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Green Entrepreneur Learning Strategy in Strengthening Environmental Care Character for Sustainable Living

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ABSTRACT

Environmental care character education is one of the main foundations of living a sustainable lifestyle, especially for future educators who will work as social change agents. Examining green entrepreneurial learning techniques as a novel approach to assisting students by fostering environmental care values in the elementary school teacher education study program participants is the aim of this study. Students' ecological knowledge, feeling of social responsibility, and ability to think critically about environmental concerns may all be enhanced by introducing green entrepreneurship concepts into the curriculum, according to observations. Among the strategies employed are project-based learning (PjBL), multidisciplinary collaboration, and strengthening sustainability principles in all entrepreneurial undertakings. Methods: This research is descriptive and quantitative. The data analysis from expert validation results yielded an average score of 91, indicating exceptionally valid. The study's subjects were 112 pupils. Techniques for analyzing data that employ inferential statistics. Effectiveness testing is done using the analytical requirements test. The results show that this method not only shapes students' concerns about the environment but also inspires them to take an active role in developing creative, environmentally responsible solutions. According to this conclusion, the idea of green entrepreneurs should be more widely integrated into education in order to improve the nature of environmental care, which suggests that doing so will support sustainable development.

Keywords
Characters
Environmental Care
Green Entrepreneur
Learning Strategy
Sustainable Living

Introduction

Environmental challenges are no longer only an Indonesian problem; they are becoming a global one. Humanity, the planet Earth, prosperity, peace, and partnerships are the five interconnected issues that the Sustainable Development Goals (SDGs) were created to address in response to international requests. When people begin to act differently to preserve the environment, peace, and other living things, the earth will continue to be a good place to live [1]. People and the environment are intertwined components. Humans need a range of resources from the environment to meet their needs, and human activity will ensure that the ecosystem is sustainable.

Changes in moral orientation, a lack of environmental awareness, and actions like littering, environmental damage, and air pollution are the main causes of the annoyances of living in society [2], [3]. Some concerning practices disregard hygiene, such as the unclean school restrooms and the inability to distinguish between organic and inorganic trash [4]. Problems with waste are closely related to human social and economic activity. Waste from the packaging of consumer products made of paper, plastic, cans, and Styrofoam is among the many complex economic and social activities that contribute to the large amount of rubbish produced by a rising population. Because consumer goods packaging takes a long time to degrade, it pollutes the environment [5].

The necessity for Indonesians to be ecologically sensitive is brought home by this environmental problem. This indifference is caused by a character issue that presents an unclear image of the educational environment. Two morally superior countries are Japan and Taiwan [6]. Indonesia might learn from this country and start educating post-Gen Zers about character. According to current events, these individuals typically lead comfortable lives with inexpensive, straightforward, and easily accessible items. This implies that this ease of use pampers post-generation Z [7]. It is believed that millennial parents have traditionally faced adversity, which is why this incident happened. They therefore want to ensure that their offspring in the digital era do not have to experience the miseries of the past. Instead, though, parents often free their kids and lavish them with modern conveniences without teaching them how to be environmentally mindful or responsible consumers [8].

A variety of learning strategies may be used to successfully develop character education. To make sure that students comprehend the material being presented, teachers might employ a variety of techniques [9]. The development of a child's character requires habituation and modeling by parents and educators. Habituation also affects how students build their character by instilling moral values in them, which, if deeply rooted, allow them to do activities without being forced to [4]. Furthermore, habituation influences students' character development by fostering moral principles in them that, once established, permit them to engage in activities without restriction. In addition to the existing source materials that are thematically based on regional potential or local wisdom and employ a scientific approach, educators must employ additional instructional resources to increase students' understanding of the environment [10].

As a type of character education, primary school pupils can get a tri-center education by consistently promoting character ideals in the community, school, and family [8], [11]. Numerous studies have found that children are both victims and actors of climate change. However, nothing is said about preparing children to be compassionate adults and environmental actors [12]. Parents and educators must collaborate to address this issue in this particular case. Environmental problems resulting from children's insufficient understanding of the need to maintain healthy relationships with the environment [13].

PjBL strategies are starting to be used extensively learning activities since it is believed that they can adapt to students' different learning needs and speeds. Students can experiment with additional learning resources thanks to PjBL, which may lead to the emergence of distinct learning styles. One educational technique that can assist in raising educational standards in line with 21st-century demands and expectations, as well as Industrial Revolusion Era 4.0, is PjBL [14].

In the PjBL, the teacher offers suggestions about how to create green entrepreneurship by making eco-friendly crafts or using their ingenuity to recycle [15], [16]. In the era of the fourth industrial revolution, ecopreneurship is a chosen academic movement that uses a project-based. Environmental awareness and concern are used with attitudes and abilities while cultivating the character of environmental care. Post-generation Z students will be more involved in the learning process if technology is used to support it. To increase students' interest in theme learning in this context, teachers use PjBL strategies by asking them to produce a skill or product [17]. It, which blends online and e-learning with in-person project learning, is one of the learning innovations that may be applied today.

This PjBL may make learning more significant. Pupils who employ this kind of instruction will be more environmentally conscious and innovative in their use of trash to

create sustainable solutions. Project learning is a type of problem-based learning that encourages creativity by incorporating new knowledge derived from students' practical experiences [18]. As a result of collaborating with their instructors to finish a project, children will gain independence, creativity, maturity, and collaboration skills [19]. Decision-makers, including the top leadership, may readily reinforce the Green Entrepreneur application by enforcing environmental consciousness among entrepreneurs. Students, who will be the future generation of business owners, may be introduced to this idea at an early age [20], [21]. Educational institutions that have adopted the Adiwiyata program, for instance, urge all of their members to take care of the environment. Because of this tendency, environmental awareness is ingrained in children from a young age through government initiatives [22]. The existence of human rights, particularly the right to a good and healthy environment, and the attainment of ecological justice by refraining from environmental exploitation without considering environmental protection, as demonstrated by the findings of earlier research, demonstrate the fundamental relevance of both ideas [23], [24].

According to the Greek philosopher Aristotle, having great character involves living a life of moral behavior toward oneself and other people, that is, between one's knowledge, feelings, and acts [14]. If students already exhibit love and concern for the environment, they will work to protect, maintain, and defend the surrounding environment. Additionally, they will have a deep sense of belonging and a great fear of losing it [25]. Thus, students need to understand that if the last tree becomes extinct, humanity would have no purpose. Incorporating their curriculum into their classes is only one of the many ways teachers may teach pupils the value of environmental protection. Additionally, teachers may set an example for children by continuously exhibiting environmental responsibility [26]. By highlighting the learning method's character values, teachers may create teaching modules that can be used both alone and in conjunction with one another to help students build their character [27], [28].

According to the findings of earlier studies, using ecopreneur-based modules may improve ecological literacy, enabling students to manage environmental issues. It also encourages students to be excited about learning by enabling them to study the content freely [29]. Many entrepreneurs don't care about the environment around them; they are just interested in making money. As a result, unethical entrepreneurship causes significant pollution and environmental harm [30]-[32].

Students can build environmental consciousness to act in an ecologically responsible manner, in addition to studying potential environmental calamities and increasing their readiness to address the issue. Students must demonstrate the creativity of green entrepreneurship while using PjBL [33]-[35]. The curriculum development instructions published by the Ministry of Education, Culture, Research, and Technology, more specifically,

the Directorate of Learning and Student Affairs, are referred to as the 2024 higher education curriculum. This curriculum places a strong emphasis on the Outcome-Based Education (OBE) approach. The development of active learning was an effort to integrate an OBE-based curriculum with active learning strategies such as PjBL [13].

One of the instructional strategies that may be applied in classrooms is project- based learning. Character development can be aided by this type of education. Instructors use innovative teaching strategies that emphasize contextual learning through real-world projects like PjBL [36]. By solving real-world problems, students must be able to choose topics and suggest projects or products utilizing PjBL. PjBL and other learning challenges are believed to help students realize their full potential [37], [38]. The PjBL is a method utilized in the [39]. Project creation is the main learning exercise in this approach. By use of investigation, assessment, observation, and interpretation, PJBL enables students to acquire new knowledge, abilities, and constructive social attitudes while working together to produce a final product.

The methods employed are in line with the learning goals for graduates. In terms of attitude, graduates are expected to demonstrate concern for environmental protection and sustainability. In terms of knowledge, they should understand the basics of green business. With respect to unique abilities, they should be able to develop and implement environmentally responsible corporate initiatives while also adhering to the principles of basic education [17], [35].

One of the suggested learning strategies is PjBL, which motivates students to take a more active role in addressing project-based difficulties through investigation, synthesis, interpretation, and discovery [29], [33]. This is in line with the course's learning goals. In the era of rapid technological development, PjBL are now crucial. The phases of project design and completion may be carried out by future educators using collaborative learning strategies. Students should be able to take on project-based tasks and gain new knowledge and skills from these environmental issues in order to grow their attitudes, knowledge, and abilities [40].

Research on green entrepreneur learning techniques to help elementary school teachers develop environmentally conscious characteristics for sustainable living [41]. This study aims to examine the effectiveness of green entrepreneurial learning techniques as a novel approach to fostering environmental care values among students in the elementary school teacher education program. Specifically, the study seeks to enhance students' ecological knowledge, social responsibility, and critical thinking about environmental issues by integrating green entrepreneurship concepts into the curriculum through project-based learning, multidisciplinary collaboration, and the application of sustainability principles.

Materials and Methods

A. Type of research

This study employs experimental quantitative research. This study aims to investigate how the Green Entrepreneur Learning Strategy aids in the development of environmental awareness and sustainable living skills among elementary school teacher education program participants. Such studies might be used to assess the effectiveness of green entrepreneur learning strategies in raising environmental awareness. This type of research is often used in the field of education. This study used a pre-experimental, one-group pretest-posttest design. Using PjBL to improve the environmental care character of Elementary School Teacher Education Program and economic education students at FKIP Uhamka, the trial's effectiveness in ensuring the operation of the green entrepreneur learning strategy is evaluated through experiments. Students in the fifth semester of the Primary School Teacher Education Study Program and the Economic Education Study Program, who enrolled in entrepreneurial courses, participated in this study.

B. Subject of Research

The research subjects were Elementary School Teacher Education Program and Economics Education Program students in Semester V (five).

Table 1. Research Subject Distribution by Gender

No	Studi Program	Number Of Students	Number of Male	Number of Female
1	Elementary School Teacher Education Study Program	73	8	65
2	Economics Education Study Program	39	7	32

C. Techniques for Data Analysis

Information that has been gathered and shown as numerical values is known as quantitative data. The collected data was then analyzed quantitatively in the form of descriptions using smartPLS [31] [42].

Results

A. An Improvement of the Environmental Care

The typical steps that set the PjBL strategy apart from others are as follows: (1) identifying fundamental questions that are pertinent to the real world and serve as the basis for project assignments; (2) developing project designs in collaboration with students to enhance the sense of ownership of the project; (3) creating project implementation schedules with explicit time constraints; (4) tracking project progress throughout the learning process; (5) evaluating project outcomes; and (6) assessing the learning experience. In order to make learning more

relevant and useful, this method places a strong emphasis on students actively participating in the planning and execution of projects pertaining to environmental issues in their community.

B. The field test

In a field test study of the Green Entrepreneur Learning Strategy, 112 students, 39 from the control group and 73 from the experimental group, participated in the PjBL methodology. The findings showed that pupils' understanding of environmental issues and sustainable living had significantly improved. The scores of both groups increased based on the results of the pretest and posttest, although the experimental class experienced a greater increase (posttest score: 70-100) than the control class (posttest score: 60-90). The comparison of prospective Elementary School Teacher Education Program students showed that students had the highest posttest score (97.5), while economics education students had an average score of 89.6. Normality and homogeneity tests confirmed the validity of the data. These results indicate that learning strategies that strengthen environmental awareness are effective at the level of economics education study program students and Elementary School Teacher Education Program students at the Faculty of Teacher Training and Education, Prof. Dr. Hamka University.

C. Requirement Test Analysis

The research sample consisted of 122 students, of whom 39 were from the experimental class and 73 were from the control class. The environmental character variable had a mean of 70 and a standard deviation of 8.6, ranging from 57.5 to 82.5. Due to their superior analytical capabilities, principal component regression and multiple regression were used in data collection and analysis.

To confirm the research findings, the data were assessed using the Partial Least Squares (PLS) approach, a multivariate statistical technique that can manage several response variables and explanatory factors at once. PLS is a helpful alternative to robust analytic approaches since the parameters of the final model stay mostly unchanged even when more sampling is done from the same population. The main advantages of PLS are its power to both explain and validate the relationship between latent variables, its ability to handle very small sample sizes, and its independence from the multivariate normal distribution of data. This investigation was conducted in line with the Structural Equation Modeling (SEM) approach utilizing SmartPLS software.

Average variance extracted (AVE), loading factors, and composite reliability are assessed to confirm the validity of the reflective measurement model.

The loading factor (LF) value > 0.60 indicates the indicator is valid (Table 2). Composite Reliability (CR) variable X = 0.882> 0.70 and variable Y above 0.60, indicating that both variables are reliable. AVE X1 = 0.602 > 0.50, meaning that 60.2% of the variation in items X1.1-

X1.7 is explained by variable X1, meeting the requirements of convergent validity. All items have LF> 0.60, so the indicators are valid and reliable in measuring their variables.

Table 2. Loading Factor

	X1	X2	Y1	Y2	Y3	Y4
X1.1	0.670					
X1.2	0.806					
X1.3	0.866					
X1.4	0.767					
X1.5	0.751					
X2.2		0.656				
X2.4		0.756				
X2.5		0.785				
X2.6		0.804				
X2.7		0.767				
X2.8		0.698				
Y1.1			0.795			
Y1.2			0.787			
Y2.4				0.811		
Y2.5				0.681		
Y3.5					1.000	
Y4.1						1.000

Table 3 presents the path coefficients and confidence intervals derived from the model estimation.

Table 3. Path Coefficients-Confidence Intervals

	Original Sample	Sample Mean (M)	2.5%	97.5%
Y1–› X1	-0.009	-0.001	-0.274	0.257
Y1–› X2	0.048	0.048	-0.345	0.397
Y2–› X1	0.330	0.334	0.114	0.524
Y2–› X2	0.152	0.135	-0.206	0.413
Y3–› X1	0.087	0.071	-0.286	0.346
Y3–› X2	-0.099	-0.102	-0.340	0.234
Y4–› X1	-0.196	-0.168	-0.396	0.165
Y4–› X2	-0.176	-0.136	-0.399	0.292

Table 4 presents the path coefficients among the observed variables. The findings demonstrate that several relationships exhibit moderate to strong associations, while others remain relatively weak.

Table 4 . Path Coefficients-Confidence Intervals Variable

	X1	X2	Y1	Y2	Y3	Y4
X1						
X2	0.117					
Y1	0.121	0.201				
Y2	0.385	0.179	0.589			
Y3	0.185	0.147	0.330	0.247		
Y4	0.109	0.153	0.423	0.413	0.432	

The issue of sustainability has become a major focus in higher education, particularly in the field of entrepreneurship learning. One relevant approach is the green entrepreneurship learning strategy, which is not only profit-oriented but also focuses on environmental concerns

and sustainability. To test this relationship, a structural model with PLS approach was used through SmartPLS software.

The next step is structural model testing, which uses substantive theory to explain how latent variables relate to one another. A structural model, namely the R-square, Q-square, and path coefficient test phases, is used to do this measurement. SmartPLS measurement analysis. Fig. 1 displays the outcomes of SmartPLS's internal model.

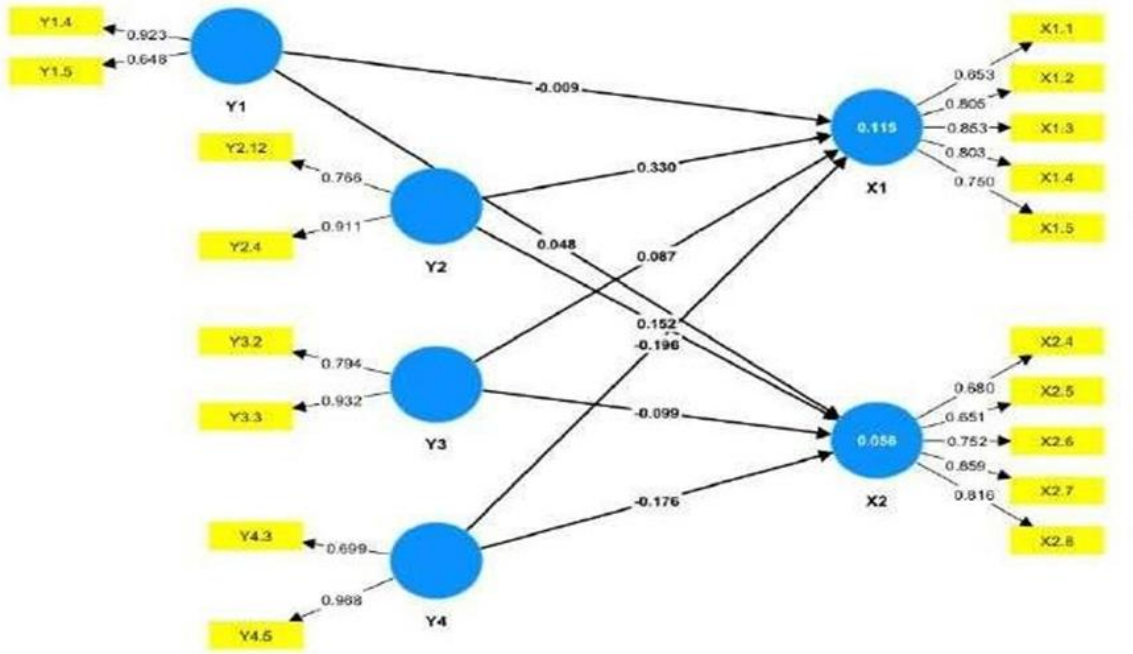

Fig. 1. Path Analysis Diagram

In this model, X is the endogenous variable while Y1–Y4 are the exogenous variables. More specifically, the link between X and Y1–Y4 is mediated by the mediator variable Y.

D. Structural Model

In this study, variable X1 represents Learning Strategy, while X2 represents Green Entrepreneurship. These variables act as endogenous variables that are assumed to influence the formation of environmentally conscious character. Meanwhile, variable Y functions as a mediator that bridges the influence of X on the indicator variables. The indicators from instruments that have been validated by expert judgment of environmental awareness measured through variables Y1–Y4 are [14]:

- Y1: Ecological awareness,
- Y2: Responsibility toward the environment,
- Y3: Pro-environmental behavior,
- Y4: Commitment to sustainability.

E. Structural Model Analysis Results

Structural model testing was conducted through three main stages:

1. Path Coefficients
    - The analysis results show that the Green Entrepreneurship Learning Strategy (X) has a significant effect on Environmental Awareness (Y).
    - This proves that PjBL, recycling practices, and green product innovation can strengthen students' awareness and attitudes towards environmental issues.
2. R-Square (R^2)
    - The R^2 value obtained for the mediator variable Y shows how much the learning strategy contributes to shaping environmental awareness.
    - For example, if R^2 = 0.60,2 it can be interpreted that 60,2% of the variation in the formation of environmental awareness is explained by the learning strategy applied.
    - This figure falls into the substantial category, proving that the learning strategy is effective.
3. Q-Square (Q^2) Predictive Relevance
    - Positive Q^2 value indicates that the model has good predictive relevance.
    - This means that the learning strategy is not only effective in theory but also capable of predicting the development of students' environmentally conscious character in practice.

These results show that green entrepreneurship learning strategies can serve as both an educational tool and a means of character transformation. By utilizing a practice-based approach (e.g., making organic soap, recycled bags, eco-bricks), students not only acquire entrepreneurial skills but also internalize values of environmental sustainability [43]. Furthermore, the existence of mediator Y (environmentally conscious character) explains that the learning strategy does not automatically produce sustainability indicators (Y1–Y4). Instead, these indicators are achieved after students develop awareness, responsibility, and commitment through the learning process.

Discussion

Before the learning process takes place, lecturers prepare a learning plan that also serves as a reference in the learning process. The flowchart of the learning strategy to strengthen environmental care character based on green entrepreneurship is as follows: Lecturers prepare a learning plan for the course learning outcomes that have been designed for one semester in the entrepreneurship course with the topic of green entrepreneurs oriented towards environmental care using the PjBL learning model. The learning outcome of this course is to foster young entrepreneurs with an environmentally conscious character. Next, students identify environmental problems. After finding problems, they discuss and

brainstorm green business ideas, plan projects (green business canvas), develop and create environmentally friendly products, then give presentations and reflections. Finally, the outcome is environmentally friendly products and the creation of environmentally conscious characters [44]. The more detailed stages are illustrated in Fig. 2.

Fig. 2. Flowchart of Learning Strategy to Strengthen Environmental Care Character based on Green Entrepreneurship

The Learning Strategy to Strengthen Environmental Care Character based on Green Entrepreneurship, students are able to produce environmentally friendly entrepreneurial products that have commercial value by utilizing used materials or household waste. The learning process cannot be completed in just one meeting. The first thing that needs to be done is to raise awareness and promote a strong understanding in order to foster an environmentally conscious character in students. We also educate the surrounding community by collaborating with the East Jakarta Environmental Agency. With this understanding and awareness, the community and students will also realize the importance of caring for the environment [45].

Fig. 3. Socialization and selection of household waste

The results of socialization and household waste selection (Fig. 3) are utilized in the form of products that can have selling value. The products produced by students include recycled bags, eco-bricks, organic soap from used cooking oil, compost/eco-enzyme soap, decorative lamps/decorations from used glass bottles, mini furniture from used pallet wood, and fabric scrap accessories [46], [47]. Further details on the materials and their benefits are provided in the following image. Fig. 4 is an example of environmentally friendly products produced by fifth-semester students.

Fig. 4. Environmentally friendly entrepreneurial products produced by students

Prospective educators may find it simpler to adopt project-based sustainable learning, something that many instructors find difficult, by utilizing [32],[48]. By using suitable instructional models and learning methodologies, it is possible to successfully integrate thematic integration of character education within the curriculum and academic topics.

Therefore, using the PjBL techniques in conjunction with a green entrepreneurship strategy has a lot of promise to raise students' awareness of environmental issues and encourage a dedication to sustainable living [49].

Conclusion

According to the study's findings, green entrepreneurial character development can assist pre-service teachers in strengthening their environmental awareness abilities. Particularly when employing a PjBL, instructors and students in entrepreneurship courses should promote environmental awareness character through the use of suitable learning tools. Prospective educators who wish to pursue entrepreneurship have not been prepared with an understanding of green entrepreneurship, particularly in Indonesia. Prospective educators must convey the value of environmental stewardship even if they have no desire to start their own business.

Much research has focused on environmental concern, which is a deteriorating component of student character. Ecological education is crucial to educating future generations about how the environment affects sustainable living as a component of the ecosystem. By setting an example of good environmental care and preservation actions, educational institutions may cooperatively execute environmental character education beyond the support of parents and communities. Consequently, using PjBL-based green entrepreneur learning approaches can raise awareness of environmental issues and promote sustainable living.

Conflict of Interest

The authors declare that there is no conflict of interest.

References

[1] A. R. Purnomo, B. Yulianto, M. A. Mahdiannur, and H. Subekti, "Embedding Sustainable Development Goals to Support Curriculum Merdeka Using Projects in Biotechnology," *Int. J. Learn. Teach. Educ. Res.*, vol. 22, no. 1, pp. 406–433, 2023, doi: 10.26803/ijlter.22.1.23.

[2] Koderi and Guntur Cahaya Kesuma, "Moodle E-learning to Improve Motivation and Learning Activities at Green Campus," *J. Educ. Technol.*, vol. 7, no. 1, pp. 12–24, 2023, doi: 10.23887/jet.v7i1.54125.

[3] A. Husin, Y. Yosef, M. Raharjo, S. D. Maharani, and S. Sumarni, "Analysis of implementation of green campus needs in education and research pillars at Edupark FKIP UNSRI," *JPPI (Jurnal Penelit. Pendidik. Indones.*, vol. 9, no. 3, p. 1607, 2023, doi: 10.29210/020232279.

[4] A. S. Nugroho, B. Sumardjoko, A. Desstya, Minsih, and Choiriyah, "Strengthening the Character of Caring for the Environment in Elementary Schools through Ecoprint Artwork," *Int. J. Elem. Educ.*, vol. 7, no. 3, pp. 394–402, 2023, doi: 10.23887/ijee.v7i3.56472.

[5] S. Suryanti, S. Ferazona, I. Hajar, and R. Mahendra, "Profile of Prospective Teachers Based on 3R Eco Lifestyle: Case Study of Biology Education Students at Riau Islamic University," *J. Nat. Sci. Integr.*, vol. 6, no. 1, p. 94, 2023, doi: 10.24014/jnsi.v6i1.20443.

[6] A. T. Pratama, R. D. Anazifa, and N. B. Abd Wahid, "Visiting professor program for environmental science: Does it contribute to student learning experience and problem-solving skills?," *JPBI (Jurnal Pendidik. Biol. Indones.*, vol. 9, no. 3, pp. 236–243, 2023, doi: 10.22219/jpbi.v9i3.27060.
[7] A. Moriggi, "Exploring enabling resources for place-based social entrepreneurship: a participatory study of Green Care practices in Finland," *Sustain. Sci.*, vol. 15, no. 2, pp. 437–453, 2020, doi: 10.1007/s11625-019-00738-0.
[8] R. Puspitasari, D. Budimansyah, S. Sapriya, and R. Rahmat, "Internalizing the Character Value of Caring for the Environment Through the Project to Strengthen the Profile of Pancasila Students in Elementary Schools," *IJORER Int. J. Recent Educ. Res.*, vol. 4, no. 6, pp. 837–846, 2023, doi: 10.46245/ijorer.v4i6.390.
[9] E. Susanti and S. Suyatno, "Teacher's strategy in Instilling Integrated Religious Character in The Learning of Elementary Schools," *Jurnal Inovasi dan Manajemen Pendidikan*, vol. 1, no. 1. Universitas Ahmad Dahlan, p. 52, 2021, doi: 10.12928/jimp.v1i1.4142.
[10] I. A. Pratiwi, "Fifth grade students care about the environment through the Clean and Healthy Friday event," *Elem. Educ. J.*, vol. 7, no. 3, pp. 3034–3046, 2024, doi: 10.31949/jee.v7i3.10525.
[11] R. S. Retno, W. L. Yuhanna, and S. Utami, "Fostering Environmental Awareness Character in Elementary Education Through the Economic Green Living Approach," *Indones. VALUES CHARACTER Educ. J.*, vol. 7, pp. 186–195, 2024.
[12] I. W. Lasmawan and D. B. Sanjaya, "Implementation of Tri Hita Karana-Based Education in Protecting the Environment in Schools," *Din. J. Ilm. Pendidik. Dasar*, vol. 17, no. 1, pp. 1–13, 2025.
[13] G. N. Papageorgiou, E. Tsappi, E. Konis, R. Adiguna, and N. Indarti, "Developing Green Entrepreneurship Skills in Indonesia; An Educational Perspective," *Proc. Eur. Conf. Innov. Entrep. ECIE*, vol. 2, pp. 704–709, 2023, doi: 10.34190/ecie.18.2.1863.
[14] M. Sukri, A., Rizka, M. A., Purwanti, E., Ramdiah, S., & Lukitasari, "Validation of Students' Green Behavior Instrument Based on Local Potential Using Structural Equation Modeling With Smart Partial Least Squares," *Eur. J. Educ. Res.*, vol. 11, no. 2, pp. 859–872, 2022.
[15] S. Maharjan, "Sustainable Business through Green Entrepreneurship in Nepal," in *jamk*, no. May, 2025.
[16] M. C. Ramírez, L. A. Navas Castaño, Á. Delgado, M. A. González, L. C. Caicedo, and M. Peralta, "Promoting Entrepreneurship through a Community Learning Model – Case Study: Green Businesses," *Syst. Pract. Action Res.*, vol. 32, no. 6, pp. 629–643, 2019, doi: 10.1007/s11213-019-9477-z.
[17] H. Babar and U. Tahir, "Green Entrepreneurship : Developing a Sustainable Skillset for Small Business Owners," *Int. J. Green Ski. Disruptive Technol.*, vol. 1, no. 1, pp. 22–34, 2024.
[18] N. Syam, M. Yaumi, and M. M. Ibrahim, "Implementation of the Pancasila Student Profile Strengthening Project at SD Negeri 1 Centre," *Prima Magistra J. Ilm. Kependidikan*, vol. 6, no. 2, pp. 100–110, 2025.
[19] S. Davies, P. Seitamaa-Hakkarainen, and K. Hakkarainen, "Idea generation and knowledge creation through maker practices in an artifact-mediated collaborative invention project," *Learn. Cult. Soc. Interact.*, vol. 39, no. February, p. 100692, 2023, doi: 10.1016/j.lcsi.2023.100692.
[20] R. Jannah, "Environmental Education and Adiwiyata Program Acceleration for Madrasah," *AL-TA'LIM J. Univ.*, vol. 31, no. 1, pp. 42–55, 2024, doi: 10.15548/jt.v31i1.805.
[21] M. Pulungan, N. T. Rahma, and L. A. Utami, "Profile of Enviromental Literacy of Students on the Topic of Renewable Energy," *J. Penelit. Pendidik. IPA*, vol. 11, no. 3, 2025, doi: 10.29303/jppipa.v11i3.9774.
[22] A. Ekantini and I. D. Wijayanti, "How is the Education for Environmental Sustainable Development Support Students' Environmental Caring Character?," *J. Penelit. Pendidik. IPA*, vol. 10, no. SpecialIssue, pp. 352–360, 2024, doi: 10.29303/jppipa.v10ispecialissue.6444.
[23] Y. Saito, *Ecological Design*, vol. 24, no. 3. 2002.
[24] M. Salimi, A. Dardiri, and S. Sujarwo, "The profile of students' eco-literacy at nature primary school," *Cypriot J. Educ. Sci.*, vol. 16, no. 4, pp. 1450–1470, 2021, doi: 10.18844/cjes.v16i4.5999.
[25] T. A. Sumbogo, U. Yunus, and A. Buchori, "Leadership Initiatives on Environmental-Based Social Enterprise Toward Green Teaching Factory Practice in Vocational School," *IConVET*, 2023, doi: 10.4108/eai.6-10-2022.2327341.
[26] Lukman *et al.*, "Effective teachers' personality in strengthening character education," *Int. J. Eval. Res. Educ.*, vol. 10, no. 2, pp. 512–521, 2021, doi: 10.11591/ijere.v10i2.21629.

[27] K. D. A. Yudono, Y. Epit, and A. Djokowidodo, "'Muatan Etika Lingkungan Hidup dan Pendidikan Karakter pada Drama Musikal Petualangan Madison serta Relevansinya dalam Pembelajaran Bahasa Indonesia,'" *PRASI J. Bahasa, Seni, dan Pengajarannya*, vol. 19, no. 1, pp. 69–86, 2024.
[28] J. Sopacua, M. R. Fadli, and S. Rochmat, "The history learning module integrated character values," *J. Educ. Learn.*, vol. 14, no. 3, pp. 463–472, 2020, doi: 10.11591/edulearn.v14i3.16139.
[29] M. Schaper, "Understanding the Green Entrepreneur. In: Making Ecopreneurs: Developing Sustainable Entrepreneurship. 2nd Edition.," *Routledge Taylor&Francis Eb.*, vol. 14, p. 14, 2016.
[30] I. Muo and A. A. Azeez, "Green Entrepreneurship: Literature Review and Agenda for Future Research," *Int. J. Entrep. Knowl.*, vol. 7, no. 2, pp. 17–29, 2020, doi: 10.2478/ijek-2019-0007.
[31] N. Najjuah, A. Wibowo, and A. Pratama, "The Linkage Between Financial Literacy and Digital Entrepreneurial Intention: The Mediation and Moderation Role of Entrepreneurship Education and Social Media," *J. Pendidik. Ekon.*, vol. 17, no. 1, p. 1, 2024, doi: 10.17977/um014v17i1p001.
[32] D. Ariyani, Suyatno, and M. Zuhaery, "Principal's innovation and entrepreneurial leadership to establish a positive learning environment," *Eur. J. Educ. Res.*, vol. 10, no. 1, pp. 63–74, 2021, doi: 10.12973/EU-JER.10.1.63.
[33] S. R. A. R. S. Rum Handayani, Putu Sudira, "Green Entrepreneurship Development Strategy Based On Local Characteristic To Support Eco-Tourism Continuous," *J. Manaj.*, vol. 23, no. 2, p. 257, 2019, doi: 10.24912/jm.v23i2.476.
[34] Martini, L. Rosdiana, H. Subekti, and B. Setiawan, "Strengthening students' characters and ecopreneurship through science, environment, technology, and society course," *J. Pendidik. IPA Indones.*, vol. 7, no. 2, pp. 162–171, 2018, doi: 10.15294/jpii.v7i2.14338.
[35] Salma Rozana, Fatimah Purba, Sanggul Maharani Yessa, Rahayu Fuji Astuti, and Ahsani Maulidina, "Children as Agents of Sustainability: A Pathway to Teaching Environmental Literacy Based on Preschool Teachers' Perspectives at Sumatra," *J. Iqra' Kaji. Ilmu Pendidik.*, vol. 10, no. 1, pp. 270–289, 2025, doi: 10.25217/ji.v10i1.5748.
[36] A. Purnomo, I. N. Azizah, R. Hartono, H. Hartatik, and S. A. Tri Bawono, "Pengembangan Game Untuk Terapi Membaca Bagi Anak Disleksia Dan Diskalkulia," *Simetris J. Tek. Mesin, Elektro dan Ilmu Komput.*, vol. 8, no. 2, p. 497, 2017, doi: 10.24176/simet.v8i2.1351.
[37] N. Peimani and H. Kamalipour, "Online education in the post covid-19 era: Students' perception and learning experience," *Educ. Sci.*, vol. 11, no. 10, 2021, doi: 10.3390/educsci11100633.
[38] S. Sundaram and R. Ramesh, "Effectiveness of joyful game-based blended learning method in learning chemistry during COVID-19," *Int. J. Eval. Res. Educ.*, vol. 11, no. 4, pp. 2140–2146, 2022, doi: 10.11591/ijere.v11i4.22427.
[39] W. Qazi, J. A. Qureshi, S. A. Raza, K. A. Khan, and M. A. Qureshi, "Impact of personality traits and university green entrepreneurial support on students' green entrepreneurial intentions: the moderating role of environmental values," *J. Appl. Res. High. Educ.*, pp. 1154–1180, 2020, doi: 10.1108/JARHE-05-2020-0130.
[40] S. Le Loarne Lemaire, M. Razgallah, A. Maalaoui, and S. Kraus, "Becoming a green entrepreneur: An advanced entrepreneurial cognition model based on a practiced-based approach," *Int. Entrep. Manag. J.*, vol. 18, no. 2, pp. 801–828, 2022, doi: 10.1007/s11365-021-00791-1.
[41] Hamna and M. Kh. Ummah, "The Effectiveness of Ethnoscience Learning Based on Local Wisdom Values in Elementary Schools," *MADAKO Elem. Sch.*, vol. 3, no. 2, pp. 165–183, 2024.
[42] Sugiono, *Metode Penelitian Kuantitatif, Kualitatif dan Kombinasi (Mixed Methods)*, Cetakan ke. Bandung: Alfabeta, Bandung, 2013.
[43] S. K. Roy, "Impact of green factors on undergraduate students' green behavioral intentions: A hybrid two-stage modeling approach," *Heliyon*, vol. 9, no. 10, p. e20630, 2023, doi: https://doi.org/10.1016/j.heliyon.2023.e20630.
[44] D. P. Alamsyah, N. A. Othman, and H. A. A. Mohammed, "The awareness of environmentally friendly products: The impact of green advertising and green brand image," *Manag. Sci. Lett.*, vol. 10, no. 9, pp. 1961–1968, 2020, doi: 10.5267/j.msl.2020.2.017.
[45] T. Cherani, K. B. P. Atmaja, S. F. Syaranamual, and S. M. Youwe, "Socio-Ecological Framework in the Implementation of the Environmental Conscious Early Childhood Education CSR Program by AFT Pattimura," *J. Soc. Res.*, vol 3, no. 10, 2024.
[46] C. Barbarossa and A. Pastore, "Why environmentally conscious consumers do not purchase green products: A cognitive mapping approach," *Qual. Mark. Res.*, vol. 18, no. 2, pp. 188–209, 2015, doi: 10.1108/QMR-06-2012-0030.

[47] A. Matin, T. Khoshtaria, M. Marcan, and D. Datuashvili, "The roles of hedonistic, utilitarian incentives and government policies affecting customer attitudes and purchase intention towards green products," *International Review on Public and Nonprofit Marketing*, vol. 19, no. 4 pp. 709-735, 2021, doi: 10.1007/s12208-021-00325-z.
[48] C. Through and G. Economic, "The Role of Education: Building Student Entrepreneurship Character Through Green Economic," *J. KONSEP BISNIS DAN.MANAJEMEN*, vol. 11, no. 2, pp. 125–139, 2025, doi: 10.31289/jkbm.v11i2.14156.
[49] A. I. Saifulloh, P. Retnaningdyah, A. Mustofa, and Suhartono, "Theoretical Praxis in Environmental Education within EFL Contexts," *Prapanca Int. J. Humanit. Soc. Stud.*, vol. 1, no. 1, pp. 1–14, 2025.

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