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Penulis : Trisni Handayani*, Anindita Ramadhani

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1	Bukti Konfirmasi submit	03 Juli 2025
2	Bukti konfirmasi review dan hasil review A pertama	01 September 2025
3	Bukti konfirmasi review dan hasil review B pertama	01 September 2025
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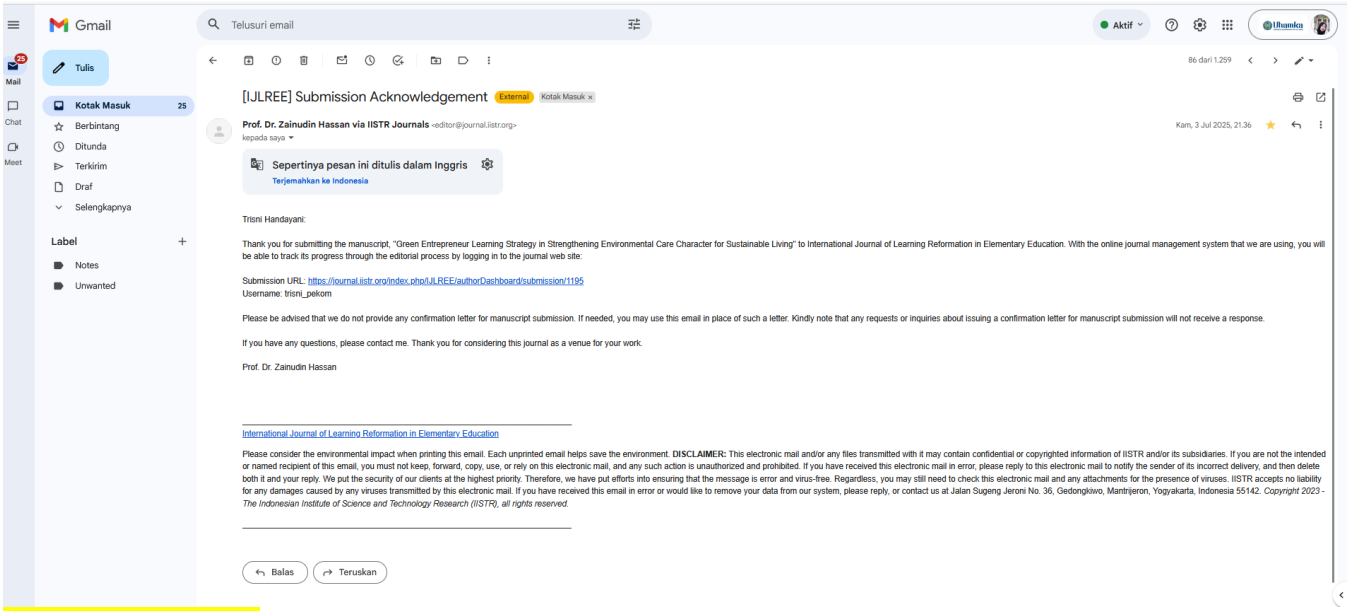
5	APC dan Copyediting	12 September 2025
6	Tahap Produksi oleh Editor	2 Oktober 2025
7	Article has been published	2 Oktober 2025

1	Bukti Konfirmasi submit	3 Juli 2025



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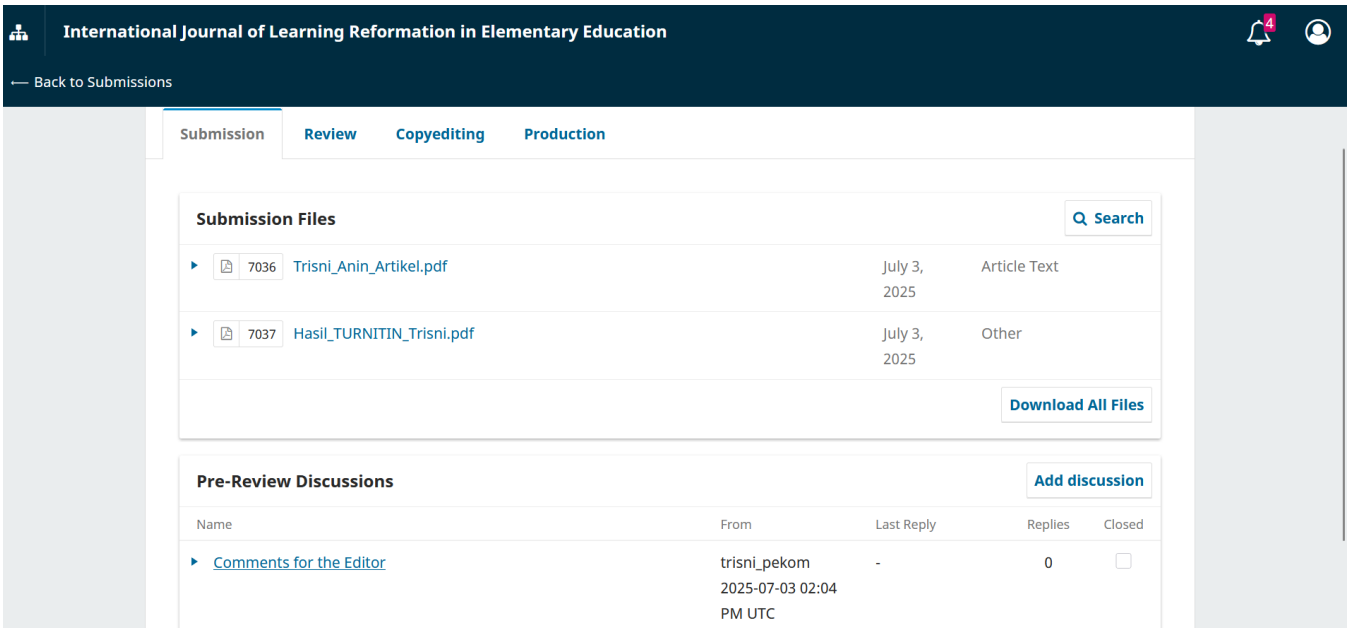
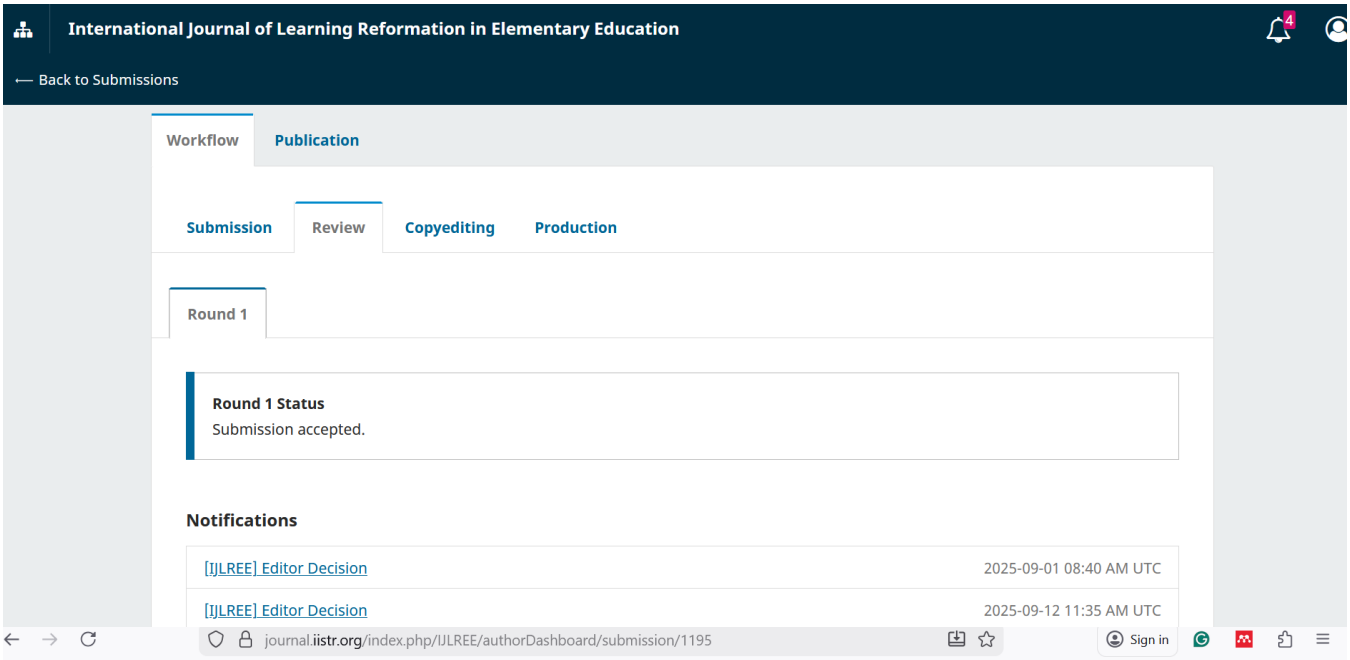
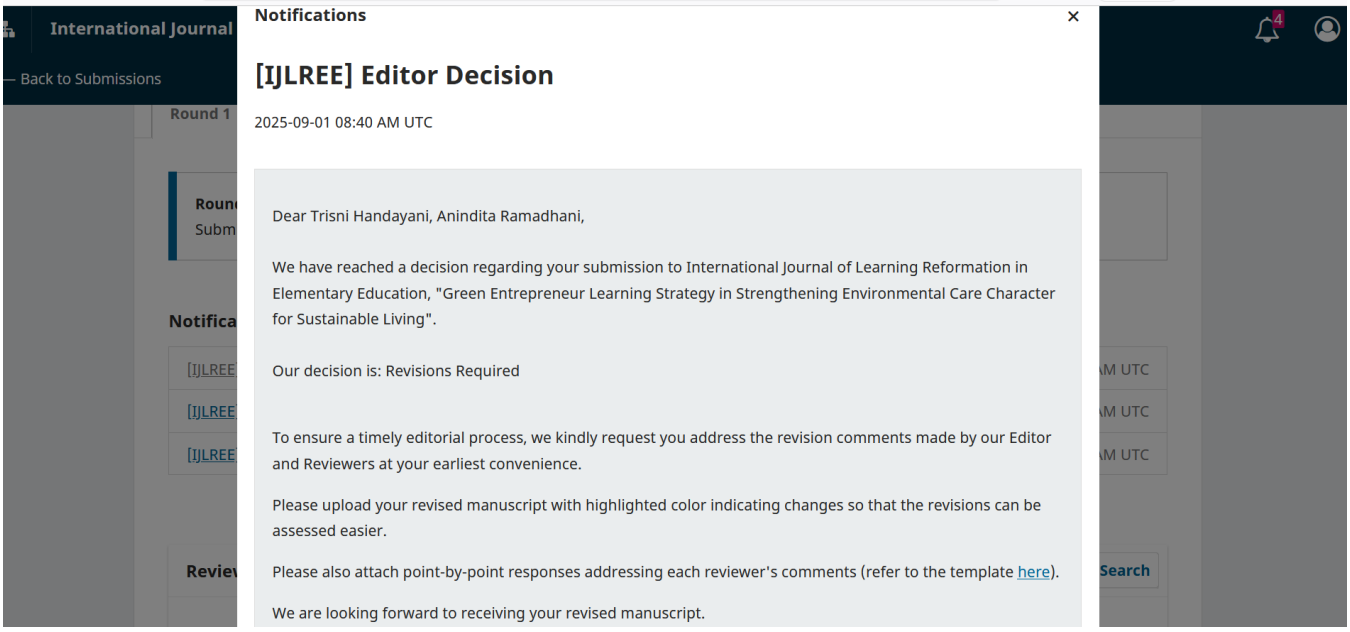
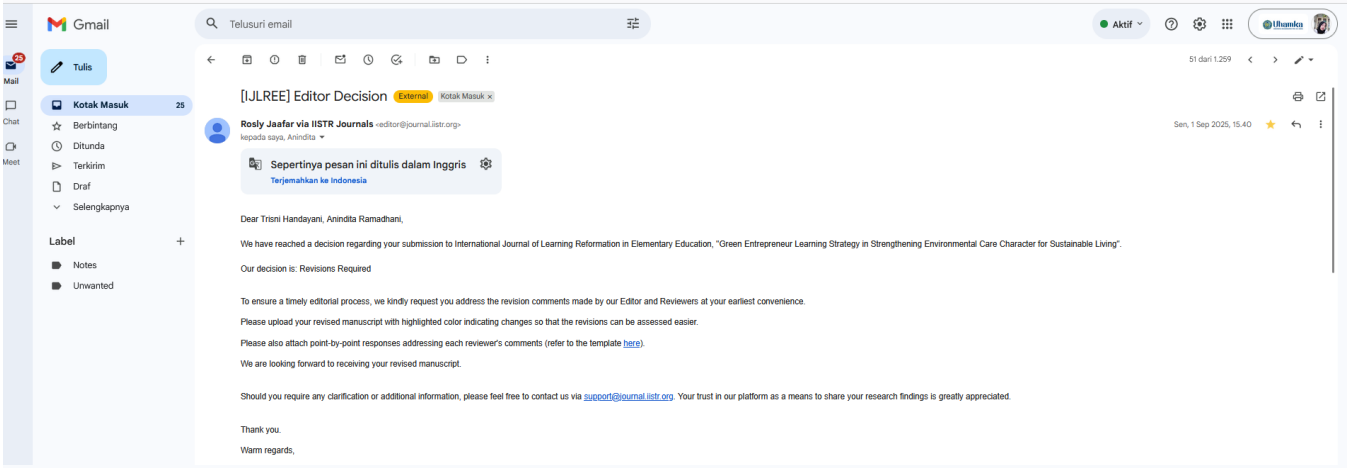


2	**Bukti konfirmasi reviewer A dan hasil review pertama**	**01 September 2025**



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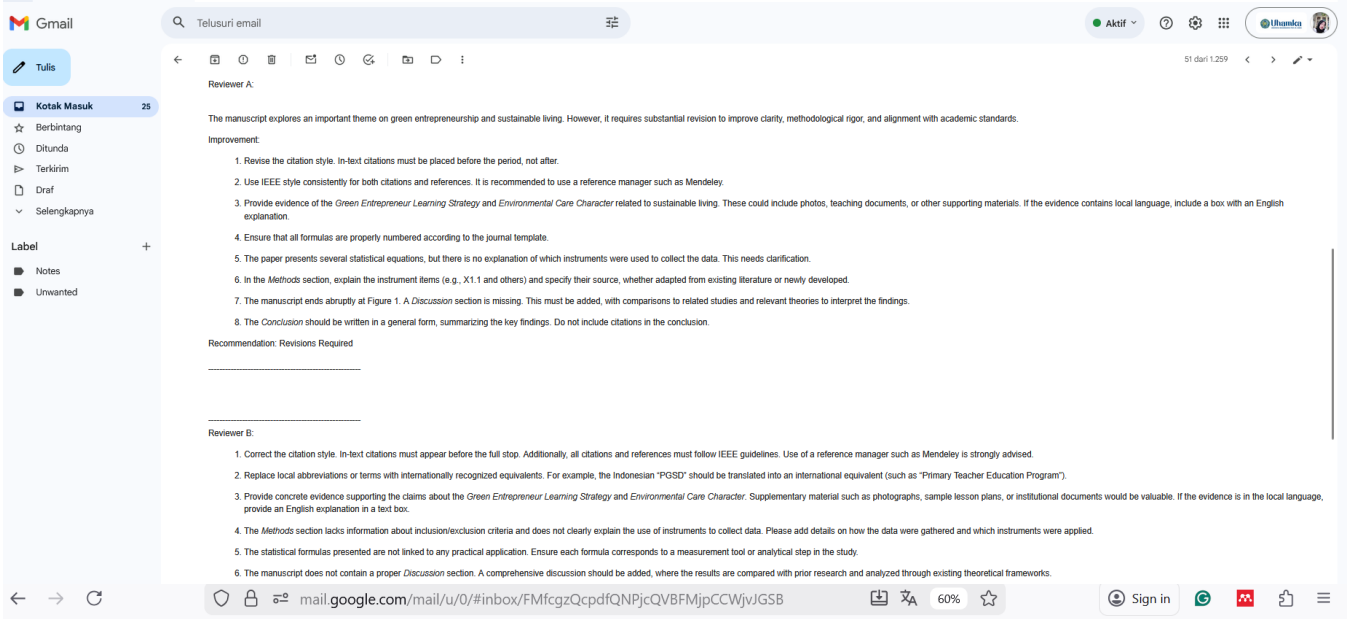
Rosly Jaafar via IISTR Journals <editor@journal.iistr.org>
kepada saya, Anindita
Sen, 1 Sep 2025, 15.40
Sepertinya pesan ini ditulis dalam Inggris
Terjemahkan ke Indonesia
Dear Trisni Handayani, Anindita Ramadhani,
We have reached a decision regarding your submission to International Journal of Learning Reformation in Elementary Education, "Green Entrepreneur Learning Strategy in Strengthening Environmental Care Character for Sustainable Living".
Our decision is: Revisions Required
To ensure a timely editorial process, we kindly request you address the revision comments made by our Editor and Reviewers at your earliest convenience.
Please upload your revised manuscript with highlighted color indicating changes so that the revisions can be assessed easier.
Please also attach point-by-point responses addressing each reviewer's comments (refer to the template here).
We are looking forward to receiving your revised manuscript.
Should you require any clarification or additional information, please feel free to contact us via support@journal.iistr.org. Your trust in our platform as a means to share your research findings is greatly appreciated.
Thank you.
Warm regards,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Reviewer A:
The manuscript explores an important theme on green entrepreneurship and sustainable living. However, it requires substantial revision to improve clarity, methodological rigor, and alignment with academic standards.
Improvement:
1. Revise the citation style. In-text citations must be placed before the period, not after.
2. Use IEEE style consistently for both citations and references. It is recommended to use a reference manager such as Mendeley.
3. Provide evidence of the Green Entrepreneur Learning Strategy and Environmental Care Character related to sustainable living. These could include photos, teaching documents, or other supporting materials. If the evidence contains local language, include a box with an English explanation.
4. Ensure that all formulas are properly numbered according to the journal template.
5. The paper presents several statistical equations, but there is no explanation of which instruments were used to collect the data. This needs clarification.
6. In the Methods section, explain the instrument items (e.g., X1.1 and others) and specify their source, whether adapted from existing literature or newly developed.
7. The manuscript ends abruptly at Figure 1. A Discussion section is missing. This must be added, with comparisons to related studies and relevant theories to interpret the findings.
8. The Conclusion should be written in a general form, summarizing the key findings. Do not include citations in the conclusion.
Recommendation: Revisions Required
Reviewer B:
1. Correct the citation style. In-text citations must appear before the full stop. Additionally, all citations and references must follow IEEE guidelines. Use of a reference manager such as Mendeley is strongly advised.
2. Replace local abbreviations or terms with internationally recognized equivalents. For example, the Indonesian "PGSD" should be translated into an international equivalent (such as "Primary Teacher Education Program").
3. Provide concrete evidence supporting the claims about the Green Entrepreneur Learning Strategy and Environmental Care Character. Supplementary material such as photographs, sample lesson plans, or institutional documents would be valuable. If the evidence is in the local language, provide an English explanation in a text box.
4. The Methods section lacks information about inclusion/exclusion criteria and does not clearly explain the use of instruments to collect data. Please add details on how the data were gathered and which instruments were applied.
5. The statistical formulas presented are not linked to any practical application. Ensure each formula corresponds to a measurement tool or analytical step in the study.
6. The manuscript does not contain a proper Discussion section. A comprehensive discussion should be added, where the results are compared with prior research and analyzed through existing theoretical frameworks.

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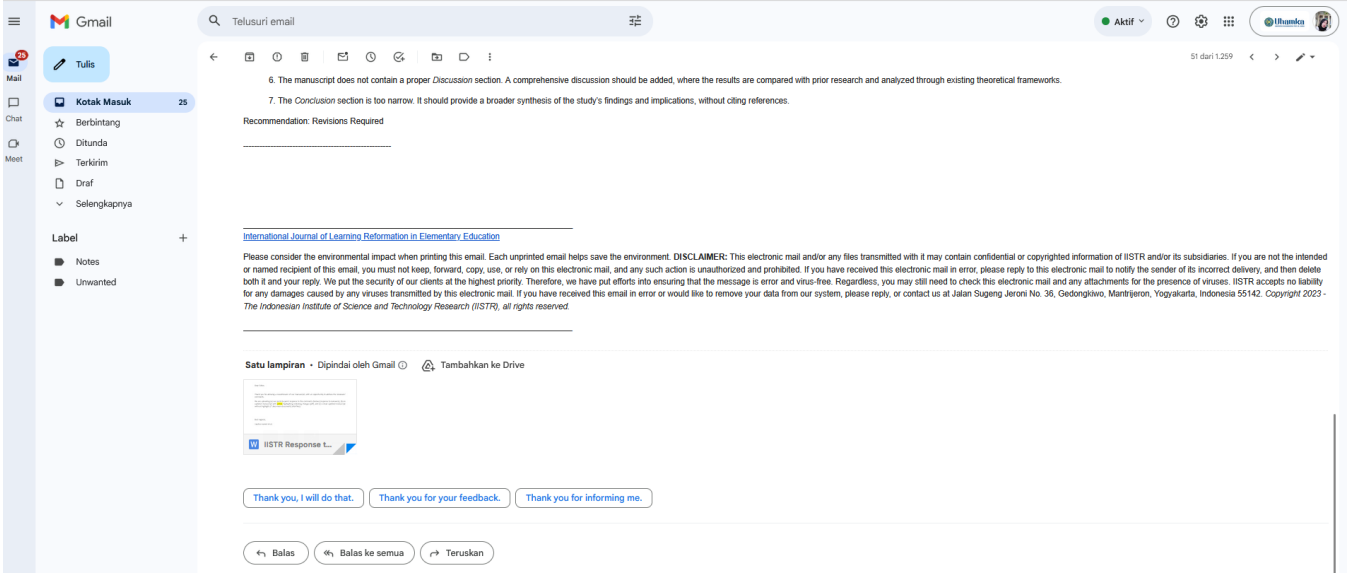
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6. The manuscript does not contain a proper Discussion section. A comprehensive discussion should be added, where the results are compared with prior research and analyzed through existing theoretical frameworks.
7. The Conclusion section is too narrow. It should provide a broader synthesis of the study's findings and implications, without citing references.
Recommendation: Revisions Required
International Journal of Learning Reformation in Elementary Education
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Original Manuscript ID: XXXX

Original Article Title: "Green Entrepreneur Learning Strategy in Strengthening Environmental Care Character for Sustainable Living"

To: IISTR Editorial Office

Re: Response to reviewers

Dear Editor,

Thank you for allowing a resubmission of our manuscript, with an opportunity to address the reviewers' comments.

We are uploading (a) our point-by-point response to the comments (below) (response to reviewers), (b) an updated manuscript with yellow highlighting indicating changes (pdf), and (c) a clean updated manuscript without highlights (*.docx main document/LaTeX files).

Best regards,

<Trisni Handayani> et al.

Reviewer#1, Concern # 1: Revise the citation style. In-text citations must be placed before the periode, not after.

Author response: We apologize for not reading the writing rules carefully.

Author action: We updated the manuscript by We have updated the manuscript by changing it in accordance with the journal's rules using the IEEE style consistently for both citations and references.

Reviewer#1, Concern # 2: Use IEEE style consistently for both citations and references. It is recommended to use a reference manager such as Mendeley

Author response: we realize that the citation is incorrect

Author action: We have updated the manuscript by changing the citations to IEEE style and using a reference manager as suggested by the reviewers.

Reviewer#1, Concern # 3: Provide evidence of the Green Entrepreneur Learning Strategy and Environmental Care Character related to sustainable living. These could include photos, teaching documents, or other supporting materials. If the evidence contains local language, include a box with an English explanation

Author response: We will include evidence of successful learning using the Green Entrepreneur Learning Strategy and Environmental Care Character related to sustainable living.

Author action: We have updated the manuscript by including flowcharts and examples of products produced by students. 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 Project Based Learning (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 the Flowchart of Learning Strategy to Strengthen Environmental Care Character based on Green Entrepreneurship.

Reviewer#1, Concern # 4: Ensure that all formulas are properly numbered according to the journal template.

Author response: Thank you for your correction and advice.

Author action: We have changed it and removed several formulas that are not necessary to be displayed in the research method.

Reviewer#1, Concern # 5: The paper presents several statistical equations, but there is no explanation of which instruments were used to collect the data. This needs clarification.

Author response: Thank you for your correction and advice.

Author action: We have made revisions by explaining that the instrument used is a questionnaire that has been validated by Judgment Experts. 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.

Reviewer#1, Concern # 6: In the Methods section, explain the instrument items (e.g., X1.1 and others) and specify their source, whether adapted from existing literature or newly developed.

Author response: Thank you for your correction and advice.

Author action: We have made revisions in accordance with the reviewer's suggestion that we explain the indicators used in this study, which were developed from previous studies.

Reviewer#1, Concern # 7: The manuscript ends abruptly at Figure 1. A Discussion section is missing. This must be added, with comparisons to related studies and relevant theories to interpret the findings.

Author response: Thank you for your correction and advice.

Author action: We apologize for our carelessness in preparing the manuscript. We have added a discussion of the results of this study to make the findings clearer and more comprehensible.

Reviewer#1, Concern # 8: The The *Conclusion* should be written in a general form, summarizing the key findings. Do not include citations in the conclusion

Author response: Thank you for your correction and advice.

Author action: We have revised the manuscript in the conclusion section and removed the citations in the conclusion.

Reviewer#2, Concern # 1: Correct the citation style. In-text citations must appear before the full stop. Additionally, all citations and references must follow IEEE guidelines. Use of a reference manager such as Mendeley is strongly advised**.**

Author response: We apologize for not reading the writing rules carefully.

Author action: We updated the manuscript by We have updated the manuscript by changing it in accordance with the journal's rules using the IEEE style consistently for both citations and references.

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

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Teacher Students

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, 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.

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].

Project-based learning 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 project-based learning, 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 Industry 4.0, is project-based learning [14].

Project-based learning approach: Students offer 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 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 project-based learning strategies by asking them to produce a skill or product [17]. Project-based learning, which blends online and e-learning with in-person project learning, is one of the learning innovations that may be applied today.

Education and Economic Education Study Program students based on current events and literature.

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 project- based learning 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 FKIP Uhamka economic education students 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).

Tabel 1.1 Research Subject Distribution by Gender

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

a. 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 in the nature of environmental care is the outcome of the PjBL Learning Strategy.

The typical steps that set the project-based learning (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 Project-Based Learning (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. Analysis Requirement Test

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

Table 4. 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 5. Path Coefficients-Confidence Intervals Variable

	X1	X2	Y1	Y2	Y3	Y4
X1						
X2	O.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 a Partial Least Squares (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. Figure 1 displays the outcomes of SmartPLS's internal model.

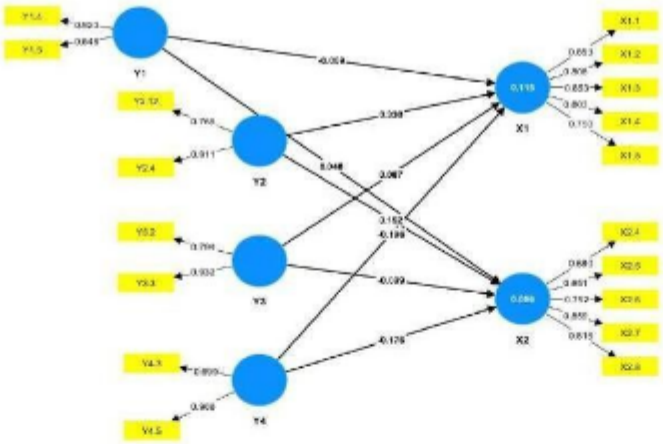


Fig. 1. Path Analysis Diagram

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.

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.

Structural Model Analysis Results

Structural model testing was conducted through three main stages:

1. Path Coefficients
   1) The analysis results show that the Green Entrepreneurship Learning Strategy (X) has a significant effect on Environmental Awareness (Y).
   2) This proves that project-based learning methods, recycling practices, and green product innovation can strengthen students' awareness and attitudes towards environmental issues.
2. R-Square (R^2)
   1) The R^2 value obtained for the mediator variable Y shows how much the learning strategy contributes to shaping environmental awareness.
   2) 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.
   3) This figure falls into the substantial category, proving that the learning strategy is effective.
3. Q-Square (Q^2) Predictive Relevance
   1) Positive Q^2 value indicates that the model has good predictive relevance.

2) 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 Project Based Learning (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 the Flowchart of Learning Strategy to Strengthen Environmental Care Character based on Green Entrepreneurship.

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.

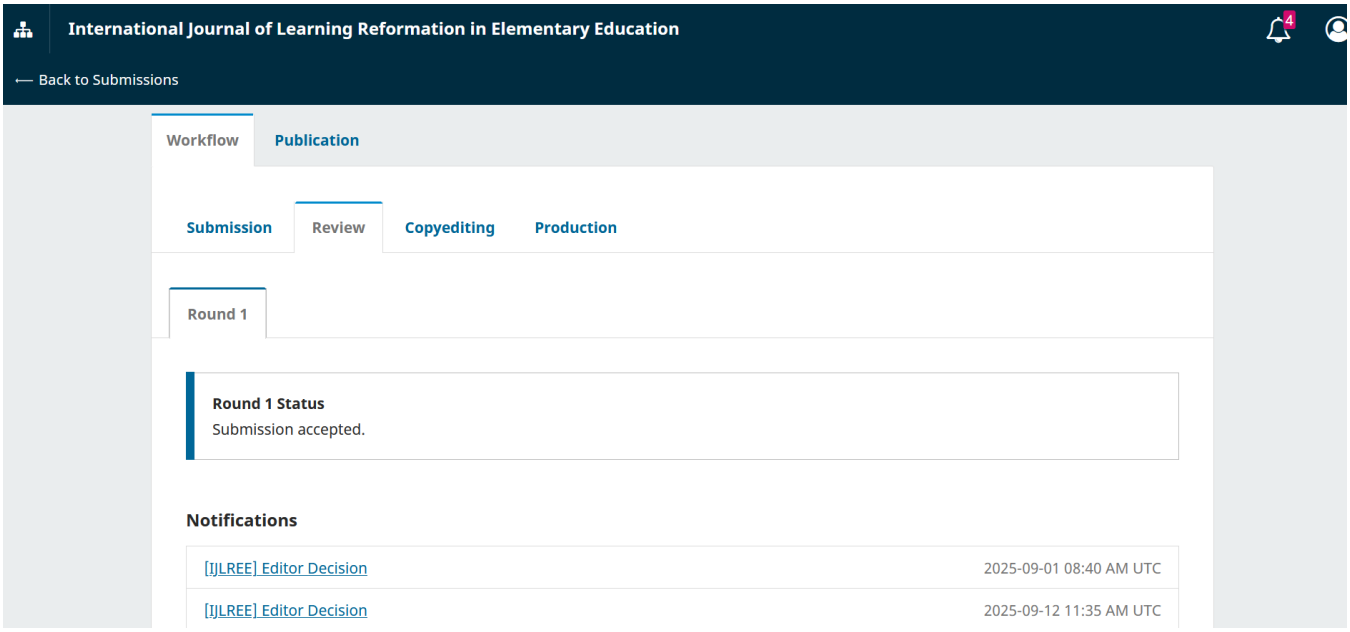
students. We also educate the surrounding community by collaborating with the East Jakarta Environmental Agency. With this understanding and awareness, the community and students will also realize the importance of caring for the environment [45].

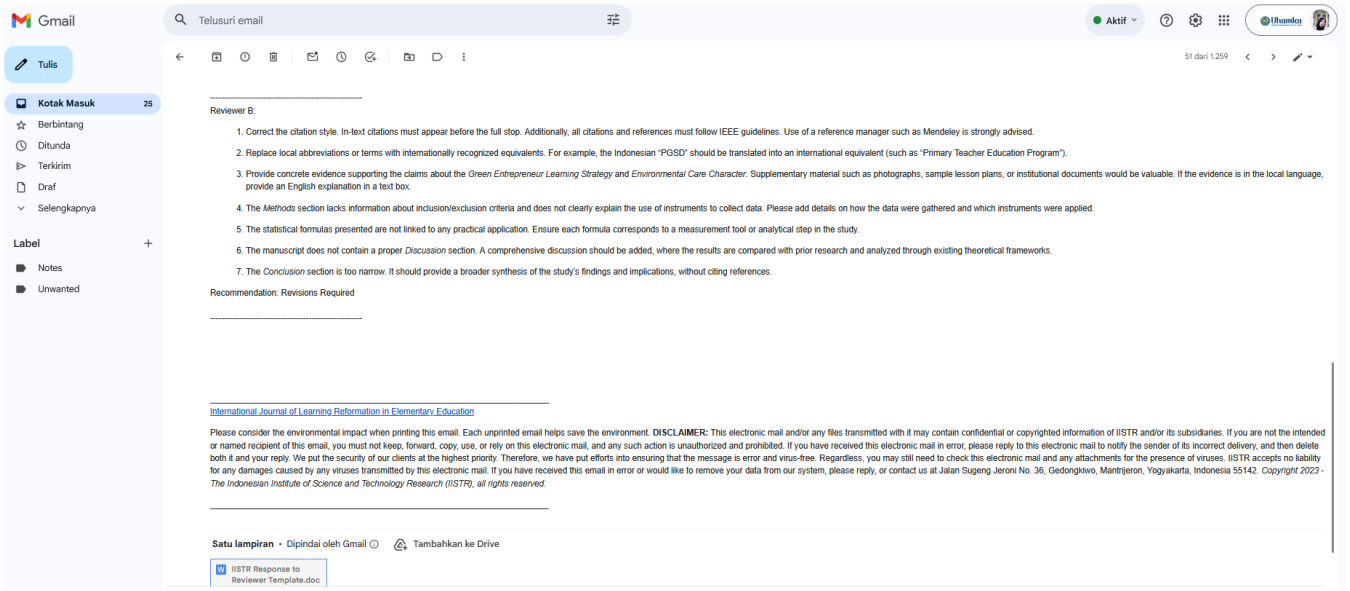
Fig. 3. Socialization and selection of household waste

The results of socialization and household waste selection 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. The following are examples of environmentally friendly products produced by fifth semester students.

Fig.4. Environmentally friendly entrepreneurial products produced by students

3	**Bukti konfirmasi review dan hasil review B Pertama**	**01 September 2025**





Reviewer#2, Concern # 2: Replace local abbreviations or terms with internationally recognized equivalents. For example, the Indonesian "PGSD" should be translated into an international equivalent (such as "Primary Teacher Education Program").

Author response: Thank you for your correction and advice.

Author action: We have made revisions in accordance with the reviewer's input, changing the term PGSD to elementary school teacher education program.

Reviewer#2, Concern # 3: The Provide concrete evidence supporting the claims about the Green Entrepreneur Learning Strategy and Environmental Care Character. Supplementary material such as photographs, sample lesson plans, or institutional documents would be valuable. If the evidence is in the local language, provide an English explanation in a text box.

Author response: Thank you for your correction and advice.

Author action: We have updated the manuscript by including flowcharts and examples of products produced by students. 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 Project Based Learning (PjBL) learning model. The results of socialization and household waste selection 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

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Reviewer#2, Concern # 4: The Methods section lacks information about inclusion/exclusion criteria and does not clearly explain the use of instruments to collect data. Please add details on how the data were gathered and which instruments were applied.

Author response: Thank you for your correction and advice.

Author action: We have made revisions in accordance with the reviewer's suggestion that we explain the indicators used in this study, which were developed from previous studies.

Reviewer#2, Concern # 5: The statistical formulas presented are not linked to any practical application. Ensure each formula corresponds to a measurement tool or analytical step in the study.

Author response: Thank you for your correction and advice.

Author action: We have changed it and removed several formulas that are not necessary to be displayed in the research method.

Reviewer#2, Concern # 6: The manuscript does not contain a proper Discussion section. A comprehensive discussion should be added, where the results are compared with prior research and analyzed through existing theoretical frameworks.

Author response: Thank you for your correction and advice.

Author action: We apologize for our carelessness in preparing the manuscript. We have added a discussion of the results of this study to make the findings clearer and more comprehensible.

Reviewer#2, Concern # 7: The Conclusion section is too narrow. It should provide a broader synthesis of the study's findings and implications, without citing references.

Author response: Thank you for your correction and advice.

Author action: We have revised the manuscript in the conclusion section and removed the citations in the conclusion.

Note: *References suggested by reviewers should only be added if it is relevant to the article and makes it more complete. Excessive cases of recommending non-relevant articles should be reported to editor@journal.iistr.org*

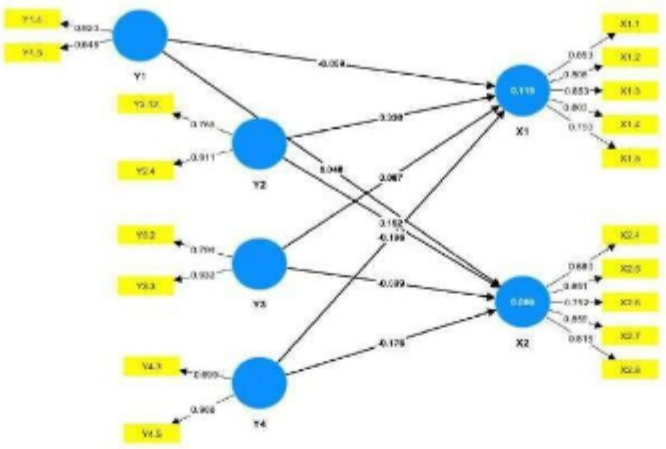


Fig. 1. Path Analysis Diagram

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.

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.

Structural Model Analysis Results

Structural model testing was conducted through three main stages:

1. Path Coefficients
   1) The analysis results show that the Green Entrepreneurship Learning Strategy (X) has a significant effect on Environmental Awareness (Y).
   2) This proves that project-based learning methods, recycling practices, and green product innovation can strengthen students' awareness and attitudes towards environmental issues.
2. R-Square (R^2)
   1) The R^2 value obtained for the mediator variable Y shows how much the learning strategy contributes to shaping environmental awareness.
   2) 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.
   3) This figure falls into the substantial category, proving that the learning strategy is effective.
3. Q-Square (Q^2) Predictive Relevance
   1) Positive Q^2 value indicates that the model has good predictive relevance.

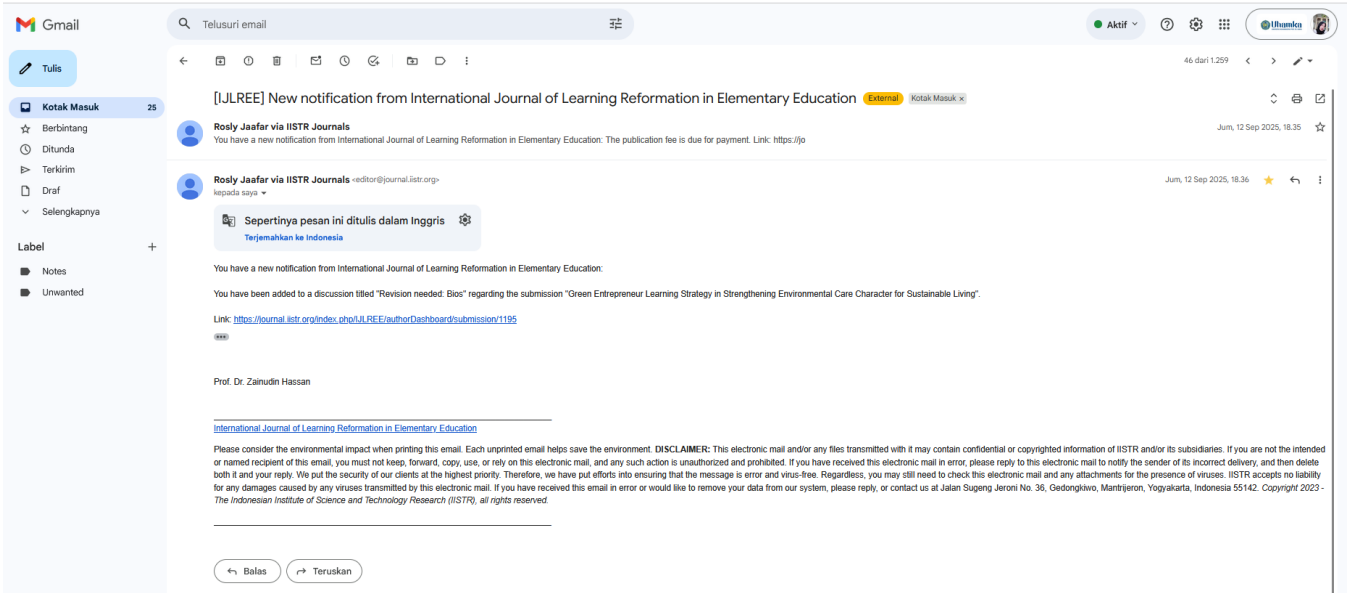
Discussion

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 Project Based Learning (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 the Flowchart of Learning Strategy to Strengthen Environmental Care Character based on Green Entrepreneurship.

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.

4	**Bukti konfimasi review dan hasil review kedua**	**12 September 2025**



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Anindita Ramadhani was born in Cilegon on November 11. She is currently an active undergraduate student in the Elementary School Teacher Education Program at Universitas Muhammadiyah Prof. Dr. HAMKA, Indonesia. She has a strong interest in the field of education and actively participates in campus-based cultural and dance organizations. Anindita believes that education is the foundation for a better future and strives to excel in both academic and non- academic activities. She aspires to contribute meaningfully to both her academic institution and the broader community. (email: anind4150@gmail.com).

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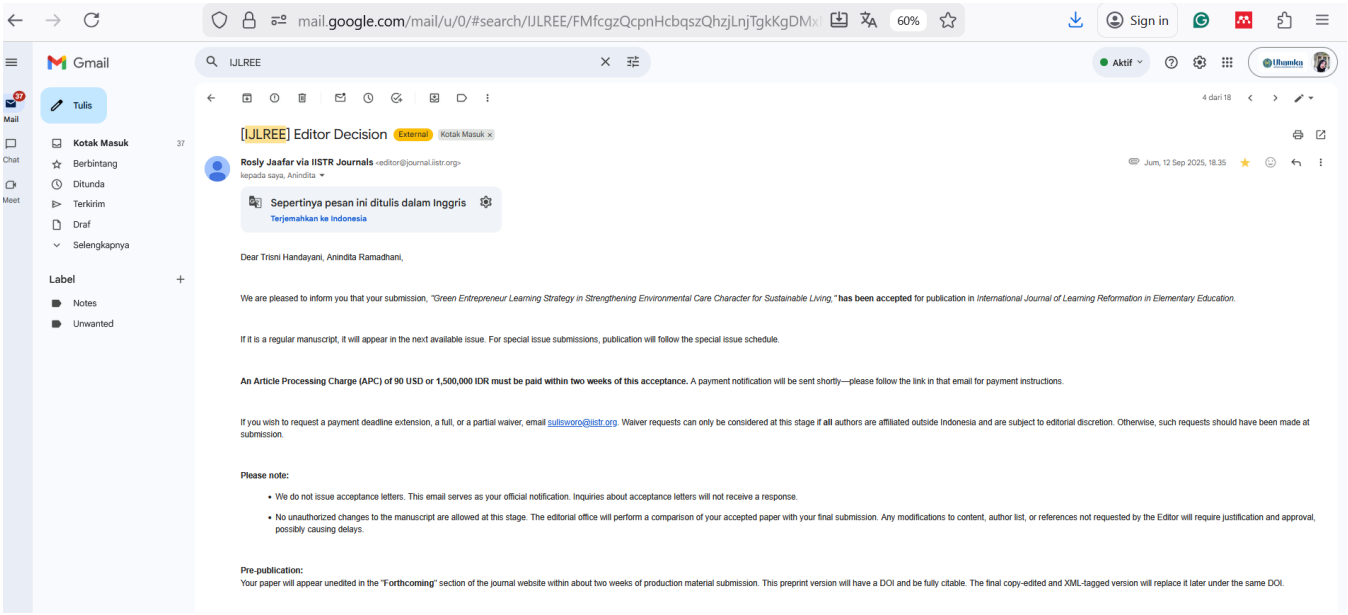

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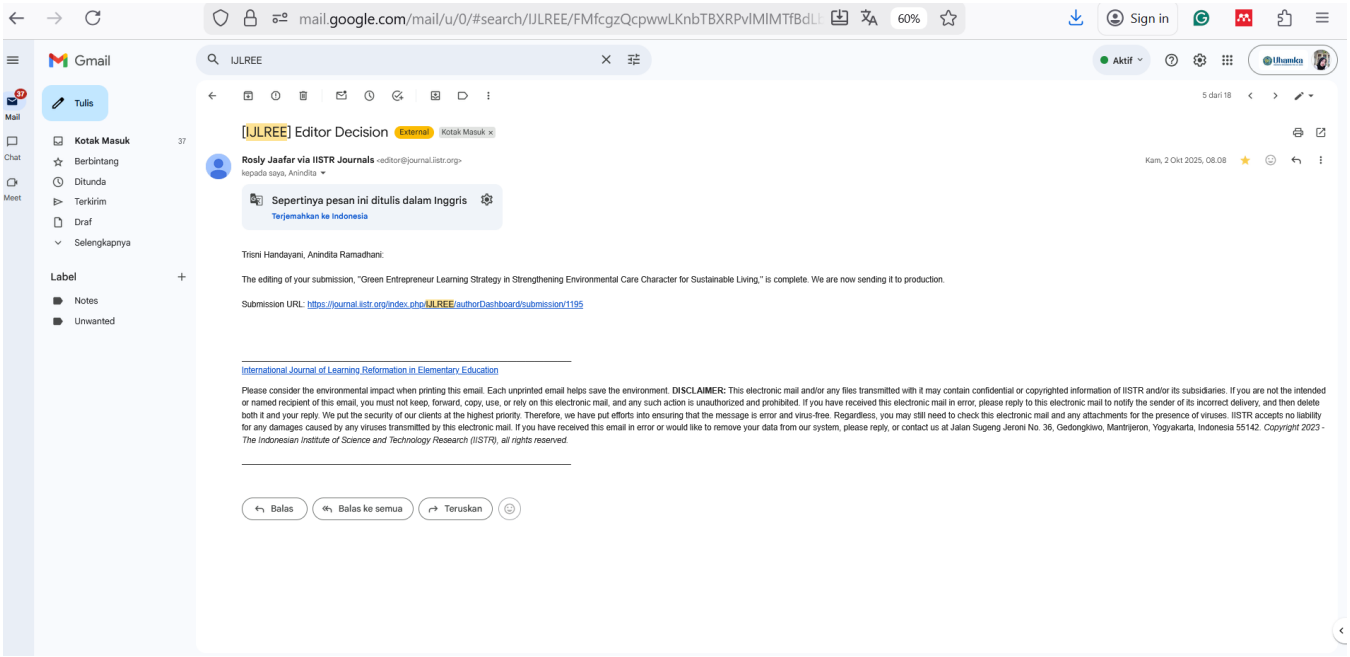

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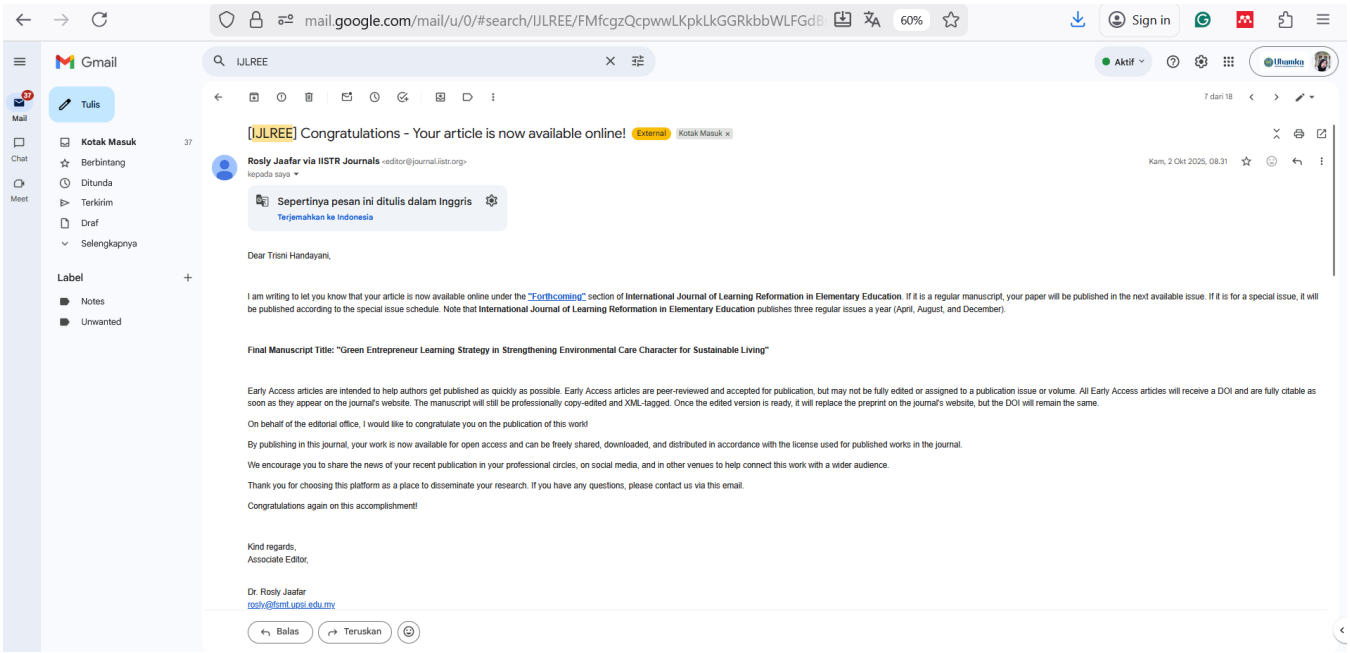

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Green Entrepreneur Learning Strategy in Strengthening Environmental Care Character for Sustainable Living

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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, 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.

Introduction

A. This is an example of writing a subsection title

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. (A. Purnomo et al., 2016). 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. (Koderi & Guntur Cahaya Kesuma, 2023), (Husin et al., 2023). Some concerning practices disregard hygiene, such as the unclean school restrooms and the inability to distinguish between organic and inorganic trash. (Nugroho et al., 2023). 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. (Suryanti et al., 2023).

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. (Pratama et al., 2023). Indonesia might learn from this country and start educating post-Gen Zers about character. According to current events, post-generation Z individuals typically lead comfortable lives with inexpensive,

straightforward, and easily accessible items. This implies that this ease of use pampers post-generation Z. (Moriggi, 2020). 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. (Puspitasari et al., 2023).

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. (Susanti & Suyatno, 2021). 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 (Nugroho et al., 2023). 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. (Pratiwi, 2024).

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. (Puspitasari et al., 2023), (Retno et al., 2024). 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. (Lasmawan & Sanjaya, 2025). 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 (Nugroho et al., 2023), (Papageorgiou et al., 2023).

Education is essential to achieving sustainable development goals, which include environmental protection. People can obtain the knowledge and insight required to lead happy lives via education. The COVID-19 pandemic has compelled the government to transition to distance learning. The virus's cycle of transmission is disrupted in this way. Educational technology is now the trendiest trend, as distance learning has changed to include technology in the learning process. (Adolph, 2022). It is important to specify the phases of the investigation. Educational technology offers several

chances to improve classroom learning by incorporating technological networks into the learning process. By the end of 2021, the government will enforce a limited in-person policy for schools as part of a new learning regime. Blended learning, which involves a transition from online to limited in-person training, is one choice offered to educators. (Koderi & Guntur Cahaya Kesuma, 2023). Project-based learning strategies are starting to be used extensively in school-based 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 project-based learning, 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 Industry 4.0, is project-based learning. (Sukri, A., Rizka, M. A., Purwanti, E., Ramdiah, S., & Lukitasari, 2022).

In the era of the fourth industrial revolution, ecopreneurship is a chosen academic movement that uses project-based, blended learning-based theme learning to strengthen students' character. By combining traditional (face-to-face) learning with online courses that are very supportive of the current situation in the wake of COVID-19 or the New Normal (Adolph, 2022). 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 project-based learning strategies by asking them to produce a skill or product (Huda et al., 2024). Project-based learning, which blends online and e-learning with in-person project learning, is one of the learning innovations that may be applied today. This project-based learning 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 (Syam et al., 2025). As a result of collaborating with their instructors to finish a project, children will gain independence, creativity, maturity, and collaboration skills (Davies et al., 2023). Character education cultivates the four Cs: critical thinking and problem-solving abilities, inventiveness, communication skills, and the capacity for teamwork. These are student competencies for the twenty-first century (Kermendikbud, 2018).

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. (Jannah, 2024), (Utami et al., 2025). 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. (Ekantini & Wijayanti, 2024).

According to pre-observation observations made by researchers, Even though the school has provided separate bins that are colored red for waste that contains toxic and hazardous materials, brown for inorganic waste (which is difficult to decompose), and green for organic waste (which is a group of waste that decomposes easily), many students still have low awareness of environmental cleanliness. (Hadiapurwa et al., 2024).

35 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. (Saito, 2002), (Salimi et al., 2021).

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 7 knowledge, feelings, and acts (Sukri, A., Rizka, M. A., Purwanti, E., Ramdiah, S., & Lukitasari, 2022). 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 (Sumbogo et al., 2023). 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 (Lukman et al., 2021). 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 36 students build their character (Kistoro et al., 2021), (Sopacua et al., 2020). 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 (Schaper, 2016).

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. (Muo & Azeez, 2020), (Najjuah et al., 2024), (Ariyani et al., 2021).

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 project-based learning. (Rum Handayani, Putu Sudira, 2019), (Martini et al., 2018), (Through & Economic, 2025). 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 project-based learning (PBL) (Papageorgiou et al., 2023).

Project-based learning approach: Students offer suggestions about how to create green entrepreneurship by making eco-friendly crafts or using their ingenuity to recycle (Maharjan, 2025), (Ramírez et al., 2019).

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 project-based learning (PBL) (A. R. Purnomo et al., 2023). By solving real-world problems, students must be able to choose topics and suggest projects or products utilizing PjBL. Project-based learning and other learning challenges are believed to help students realize their full potential. (Peimani & Kamalipour, 2021), (Sundaram & Ramesh, 2022). The project-based learning approach is a method utilized in the (Qazi et al., 2020). 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. Attitude: Demonstrate your concern for environmental protection and sustainability. Knowledge: Understand the basics of green business. Unique Abilities: ability to develop and implement environmentally responsible corporate initiatives while also adhering to basic education (Ramírez et al., 2019), (Babar & Tahir, 2024), (Through & Economic, 2025).

One of the suggested learning strategies is project-based learning, which motivates students to take a more active role in addressing project-based difficulties through investigation, synthesis, interpretation, and discovery. (Schaper, 2016), (Rum Handayani, Putu Sudira, 2019). This is in line with the course's learning goals (CPMK). In the era of rapid technological development, project-based learning techniques 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. (Le Loarne Lemaire et al., 2022).

Research on Green Entrepreneur Learning Techniques to Help Elementary School Teachers Develop Environmentally Conscious Characteristics for Sustainable Living (Khaerul & Bk, 2024). Researchers are interested in the Uhamka Faculty of Teacher Training and Education's Education and Economic Education Study Program students based on current events and literature.

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 project-based learning to improve the environmental care character of PGSD 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 FKIP Uhamka economic education students enrolled in entrepreneurial courses participated in this study.

b. Subject of Research

The research subjects were PGSD and Economics Education 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	PGSD	73	8	65
2	Economics Education	39	7	32

c. Techniques for Data Analysis

Information that has been gathered and shown as numerical values is known as quantitative data. The gathered data is subsequently subjected to qualitative analysis in the form of descriptions. (Sugiono, 2013). The following data analysis methods are employed in research and development:

1. Validity Test

   Using SPSS's product-moment correlation technique to determine whether the device measures the right item, and if rcount exceeds rtable at α = 0.05, the instrument is considered authentic.

$$r_{xy} = \frac{N\sum XY - (\sum X)(\sum Y)}{\sqrt{\{N\sum X^2 - (\sum X)^2\}\{N\sum Y^2 - (\sum Y)^2\}}}$$

   Description:

   rxy = Validity of the item

   N∑XY = Test score on the item

   ∑X = Score of the item achieved by the test

   ∑Y = Number of test participants

   The test criteria if $r_{count} > r_{table}$ with $\alpha = 0.05$, then the measurement is declared valid, and vice versa, if $r_{count} < r_{table}$, then the measuring instrument is invalid.

2. A reliability test

   Uses SPSS and the Cronbach Alpha calculation to confirm that an instrument's results are consistent when used repeatedly. An instrument is deemed reliable if its Cronbach's Alpha value is greater than 0.60.

$$r_{11} = \left[\frac{k}{k-1}\right]\left[1 - \frac{\sum \sigma_b^2}{V_t^2}\right]$$

$r11$ = instrument reliability

k = number of questions

$\sum \sigma b^2$ = sum of score variances of each item

$\sigma^2 t$ = total variance

The Cronbach Alpha criteria are presented in the following table:

Table 2. Reliability Interpretation

Correlation Coefficient	Reliability Criteria
0,81 < r ≤ 1,00	Sangat Tinggi
0,61 < r ≤ 0,80	Tinggi
0,41 < r ≤ 0,60	Cukup
0,21 < r ≤ 0,40	Rendah
0,00 < r ≤ 0,21	Sangat Rendah

3. Normalcy Test

The purpose of the normalcy test is to determine whether or not the participants are normally distributed. With computer aid, the SPSS 27 software may be used to calculate the normalcy test. The Shapiro-Wilk formula was employed in this study's normalcy test. According to the test requirements, a test is considered normally distributed if the sig value is greater than 0.05, and not so if it is less than 0.05.

4. Homogeneity Test

Use SPSS to perform the Levene Test to determine whether or not group variance is homogeneous; if the sig value is more than 0.05, the data is homogeneous.

5. Hypothesis Test

Use SPSS to perform the Levene Test to determine whether or not group variance is homogeneous; if the sig value is more than 0.05, the data is homogeneous.

Results

a. An improvement in the nature of environmental care is the outcome of the PjBL Learning Strategy.

The typical steps that set the project-based learning (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 Project-Based Learning (PBL) 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 PGSD 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 PGSD students at the Faculty of Teacher Training and Education, Prof. Dr. Hamka University.

c. Analysis Requirement Test

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.

Table 3. Loading Factor / Beban Luar Green Entrepreneur berbasis Pro-jeck Based Blended Learning

	X1	X2	Y1	Y2	Y3	Y4
X1.1	0.670					
X2.2	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				
YI.2			0.787			
Y2.4				0.811		
Y2.5				0.681		
Y3.5					1.000	
Y4.1						1.000
Y1.1			0.795			

The loading factor (LF) value > 0.60 according to Chin (1998) indicates the indicator is valid. 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 4. 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 5. Path Coefficients-Confidence Intervals Variable

	X1	X2	Y1	Y2	Y3	Y4
X1						
X2	O.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 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. Figure 1 displays the outcomes of SmartPLS's internal model.

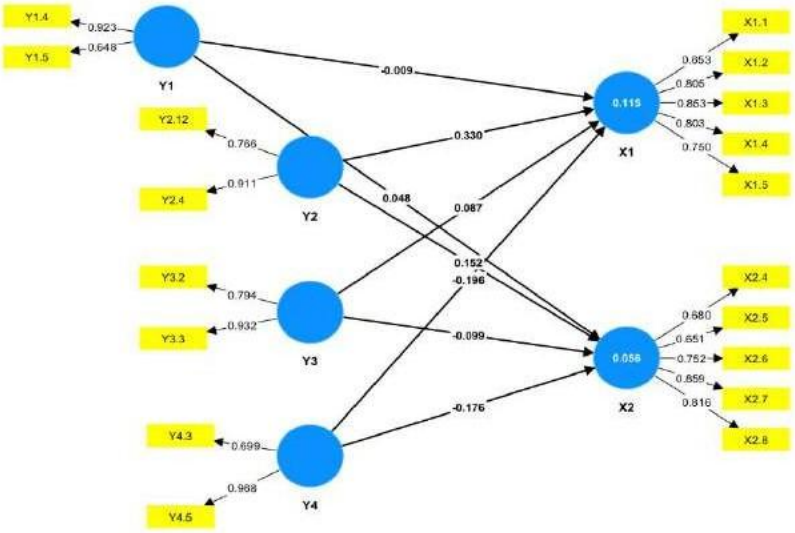

Fig. 1. Path Analysis Diagram

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.

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 project-based learning approach, 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. Prospective educators may find it simpler to adopt project-based sustainable learning, something that many instructors find difficult, by utilizing green entrepreneurship. (Ariyani et al., 2021), (Koderi & Guntur Cahaya Kesuma, 2023).

In line with the attainment of 21st-century student capabilities, project-based learning will help students enhance their critical and creative thinking talents as well as their capacity for group cooperation. With the help of the convergently valid SmartPLS software, up to 13 valid instruments were employed in the validity test. In the reliability test of variable (X), Environmental Care Character Education has a Composite Reliability (CR) value of 0.882> 0.70, meaning that each measuring item (X) is dependable and consistent in measuring (X). With a criterion value larger than 0.7, variable Y's Cronbach Alpha (α) measurement shows that its CR is over 0.60. Since the AVE root for variable (X1) of (0.776) is greater than the correlation with other variables, the discriminant validity for the correlation variable is met; the path coefficient interval of confidence is 95.

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 (Nugroho et al., 2023). 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. Therefore, using Project-Based Learning (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 (Nche et al., 2019).

Consequently, using PjBL-based green entrepreneur learning approaches can raise awareness of environmental issues and promote sustainable living.

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