouraged to understand the importance of preserving nature but also to interpret it as part of their religious worship and mandate (Anwiyah et al., 2021). Thus, environmental awareness is positioned not merely as a technical practice but as a manifestation of Islamic values in everyday life.

Character education itself is an essential element in shaping individuals with noble character and integrity. From an Islamic perspective, Imam Al-Ghazali views character as the result of a process of cultivating noble morals built through continuous practice and exemplary behavior (Ahmad et al., 2025). The main goal of character education, according to Al-Ghazali, is to shape the perfect human being, a person who balances spiritual piety and social responsibility, both for life in this world and the hereafter. He emphasized that the process of character education focuses on perfecting, cleansing, and purifying the heart so that humans become closer to God. When these values are firmly embedded, good character will be inherent in a person and naturally reflected in their attitudes and behavior without the need for complex considerations (Khumairo et al., 2025).

On the other hand, Ki Hajar Dewantara, an Indonesian national education figure, developed the concept of character education based on the nation's cultural values. He emphasized the importance of moral formation in the attitudes, behavior, and character of students. According to Ki Hajar Dewantara, the three main principles of character

education are *silih asah* (mutually sharpening or improving intellectual abilities), *silih asih* (mutually caring and cultivating affection), and *silih asuh* (mutually guiding and protecting each other) (Mulyani et al., 2024). This educational model integrates three main components: the affective (moral), cognitive (mental), and psychomotor (physical) aspects, which aligns with the concept of holistic education.

In line with this approach, the Ministry of Education and Culture of the Republic of Indonesia has established eighteen character values as the main foundation in the implementation of national education. These values are designed to shape students who are not only academically superior, but also possess moral integrity, social sensitivity, and responsibility as citizens. These eighteen character values include the dimensions of religiosity, honesty, tolerance, discipline, hard work, creativity, independence, democracy, curiosity, national spirit, love of the homeland, appreciation for achievement, communication, love of peace, love of reading, social awareness, environmental awareness, and responsibility. The integration of these character values into the learning process is expected to foster students' personalities that are balanced between intellectual, emotional, and spiritual intelligence, while also being relevant to the social and environmental challenges of the contemporary era (Supranoto, 2015). These values include aspects of religiosity, honesty, tolerance, discipline, hard work, creativity, independence, democracy, curiosity, national spirit, love of the homeland, appreciation for achievement, good communication, love of peace, concern for the environment and society, and responsibility. These values are designed to create individuals who not only excel academically, but also have high moral and social awareness.

In comparison, Al-Ghazali's concept of character education is more oriented towards spirituality and the formation of a pure soul as a path to moral perfection. Meanwhile, Ki Hajar Dewantara emphasized the balance between moral, intellectual, and physical aspects in educating humans. The concept of character education developed by the Ministry of Education and Culture is more comprehensive by incorporating various values that can be applied in national and state life. Schools based on Islamic values, such as Nature Schools and eco-Islamic boarding schools, have adapted this concept of character education by teaching environmental awareness as part of noble morals (Kimmich, 2013). Thus, holistic character education can shape individuals who are not only intelligent and competent, but also have high social and environmental concerns. The originality of this research lies in the integration of the concept of eco-theology based on collaboration that involves all groups in the madrasah context, which does not only measure success from one perspective.

METHOD

The research approach used in this study is a mixed-methods approach, a combination of quantitative and qualitative methods (Sugiyono, 2020). This approach allows researchers to obtain a more comprehensive picture of the phenomenon under study by combining numerical analysis with in-depth exploration of aspects that cannot be measured quantitatively. In this study, quantitative methods were used to measure and analyze environmental behavior in students (Creswell, 2016). According to Kasiram, quantitative research is a process of discovering knowledge that uses numerical data as an analytical tool to explain a phenomenon (Kasiram, 2010). Quantitative data were obtained

through surveys or questionnaires given to students and teachers, then analyzed statistically to identify behavioral patterns and the factors that influence them. Meanwhile, qualitative methods were used to gain a deeper understanding of how environmental behavior is formed in students from the perspective of parents and alumni. This method refers to a descriptive analytical approach, where research aims to describe a phenomenon objectively and uncover the factors behind it (Azwar, 2016).

Qualitative data collection techniques were conducted through in-depth interviews with students, teachers, parents, and alumni, as well as observations of school activities related to environmental awareness, and document analysis such as school policies on environmental education (Creswell, 2018; Miles et al., 2014). By combining quantitative and qualitative methods, this study is expected to provide an integrative understanding of the development of environmental awareness attitudes among students, as well as the role of teachers and the school environment in shaping these environmentally conscious characters. The mixed-methods approach also allows for data triangulation, so that the research results are more valid and can provide more accurate recommendations in efforts to increase environmental awareness in schools.

The location of this research is MTs Asih Putera Cimahi, located in North Cimahi District, Cimahi City, West Java. The location was chosen based on the consideration that this madrasah is committed to strengthening character education, particularly environmental character. In addition, MTs Asih Putera Cimahi is known to be active in various environmental-based programs, such as greening activities and school waste management. In this study, the population studied were students, teachers, parents of students, and alumni of MTs Asih Putera Cimahi. The sample used in this study consisted of 85 students, 5 teachers, 5 parents, and 2 alumni. According to Sugiyono, sample selection in mixed-methods research must consider sufficient subject representation to produce data that can be analyzed statistically while providing in-depth insights in qualitative analysis (Sugiyono, 2019a). Therefore, this sample combination was chosen to gain a more comprehensive understanding of Ecoschool implementation.

The data in this study were collected through three main methods: questionnaires, interviews, and observations. The questionnaire was used to measure the role of ecotheology in students' environmental stewardship and teachers' understanding of the Ecoschool concept and its implementation in fostering environmental stewardship as a mandate. According to Creswell, questionnaires are the primary instrument in quantitative research, enabling researchers to obtain structured data from a large number of respondents (Creswell & Plano Clark, 2010). In this study, the questionnaire consisted of closed-ended questions with a Likert scale, aimed at obtaining data that could be analyzed quantitatively (Azwar, 2013).

The study population included students, teachers, parents, and alumni of MTs Asih Putera Cimahi. The study sample consisted of 85 students, 5 teachers, 5 parents, and 2 alumni. This sample selection took into account the principle of representativeness as proposed by Sugiyono, so that the data obtained could be analyzed statistically while providing depth of meaning in qualitative analysis (Sugiyono, 2019b). Data collection techniques included questionnaires, interviews, and observations. The questionnaire used a Likert scale to measure environmental attitudes and behaviors, while interviews and observations were used to understand Ecoschool practices contextually. Quantitative data analysis was conducted using descriptive statistics, while qualitative data were analyzed using thematic analysis techniques

through the stages of data reduction, data presentation, and conclusion drawing (Miles et al., 2020). To ensure the validity of the data, instrument validity and reliability tests ($\alpha = 0.876$) were conducted, as well as triangulation of sources and methods, so that the research results were objective and replicable in other madrasah contexts.

RESULTS AND DISCUSSION

Student Understanding

The analysis results show that in general, students at MTs Asih Putera Cimahi have demonstrated quite good attitudes and behaviors in the aspect of environmental concern. This finding is reflected in the average score achieved for each indicator analyzed. The highest score was in the aspect of environmental knowledge, with an average score of 94.29 and a standard deviation of 11.437. These results indicate that most students have a very good understanding of environmental issues and the importance of preserving nature. Data classification also supports this finding, where 94% of students are in the "good" category in environmental knowledge, while another 6% are in the "sufficient" category. No students were found to be included in the "poor" category, indicating that environmental programs and learning at the school have been running effectively in building students' basic ecological knowledge.

Meanwhile, environmental awareness had an average score of 78.57 with a standard deviation of 8.732, indicating that most students had a positive attitude towards environmental issues. The majority of students (63.1%) fell into the "good" category, while 35.7% were still in the "sufficient" category, and only 1.2% were classified as "poor." The frequency distribution also showed that most students scored above 80, indicating a relatively high level of environmental awareness and appreciation. However, the presence of 35.7% of students in the "sufficient" category indicates that improvements are still needed in instilling environmental awareness values so that their positive attitudes can be more consistently applied in everyday life.

On the other hand, the aspect of environmental care behavior showed relatively lower achievement compared to attitudes and knowledge. The average score for students' environmental care behavior was recorded at 75.48 with a standard deviation of 10.259, indicating variation in behavior among students. Categorically, the majority of students were in the "good" category with a percentage of 63.1%. However, there were still 31% of students in the "sufficient" category and 6% were classified as "poor." This finding indicates a gap between understanding and positive attitudes towards the environment and the implementation of actual behavior in everyday life. In other words, good knowledge and attitudes have not been fully internalized into consistent behavioral habits, so program strengthening and ongoing mentoring are needed to encourage more concrete environmental care practices.

Further analysis of the distribution of behavioral scores shows that there is considerable variation among students. For example, there are students who have a low score on environmental behavior (49), while the student with the highest score reached 91. This difference indicates that there are other factors that influence student behavior, such as the school environment, family support, or access to facilities that support an environmentally friendly lifestyle. The tendency that behavior (75.48%) is lower than knowledge (94.29%) and attitude (78.57%) confirms Al-Ghazali's theory that the formation of morals requires continuous practice (riyadhah) so that knowledge and attitudes can be manifested into

consistent behavior. This indicates that the practice of Green Education must be strengthened by teacher role models and support from the home environment, as reflected in the Sundanese proverbs *silih asah, silih asih, silih asuh*.

Environmental Care Attitude Statement					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	Good	53	63.1	63.1	63.1
	Enough	30	35.7	35.7	98.8
	Not enough	1	1.2	1.2	100.0
Total		84	100.0	100.0	

Figure 1. Environmental Care Attitude

Environmental Care Behavior Score					Cumulative
		Frequency	Percent	Valid Percent	Percent
Valid	49	1	1.2	1.2	1.2
	53	2	2.4	2.4	3.6
	56	2	2.4	2.4	6.0
	58	2	2.4	2.4	8.3
	60	5	6.0	6.0	14.3
	62	1	1.2	1.2	15.5
	64	2	2.4	2.4	17.9
	67	1	1.2	1.2	19.0
	69	4	4.8	4.8	23.8
	71	4	4.8	4.8	28.6
	73	7	8.3	8.3	36.9
	76	15	17.9	17.9	54.8
	78	6	7.1	7.1	61.9
	80	10	11.9	11.9	73.8
	82	3	3.6	3.6	77.4
	84	2	2.4	2.4	79.8
	87	6	7.1	7.1	86.9
	89	5	6.0	6.0	92.9
	91	6	7.1	7.1	100.0
	Total	84	100.0	100.0	

Figure 2. Environmentally Concerned Behavior

Teacher Understanding

Based on the results of descriptive statistical processing, the level of teacher understanding of the Ecoschool concept at MTs Asih Putera Cimahi is in the relatively good category. The average score obtained was 79.72 with a standard deviation of 6.746, which indicates that the variation in understanding between respondents is still within reasonable limits. The lowest score for teacher understanding was recorded at 65, while the highest score reached 90, with a total accumulated score of 1435 from 18 respondent teachers. Categorically, the majority of teachers, namely 66.7%, have a good level of understanding of the Ecoschool concept, while another 33.3% are in the sufficient category. However, this study noted that there were 66 incomplete data, so the total number of respondents analyzed in this study was 84 people.

The results of the correlation test were conducted to determine the relationship between teacher understanding and student attitudes, behavior, and knowledge regarding the Ecoschool concept. The null hypothesis (H_0) states that there is no relationship between teacher understanding and student attitude, behavior, and knowledge variables, while the alternative hypothesis (H_a) states the opposite. Based on the results of the Pearson correlation analysis, a correlation coefficient value of -0.322 was obtained with a significance level of 0.192. Because the significance value is greater than 0.05, H_0 is accepted and H_a is rejected, which means there is no significant relationship between teacher understanding and student attitudes, behavior, and knowledge regarding the Ecoschool concept. Thus, although teachers have a relatively good level of understanding of this concept, their understanding does not directly correlate with how students understand and apply the Ecoschool concept in everyday life. H_0 : There is no relationship between teacher understanding and student attitudes, behavior, and knowledge regarding the Ecoschool concept. H_a : There is a relationship between teacher understanding and student attitudes, behavior, and knowledge regarding the concept of green education.

If $\text{Sig} < 0.05$, then H_0 is rejected and H_a is accepted. If $\text{Sig} > 0.05$, then H_0 is accepted and H_a is rejected.

Table 1. Correlation of Student and Teacher Questionnaire Scores

<i>Correlations</i>			
		<i>Skor Angket Peserta Didik</i>	<i>Skor Angket Guru</i>
<i>Skor Angket Peserta Didik</i>	Pearson Correlation	1	-.322
	Sig. (2-tailed)		.192
	N	84	18
<i>Skor Angket Guru</i>	Pearson Correlation	-.322	1
	Sig. (2-tailed)	.192	
N		18	18

Based on the results of the statistical test which showed a significance value of 0.192 (> 0.05), the null hypothesis (H_0) was accepted and the alternative hypothesis (H_a) is rejected. Thus, it can be concluded that there is no significant relationship between teacher understanding and students' attitudes, behavior, and knowledge of the concept of green education.

Implementation of Ecotheology at MTs Asih Putera Cimahi

The school has implemented various Ecoschool programs designed to raise awareness and foster environmental stewardship among students. One key initiative is the waste management program, which includes the establishment of a waste bank and the implementation of a waste sorting system based on Islamic principles of cleanliness. This program not only serves to manage waste in a more orderly and sustainable manner, but also serves as an educational tool for students to understand the importance of reducing waste at the source. Through this program, students are accustomed to reducing the use of single-use plastics and are encouraged to seek more environmentally friendly alternatives, such as bringing their own food containers and water bottles from home. In addition, the school actively involves students in recycling activities, one of which is the creation of eco-bricks, which is carried out routinely every two to three weeks. This activity is expected to foster ecological responsibility and build positive habits in students' daily lives.



Figure 3. Interview with Principal and Teacher in MTs Asih Putera Cimahi

In addition to focusing on waste management and recycling, schools also organize various greening programs, such as tree planting and plant care activities in the school area. These activities not only have a positive impact on environmental sustainability but also serve as a learning medium for students to understand the importance of maintaining the balance of nature as taught in Islamic values. Through direct involvement in each stage of the activity, students are encouraged to develop ecological awareness while fostering a sense of responsibility towards their surroundings. This active participation is expected to shape a character of sustainable environmental care, so that these values of care are not only practiced at school, but also applied in everyday life within the family and community (Hallinger & Liu, 2016).

Schools implement integrated learning by integrating environmental materials into religious studies and science subjects. For example, in English lessons, students are given environmental-based projects that teach them how to recycle used materials into DIY crafts. Furthermore, teachers personally incorporate discussions related to environmental issues into the classroom, both by conveying the negative impacts of environmental

pollution and by encouraging students to share their personal experiences related to environmental issues in their neighborhoods. With these various programs, schools strive to create a culture of environmental awareness that not only lasts while students are at school but can also be carried over and applied in their daily lives. However, for a broader impact, synergy with the community and government is needed to support the optimal formation of environmentally conscious characters (Zhang et al., 2018).

Based on interviews with observations of parent A, with ecology learning at school, children are more concerned about animals at home (chickens) and are accustomed to sorting waste, organic and inorganic. Reduced plastic use, by diligently bringing tumblers and food containers for snacks in the canteen. Meanwhile, from parent B, that their child already understands not to litter, but to reduce plastic use still needs to be conditioned (Jefferson-Buchanan, 2016). As for interviews with 2 alumni, basically they feel the benefits of learning to love the environment while at MTs Asih Putera. Until now, the habit of living clean, disposing of waste in its place, sorting waste, and reducing the use of plastic materials are positive impacts of past learning obtained at MTs Asih Putera.

Based on interviews with eighth-grade English teachers, green education has been integrated into the learning process through a unit of material that addresses the environment. In this unit, students are given a final project in the form of recycling used materials into DIY (do-it-yourself) creations. This project is designed not only to foster students' awareness and concern for the environment but also as a medium for learning English. In the process of presenting the project results, students are trained to understand and use language structures, especially auxiliary verbs. will And have to, in explaining the plans, obligations, and benefits of the recycled products they make. This way, learning becomes more contextual, integrative, and meaningful (Kaliannan & Adjovu, 2015).

In addition to these special units, teachers also personally incorporate environmental conservation tips into the classroom and provide examples of the negative impacts that can occur if the environment is not cared for. Teachers often engage students in discussions about their experiences with environmental issues around their homes, such as water pollution, the unpleasant odor of garbage piles, and pollution from burning garbage. These discussions often broaden students' horizons, as they realize that these issues directly impact their well-being. Students' responses to environmental materials are generally quite positive. Many demonstrate enthusiasm in understanding and applying green education concepts (Melo et al., 2018). However, some students are still less enthusiastic about participating in environmental learning. This is likely due to a lack of awareness of environmental issues, leading them to view them as something commonplace and not requiring special attention.

One of the biggest challenges in teaching green education is the tendency to normalize environmental issues. Many students grow up in poor environmental conditions, thus viewing pollution or poor waste management as normal. Furthermore, another challenge is the lack of cooperation from external parties, such as local residents, local government, and law enforcement, in supporting schools' efforts to implement environmental education. Without synergy from various parties, the goal of fostering environmental awareness in students becomes more difficult to achieve optimally. At the school level, an eco-school program is part of the green education habit (Rosnaningsih & Putra, 2025). This program includes providing separate trash bins at various locations, a policy for students to bring their own food containers, making eco-bricks, and managing organic waste for

composting. Furthermore, the school foundation regularly holds green education workshops every semester to strengthen students' understanding and commitment to the environment.

The level of student participation in this program is quite high and has a significant impact on the sustainability of the school program. One policy implemented is a ban on students purchasing food outside of school to reduce the use of single-use plastic. Instead, they bring their own lunchboxes, a practice that is consistently implemented. Furthermore, students actively make at least one eco-brick every 2-3 weeks from plastic waste brought to school. Waste sorting has also been running well through regular supervision by the school. Ideally, this program can foster environmental awareness in students. However, teachers believe that the implementation of this awareness tends to be effective only within the school environment. To create broader and more sustainable environmental awareness, support is needed from various parties outside the school, including families, the community, and government agencies. Without a shared perception and commitment from various parties, green education provided in schools may not have an optimal impact on students' lives outside the school environment.

Challenges in Implementing Ecotheology

Although schools have attempted to implement the Ecoschool concept through various programs, several challenges remain. One major challenge is the lack of supporting resources, such as adequate recycling facilities and environmental laboratories. Although schools have implemented waste management policies through the provision of segregated waste bins and the production of eco-bricks, supporting facilities for recycling activities are still limited. This hinders the effectiveness of environmental programs aimed at teaching students about more sustainable waste management (Ay et al., 2025). Furthermore, some students still lack a clear understanding of the relationship between Islam and environmental stewardship. As revealed in an interview with a teacher, some students lack awareness that environmental issues directly impact their lives. Students often normalize polluted environments, such as the smell of garbage or air pollution from burning waste, so they do not see them as serious problems that need to be addressed immediately. This lack of awareness leads some students to be less enthusiastic about participating in environmental programs implemented in schools. Teachers also need to provide additional understanding through classroom discussions to raise students' awareness of the importance of protecting the environment in accordance with Islamic teachings (Prihatmoko, 2020).

Another challenge faced in implementing Ecoschools is the limited time allocated within the curriculum to accommodate more in-depth environmental education activities. Teachers who have attempted to integrate environmental issues into subjects, such as English, often face limited learning time, preventing comprehensive discussions. Although learning units or themes related to the environment exist, their implementation tends to be limited to specific activities, such as DIY craft projects utilizing recycled materials. Furthermore, teachers generally only have a short time at the beginning or end of a lesson to insert additional material on environmental awareness. This situation results in environmental learning not being optimally and comprehensively integrated into the entire school curriculum (Nurlila & La Fua, 2022).

In addition to internal factors, external obstacles also pose significant challenges to efforts to foster sustainable environmental awareness. One major obstacle is the minimal involvement of stakeholders outside of schools, such as the surrounding community, local government, and law enforcement. Interviews with teachers revealed that environmental education cannot be effective if it is solely the responsibility of the school institution; it requires synergy with the broader social environment. Policy support, community role models, and enforcement of environmental regulations significantly influence the formation of student habits. When the environment outside of school does not reflect values of environmental stewardship, students tend to practice environmentally friendly behaviors only in the classroom, without sustainability at home or in the community. This situation demonstrates the importance of cross-sector collaboration for environmental education to produce consistent and long-term behavioral changes (Saputra et al., 2025).

To address these challenges, schools need to enhance collaboration with various parties to strengthen Ecoschool implementation. Providing more adequate facilities, increasing student awareness through more contextual learning methods, and synergy between schools, communities, and the government will be important steps in creating a sustainable culture of environmental awareness. The implications of this research indicate that the results of the study can serve as a model for implementing Islamic theology-based Ecoschool in secondary education units for schools/madrasas, as well as serve as a guide for teachers in integrating environmental values into lesson plans, particularly in Islamic Religious Education (PAI) and Science (IPA) subjects. For students, this research is useful in strengthening the character of *ihsan* (respect for nature) through the habituation of ecological worship (Adzani et al., 2024). Furthermore, the findings of this study can also serve as a basis for the government and environmental activists in formulating policies for the development of Green Islamic Education nationally, and provide opportunities for future researchers to expand the study through comparative studies between *Adiwiyata* and non-*Adiwiyata* madrasas, thereby further developing research contributions in the scientific realm.

CONCLUSION

This study concludes that ecotheology education at MTs Asih Putera Cimahi has been quite effective in fostering environmental awareness among students. Waste management programs, eco-brick production, and the integration of environmental conservation values into Islamic Religious Education (IS) learning have fostered awareness that protecting the earth is part of the Islamic mandate and worship. The school's policy of prioritizing an environmentally friendly culture also demonstrates consistency in shaping students' sustainable behavior. However, the implementation of Green Education still faces several obstacles, such as limited supporting facilities, a lack of understanding among some students regarding the relationship between Islamic teachings and ecology, and a lack of external support to support the program's sustainability throughout the community. Based on these findings, strengthening measures are needed, such as expanding the integration of environmental education throughout the curriculum, improving environmental practice facilities, and providing more optimal training for teachers and students to strengthen environmental literacy based on Islamic values. Schools are also advised to expand partnerships with communities and related institutions to support the implementation of

environmental programs, while encouraging the active involvement of parents and the community so that environmental awareness behavior does not stop at school but continues as a daily culture. With a focused and collaborative strategy, ecotheology education is expected to become a model for developing sustainable environmental character within Islamic educational institutions. Thus, ecotheology education is not merely a strategy for environmental conservation, but also a manifestation of worship and the mandate of the caliphate in shaping Islamic ecological character. MT Asih Putera Cimahi has proven capable of integrating the cognitive, affective, and psychomotor domains of the environment and transforming students into green ambassadors who bring a culture of environmental care to their families and communities. This model can be replicated and developed as a national Green Islamic Education standard.

REFERENCES

- Adzani, I. A., Azizah, K. N., Adiwinata, N. J., & Marthania, W. (2024). Implementasi Ekopedagogi Dalam Pembelajaran Sekolah Dasar: Meningkatkan Kesadaran Lingkungan Dan Keterlibatan Siswa [Implementation of Ecopedagogy in Elementary School Learning: Increasing Environmental Awareness and Student Engagement]. *Jurnal Pendidikan, Bahasa Dan Budaya*, 3(1), 106–115. <https://doi.org/10.55606/jpbb.v3i1.2730> [In Indonesian]
- Ahmad, V. I., Ali, N., & Zuhriyah, I. A. (2025). Islamic Values in Environmental School Culture: Character Formation and Challenges. *EDUKASIA Jurnal Pendidikan Dan Pembelajaran*, 6(1), 267–280. <https://doi.org/10.62775/edukasia.v6i1.1400>
- Al-Qur'an, T. P. T. (2019). *Al-Qur'an dan Terjemahannya Edisi Penyempurnaan [The Qur'an and its Translation, Improved Edition]* (1st ed.). Lajnah Pentashihan Mushaf Al-Qur'an.
- Amrullah, H., & Herdiansyah, H. (2019). The Analysis of Green School Program Impact on Environmental Management Behavior and Psychology of High School Students in Jakarta. In ICOMHER (Ed.), *Proceedings of the Proceedings of the 1st EAI International Conference on Medical And Health Research, ICoMHER November 13-14th 2018, Padang, West Sumatera, Indonesia* (pp. 1–6). EAI. <https://doi.org/10.4108/eai.13-11-2018.2283821>
- Anwiyah, R., Rahmatullah, A. S., & Fauzan, A. (2021). Islamic Character Values In Ecological Education Practices At Sanggar Anak Alam (Salam) Nitiptayan Bantul. In *Profetika: Jurnal Studi Islam* (Vol. 22, Issue 2). <https://doi.org/10.23917/profetika.v22i2.16662>
- Ay, S., Atasoy, E., & Güleç, S. (2025). Evaluation of Eco-School Programs from the Perspective of School Principals: The Case of Bursa Province. *Anadolu Journal of Educational Sciences International*, 15(2), 655–678. <https://doi.org/10.18039/ajesi.1527069>
- Azwar, S. (2013). *Metode Penelitian [Research methods]*. Pustaka Pelajar.
- Azwar, S. (2016). *Metode Penelitian [Research methods]*. Pustaka Pelajar.
- Burke, J. F. (2013). Quixote's soldiers: A local history of the Chicano movement. *The Social Science Journal*, 50(4), 405–407. <https://doi.org/10.1016/j.socij.2013.10.001>
- Creswell. (2016). *Qualitative Inquiry and Research Design: Choosing Among Five Approaches*. Sage publications.

- Creswell, J. W. (2018). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Sage Publications.
- Creswell, J. W., & Plano Clark, V. L. (2010). Mixed Methods Design. In *Encyclopedia of Research Design* (pp. 1–305). SAGE Publications, Inc. <https://doi.org/10.4135/9781412961288.n245>
- Friedel, M. H., Grice, A. C., Marshall, N. A., & van Klinken, R. D. (2011). Reducing contention amongst organisations dealing with commercially valuable but invasive plants: The case of buffel grass. *Environmental Science & Policy*, 14(8), 1205–1218. <https://doi.org/10.1016/j.envsci.2011.08.001>
- Ghosh, S. (2015). Environmental standards and political federalism: Do labor legislations matter? *Environmental Development*, 16, 15–30. <https://doi.org/10.1016/j.envdev.2015.06.002>
- Hallinger, P., & Liu, S. (2016). Leadership and teacher learning in urban and rural schools in China: Meeting the dual challenges of equity and effectiveness. *International Journal of Educational Development*, 51, 163–173. <https://doi.org/10.1016/j.ijedudev.2016.10.001>
- Hermawan, A. H., Nasir, T. M., Sabarudin, M., Sugiana, Y., Ambya, R., Hasanah, A., & Arifin, B. S. (2025). Systematic Review of Character Education Integrating Islamic and Global Moral Values. *Ta'dibuna: Jurnal Pendidikan Islam*, 14(4), 267–289. <https://doi.org/10.32832/tadibuna.v14i4.19848>
- Husin, A., Helmi, H., Nengsih, Y. K., & Rendana, M. (2025). Environmental Education in Schools: Sustainability and Hope. *Discover Sustainability*, 6(1), 41. <https://doi.org/10.1007/s43621-025-00837-2>
- Jefferson-Buchanan, R. (2016). Traces of discourses and governmentality within the content and implementation of the Western Australian Fundamental Movement Skills programme (STEPS Professional Development). *Education 3-13*, 44(5), 525–536. <https://doi.org/10.1080/03004279.2016.1169483>
- Kaliannan, M., & Adjovu, S. N. (2015). Effective Employee Engagement and Organizational Success: A Case Study. *Procedia - Social and Behavioral Sciences*, 172, 161–168. <https://doi.org/10.1016/j.sbspro.2015.01.350>
- Kasiram, M. (2010). *Metodologi penelitian: Kualitatif-Kuantitatif [Research methodology: Qualitative-Quantitative]*. UIN-Maliki Press.
- Khan, S., Shahnaz, M., Jehan, N., Rehman, S., Shah, M. T., & Din, I. (2013). Drinking water quality and human health risk in Charsadda district, Pakistan. *Journal of Cleaner Production*, 60, 93–101. <https://doi.org/10.1016/j.jclepro.2012.02.016>
- Khumairo, S., Chasanah, I., & Salsabila, A. A. P. (2025). Habituation of Green Education Based on Islamic Values: Instilling Environmental Ethics from an Early Age. *Al-Abshar: Journal of Islamic Education Management*, 4(1), 93–105. <https://doi.org/10.58223/al-abshar.v4i1.463>
- Kimmich, C. (2013). Linking action situations: Coordination, conflicts, and evolution in electricity provision for irrigation in Andhra Pradesh, India. *Ecological Economics*, 90, 150–158. <https://doi.org/10.1016/j.ecolecon.2013.03.017>

- Macpherson, A. J., Principe, P. P., & Smith, E. R. (2010). A directional distance function approach to regional environmental–economic assessments. *Ecological Economics*, 69(10), 1918–1925. <https://doi.org/10.1016/j.ecolecon.2010.04.012>
- Marwiji, M. H., Wahyudin, W., Setiono, J., & Ruswandi, U. (2024). Integration Of Environmental Education (Green Moral) Through The Learning Of Islamic Religion Education In School. *JHSS (Journal of Humanities and Social Studies)*, 08(01), 209–215. <https://doi.org/10.33751/jhss.v8i1.9566>
- Maslani, M. (2023). Eco-Theology : Islamic Ethics and Environmental Transformation in Islamic Boarding Schools. *Edukasi Islami: Jurnal Pendidikan Islam*, 12(04), 1001–1018. <https://doi.org/10.30868/ei.v12i04.5132>
- Melo, P. C., Ge, J., Craig, T., Brewer, M. J., & Thronicker, I. (2018). Does Work-life Balance Affect Pro-environmental Behaviour? Evidence for the UK Using Longitudinal Microdata. *Ecological Economics*, 145, 170–181. <https://doi.org/10.1016/j.ecolecon.2017.09.006>
- Miles, M. B., Huberman, A. M., & Saldana, J. (2020). Qualitative Data Analysis : A Methods Sourcebook. In *Buku Teks Umum* (4th ed., p. 380). California : SAGE.
- Miles, M. B., Huberman, A. M., & Saldaña, J. (2014). *Qualitative Data Analysis: A Methods Sourcebook* (3rd ed.). SAGE Publications.
- Muhaimin, M. (2020). Pendidikan Lingkungan Hidup dalam Perspektif Islam [Environmental Education from an Islamic Perspective]. *Syaikhuna: Jurnal Pendidikan Dan Pranata Islam*, 11(1), 64–78. <https://doi.org/10.36835/syaikhuna.v11i1.3844> [In Indonesian]
- Mulyani, N., Koswara, D., & Darajat, D. (2024). Relevansi Konsep Silih Asih, Silih Asah, Silih Asuh dalam Membentuk Karakter Peserta Didik di Era Society 5.0 [The Relevance of the Concepts of Silih Asih, Silih Asah, Silih Asuh in Shaping Students' Character in the Era of Society 5.0]. *JSIM: Jurnal Ilmu Sosial Dan Pendidikan*, 5(4), 839–846. <https://doi.org/10.36418/syntaximperatif.v5i4.484> [In Indonesian]
- Nissanke, M., & Thorbecke, E. (2010). Globalization, Poverty, and Inequality in Latin America: Findings from Case Studies. *World Development*, 38(6), 797–802. <https://doi.org/10.1016/j.worlddev.2010.02.003>
- Nurlila, R. U., & La Fua, J. (2022). Implementation of School Policy in Maintaining Environmental Care in Indonesia. *Al-TA'DIB: Jurnal Kajian Ilmu Kependidikan*, 15(2), 126. <https://doi.org/10.31332/atdbwv15i2.5227>
- Palmer, J. (2014). Past remarkable: Using life stories to trace alternative futures. *Futures*, 64, 29–37. <https://doi.org/10.1016/j.futures.2014.10.002>
- Pamuji, S., & Mulyadi, Y. (2024). Formation Of Students' Character Through Islamic Education. *International Journal of Islamic Thought and Humanities*, 3(1), 26–35. <https://doi.org/10.54298/ijith.v3i1.183>
- Prihatmoko, D. D. (2020). Implementasi Kebijakan Pendidikan Lingkungan Hidup Di Sekolah Islam Terpadu Dalam Kajian Literatur [Implementation of Environmental Education Policy in Integrated Islamic Schools in Literature Review]. *Ulumuddin : Jurnal Ilmu-Ilmu Keislaman*, 10(2), 117–132. <https://doi.org/10.47200/ulumuddin.v10i2.433> [In Indonesian]

- Ramadhani, T., Widiyanta, D., Sumayana, Y., Santoso, R. Y., Agustin, P. D., & Al-Amin. (2024). The Role Of Character Education In Forming Ethical And Responsible Students. *IJGIE (International Journal of Graduate of Islamic Education)*, 5(2), 110–124. <https://doi.org/10.37567/ijgie.v5i2.3064>
- Rosnaningsih, A., & Putra, A. S. (2025). Cahaya Pengabdian Edukasi Sekolah Hijau (Green School) untuk Menanamkan Karakter Peduli Lingkungan Pada Siswa Sekolah Dasar Cahaya Pengabdian [Cahaya Pengabdian Green School Education Service to Instill Environmentally Caring Character in Elementary School. *Cahaya Pengabdian*, 2(1), 22–30. <https://doi.org/10.61971/cp.v2i1.160> [In Indonesian]
- Ruswanda, A. S. (2025). Mengkaji Konsep Ekoteologi Menurut Nasaruddin Umar [Examining the Concept of Ecotheology According to Nasaruddin Umar]. *Jurnal Keislaman*, 8(2), 532–545. <https://doi.org/10.54298/jk.v8i2.667> [In Indonesian]
- Safwannur, S., Permana, H. A., Triansyah, A. A., Nasir, T. M., & Sari, I. I. (2023). Peran Guru PAI dalam Pembentukan Karakter Kedisiplinan Santri di MI Raudhatul Ulum Sakatiga Indralaya Ogan Ilir [The Role of Islamic Religious Education Teachers in the Formation of Disciplinary Character of Students at MI Raudhatul Ulum Sakatiga Indralay. *AT-TA'DIB*, 7(1). <https://doi.org/10.32832/at-tadib.v7i1.19541> [In Indonesian]
- Saputra, T. A., Baharudin, & Afriyadi, M. M. (2025). Menumbuhkan Kesadaran Ekologis Siswa Sejak Dini : Menjadikan Lingkungan Sebagai Sekolah Kehidupan [Cultivating Students' Ecological Awareness from an Early Age: Making the Environment a School of Life]. *Muallimun: Jurnal Kajian Pendidikan Dan Keguruan*, 5(1), 1–21. <https://doi.org/10.23971/muallimun.v5i1.10007> [In Indonesian]
- Shaw, A., Sheppard, S., Burch, S., Flanders, D., Wiek, A., Carmichael, J., Robinson, J., & Cohen, S. (2009). Making local futures tangible—Synthesizing, downscaling, and visualizing climate change scenarios for participatory capacity building. *Global Environmental Change*, 19(4), 447–463. <https://doi.org/10.1016/j.gloenvcha.2009.04.002>
- Sugiana, Y., Nasir, T. M., & Badrudin, B. (2025). Islamic Character Education: A Conceptual Linguistic Approach to Ittibā' and Mulḥaq Based on Surah At-Tūr 21. *Al-Muhajirin International Conference*, 1(1), 149–154.
- Sugiyono. (2019a). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D [Quantitative, Qualitative, and R&D Research Methods]*. Alfabeta.
- Sugiyono. (2019b). *Metode Penelitian Kuantitatif, Kualitatif, dan R&D [Quantitative, Qualitative, and R&D Research Methods]*. Alfabeta.
- Sugiyono. (2020). *Metode Penelitian Kualitatif [Qualitative Research Methods]*. Alfabeta.
- Supranoto, H. (2015). Implementasi Pendidikan Karakter Bangsa dalam Pembelajaran SMA [Implementation of National Character Education in High School Learning]. *PROMOSI (Jurnal Pendidikan Ekonomi)*, 3(1), 36–49. <https://doi.org/10.24127/ja.v3i1.141> [In Indonesian]
- White, L. (1967). The Historical Roots of Our Ecologic Crisis. *Science*, 155(3767), 1203–1207. <https://doi.org/10.1126/science.155.3767.1203>

- Xiong, Z., Song, Y., & Zhu, R. (2025). Pedagogical Strategies for Teaching Environmental Literacy in Secondary School Education: A Systematic Review. *Sustainability*, 17(20), 9104. <https://doi.org/10.3390/su17209104>
- Yamin, M., Ahmad, N., & Suhartini, A. (2022). Konsep Pendidikan Berwawasan Lingkungan dalam Perspektif Islam [The Concept of Environmentally Conscious Education from an Islamic Perspective]. *EDUKATIF: JURNAL ILMU PENDIDIKAN*, 4(4), 5852–5862. <https://doi.org/10.31004/edukatif.v4i4.3513> [In Indonesian]
- Zhang, C.-W., Li, F.-Y., Li, J.-F., Li, Y.-L., Xu, J., Xie, Q., Chen, S., & Guo, A.-F. (2018). Novel treatments for compatibility of plant fiber and starch by forming new hydrogen bonds. *Journal of Cleaner Production*, 185, 357–365. <https://doi.org/10.1016/j.jclepro.2018.03.001>



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