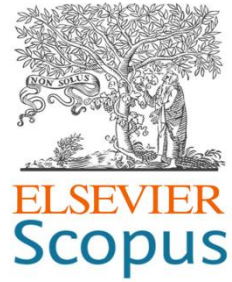


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Nurturing Sustainable Mindsets: Building Green Entrepreneurial Orientation through Education and Practice among Nature-Based School Students

Inaya Sari Melati^{1*}, Rantiyas Kholifatul Aziyah², Chuah Soo Cheng³, Muhammad Hasan⁴,
Naning Margasari⁵

^{1,2}Department of Economics Education, Universitas Negeri Semarang, Semarang, Indonesia,

³Department of Economy and Finance, Universiti Teknologi MARA, Kuala Lumpur, Malaysia,

⁴Department of Economics Education, Universitas Negeri Makassar, Makassar, Indonesia,

⁵Department of Management, Universitas Negeri Yogyakarta, Yogyakarta, Indonesia,

* Corresponding author: inaya.sari@mail.unnes.ac.id

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Abstract: The increasing urgency of environmental sustainability calls for cultivating green entrepreneurial orientation (GEO) among youth, empowering them to lead the transition toward a sustainable economy. This study proposes and tests a conceptual model examining the influence of Green Education (GE) on GEO, both directly and indirectly through Green Entrepreneurship Practices (GEP), in junior high school students. Using a total population sample of 108 students from an inclusive, nature-based educational setting in Indonesia, the findings demonstrate that green education plays a crucial role in fostering green entrepreneurship practices, which in turn strengthen students' green entrepreneurial orientation. Additionally, green education directly enhances students' entrepreneurial mindset toward sustainability. Unlike previous studies that primarily focus on university or adult learners, this study



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offers a novel contribution by extending green entrepreneurship discourse to early adolescence within a nature-based learning environment. It integrates experiential learning theory with sustainability education, highlighting how practical, nature-embedded entrepreneurial experiences can shape young students' sustainable mindsets. The findings are significant as they provide empirical evidence of how early educational interventions can build the foundation for long-term environmental responsibility and innovative green behavior. Overall, this study contributes to both theory and practice by demonstrating that integrating green education and hands-on entrepreneurship practices in junior high school can effectively nurture future-oriented green entrepreneurs.

Keywords: Green Entrepreneurial Orientation, Green Education, Green Entrepreneurship Practices, Experiential Learning, Junior High School Student.

培养可持续思维：通过教育与实践构建以自然为本学校学生的绿色创业导向

摘要：随着环境可持续性问题的日益紧迫，培养青年一代的绿色创业导向意识已成为推动可持续经济转型的重要途径。本研究提出并验证了一个概念模型，用以探讨绿色教育对初中生绿色创业导向的影响，包括其直接作用以及通过绿色创业实践的间接作用。研究以印度尼西亚一所融合自然教育理念的包容性学校的108名初中生为总体样本。研究结果表明，绿色教育在促进绿色创业实践方面发挥着关键作用，而绿色创业实践进一步强化了学生的绿色创业导向。此外，绿色教育还直接提升了学生面向可持续发展的创业思维。与以往主要聚焦于大学生或成人学习者的研究不同，本研究的创新之处在于将绿色创业的讨论延伸至自然教育环境中的早期青少年阶段。研究融合了体验式学习理论与可持续教育，强调实践性、自然嵌入式的创业体验如何塑造学生的可持续思维模式。研究结果具有重要意义，因为它为早期教育干预如何奠定长期环境责任意识和创新绿色行为的基础提供了实证支持。总体而言，本研究在理论与实践层面均作出了贡献，证明在初中阶段整合绿色教育与实践性创业学习能够有效培育具有未来导向的绿色创业者。

关键词：绿色创业导向，绿色教育，绿色创业实践，体验式学习，初中学生

1. Introduction

In the face of escalating environmental challenges, the need to cultivate green entrepreneurial orientation (GEO) among youth has become increasingly urgent [1], [2]. Younger generations hold a pivotal role in driving sustainable innovation and shaping a low-carbon, circular economy [3], [4]. Research on business-educated Generation Z in Europe reveals that this cohort exhibits a strong interest in green innovation and environmental responsibility, highlighting their potential to accelerate green initiatives across industries [5]. Green Entrepreneurial Orientation (GEO) characterized by proactiveness in seeking green opportunities [6], innovativeness in developing eco-friendly solutions [7], [8] and willingness to take risks [9]. Fostering this orientation

is critical to empowering youth as future leaders who can integrate environmental stewardship with economic and social development.

While prior research has predominantly focused on university students' green entrepreneurial intentions using frameworks such as the Theory of Planned Behavior [10], [11], there is a significant gap in understanding these dynamics at earlier educational stages. Particularly, empirical studies examining the interplay of green education and entrepreneurship practices in fostering GEO among junior high school students-especially within inclusive, nature-based learning environments-are scarce. By integrating experiential learning theory with green entrepreneurship concepts, this study aims to fill this gap by investigating how educational and practical entrepreneurial experiences jointly influence GEO in

younger student populations. The findings are expected to inform educational strategies that effectively nurture sustained green entrepreneurial mindsets and behaviors, empowering youth as proactive agents of environmental and societal change.

Despite growing attention to green entrepreneurship, the mechanisms through which GEO develops in educational contexts remain underexplored. This study proposes a conceptual model that positions Green Education (GE) as a key antecedent influencing GEO both directly and indirectly through Green Entrepreneurship Practices (GEP). GE encompasses formal and informal learning experiences that embed environmental knowledge, values, and skills, thereby nurturing awareness and motivation toward sustainability [6]. GEP refer to the application of entrepreneurial behaviors focused on environmental goals, including opportunity recognition, innovation, and risk-taking within green ventures.

Within educational contexts, GEO reflects not only a commitment to environmental preservation but also active student involvement in creating innovative ecological solutions with economic value [12]. Environmental education (Green Education - GE) has emerged as a strategic approach to fostering GEO among students. This form of education not only instills ecological awareness but also cultivates critical thinking, innovation, and environmental insight. Central to this approach is Kolb's (1984) experiential learning theory, which posits that effective learning occurs through a cyclical process involving concrete experience, reflective observation, abstract conceptualization, and active experimentation [13]. This aligns closely with the principles of green education, which emphasize direct student engagement in environment-based activities [14]. By integrating green entrepreneurship concepts into nature-based school environments, students can be trained as agents of change capable of responding creatively and responsibly to environmental challenges [15]. Previous studies have demonstrated that entrepreneurship education positively influences GEO [16]. Sustainability education exerts a significant positive effect on green entrepreneurship inclination [17]. Based on these findings, the first hypothesis of the current study is formulated as follows:

Hypothesis 1 (H1): *Green Education (GE) positively influences Green Entrepreneurial Orientation (GEO).*

Empirical studies support that GEO acts as a cognitive and behavioral driver that encourages firms and individuals to engage in green innovation and sustainable entrepreneurial activities [18]. For example, GEO enhances the capacity for boundary-spanning search for external knowledge and resources, which facilitates the development and implementation of green entrepreneurial practices that improve

environmental and economic performance [19]. In educational contexts, fostering GEO among students is critical as it equips them with the entrepreneurial mindset necessary to engage in green practices effectively [20]. This orientation encourages proactive opportunity recognition, innovation, and risk-taking behaviors that translate into concrete green entrepreneurship practices such as sustainable product development and environmentally responsible business models [21]. Therefore, based on theoretical foundations and empirical evidence, it is well supported the Hypothesis 2.

Hypothesis 2 (H2): *Green Entrepreneurial Orientation (GEO) introduced within educational settings have a significant positive impact on students' Green Entrepreneurship Practices (GEP).*

Green Entrepreneurship Practices (GEP) play a crucial role in enhancing students' Green Education (GE) by providing experiential learning opportunities that deepen environmental knowledge, skills, and attitudes [22]. Engaging students in practical green ventures such as waste management, sustainable agriculture, and eco-friendly product development transforms abstract environmental concepts into tangible experiences, thereby reinforcing their understanding and commitment to sustainability [23]. Such hands-on activities foster critical thinking, problem-solving, and innovation, which are essential components of effective green education [24]. Furthermore, GEP encourages collaboration among students, educators, and community stakeholders, creating a supportive ecosystem that amplifies learning outcomes and environmental awareness [25]. Empirical evidence suggests that integrating green entrepreneurship practices into curricula enhances students' self-efficacy and motivation to engage with environmental issues, leading to improved educational outcomes related to green knowledge and values [26]. Therefore, both theoretical foundations and practical considerations strongly support the following hypothesis.

Hypothesis 3 (H3): *Green Entrepreneurship Practices (GEP) have a significant positive impact on students' Green Education (GE).*

This study carries both theoretical and practical implications. Theoretically, it expands the understanding of how GE and GEP interact to shape GEO among younger students—an area that has received limited empirical attention. By applying experiential learning theory in a junior high school context, the study contributes to the development of a more comprehensive framework for early-stage environmental entrepreneurship education. Practically, the findings are expected to guide educators and policymakers in designing school-based programs that integrate environmental education with entrepreneurial activities. Such integration can nurture students'

proactive, innovative, and responsible attitudes toward sustainability from an early age, supporting the broader national and global agenda for sustainable development.

2. Method

This study employed a quantitative research design to investigate the relationships among Green Education (GE), Green Entrepreneurship Practices (GEP), and Green Entrepreneurial Orientation (GEO) among junior high school students. The research was conducted at SMP Alam Arridho Semarang, Central Java, Indonesia, a nature-based junior high school renowned for its inclusive, project-based learning approach that integrates direct interaction with the natural environment.

The selection of SMP Alam Arridho Semarang as the research site was based on several considerations. First, the school implements a nature-based and inclusive education model that integrates environmental values into its curriculum and daily learning activities, making it an ideal setting for examining the interaction between GE, GEP, and GEO. Second, the school's emphasis on project-based and experiential learning provides authentic opportunities for students to engage in practical green entrepreneurship initiatives, aligning closely with the theoretical foundation of experiential learning.

Finally, the accessibility of the entire student population enabled a comprehensive analysis of the relationship among the studied constructs without sampling bias, ensuring the validity of the findings within the context of early adolescent education.

Data were collected using a structured questionnaire comprising 13 items distributed across three constructs: GE (4 items), GEP (4 items), and GEO (5 items). The questionnaire was administered to the entire population of 108 students from grades VII to IX, with the population and sample being identical to ensure comprehensive representation within this educational context.

Data analysis was conducted using WarpPLS 8.0 software. WarpPLS was utilized to assess the measurement model's reliability and validity, including convergent and discriminant validity, as well as the structural model's path coefficients and significance through bootstrapping procedures. This analysis enabled rigorous testing of the hypothesized relationships among GE, GEP, and GEO, including direct and mediating effects. By leveraging WarpPLS, the study provides robust empirical insights into how green education and entrepreneurship practices contribute to cultivating green entrepreneurial orientation among junior high school students in an inclusive, nature-based learning environment.

3. Results

3.1. Model Feasibility Test

3.1.1. Convergent Validity Test

Convergent validity in this study was evaluated using the Average Variance Extracted (AVE). A construct is deemed to exhibit convergent validity when its AVE value exceeds 0.50. The analysis revealed that all constructs achieved AVE values above this threshold, demonstrating satisfactory convergent validity.

Table 1. AVE and Composite Reliability (processed data developed by the authors)

Construct	AVE	Composite Reliability	Cronbach's Alpha	Notes
GE	0.618	0.829	0.690	Valid and Reliable
GEP	0.513	0.806	0.679	Valid and Reliable
GEO	0.718	0.836	0.608	Valid and Reliable

3.1.2. Discriminant Validity Test

Discriminant validity was assessed by comparing the square root of the AVE for each construct with the correlation coefficients between constructs. Adequate discriminant validity is indicated when the square root of the AVE for a construct exceeds its correlations with other constructs.

Table 2. Correlations and Square Roots of AVE (processed data developed by the authors)

Construct	GE	GEP	GEO
GE	0.786	0.653	0.254
GEP	0.653	0.716	0.417
GEO	0.254	0.417	0.848

Note: Diagonal values are square roots of AVE.

The results show that for each construct, the square root of the AVE exceeds the correlations with other constructs, demonstrating that discriminant validity has been achieved.

3.1.3. Goodness of Fit Model

The overall model fit evaluation was conducted through the Goodness of Fit (GoF) test, which includes several indicators as listed in Table 3.

Table 3. Goodness of Fit Model SEM (processed data developed by the authors)

Indicator	Value	Criteria	Notes
Average Path Coefficient (APC)	0.462	$P < 0.001$	Significant
Average R-squared (ARS)	0.235	$P = 0.003$	Significant
Average Adjusted	0.228	$P = 0.003$	Significant

Indicator	Value	Criteria	Notes
R-squared (AARS)			
Average Collinearity (AFVIF)	Full VIF	1.644	Acceptable if ≤ 5 , ideally ≤ 3.3
Tenenhaus (GoF)	GoF	0.381	Small ≥ 0.1 , Medium ≥ 0.25 , Large ≥ 0.36
Simpson's Paradox Ratio (SPR)	1.000	1.000	Acceptable if ≥ 0.7 , ideally = 1
R-squared Contribution Ratio (RSCR)	1.000	1.000	Acceptable if ≥ 0.9 , ideally = 1
Statistical Suppression Ratio (SSR)	1.000	0.7	Acceptable if ≥ 0.7
Nonlinear Bivariate Causality Direction Ratio (NLBCDR)	1.000	0.7	Acceptable if ≥ 0.7

The model demonstrates statistically significant path relationships with moderate explanatory power, low multicollinearity, and a strong overall fit. The ideal values for advanced indices (SPR, RSCR, SSR, NLBCDR) further confirm the robustness and validity of the model's structure and causal assumptions [27]. Collectively, these results support the reliability and predictive quality of the proposed relationships among Green Education, Green Entrepreneurship Practices, and Green Entrepreneurial Orientation in the studied context.

3.2. Structural Model Analysis (Inner Model)

Table 4 reveals varying levels of explanatory power across the three key constructs. GE stands out with 42.9% variance explained, followed by GEP (17.1%) and GEO (8.5%).

Table 4. Determinant Coefficient (R²) (processed data developed by the authors)

Latent Variable	R ²	Adjusted R ²
GE	0.435	0.429
GEP	0.179	0.171
GEO	0.093	0.085

Source: processed data (2025), developed by the authors.

3.3. Hypothesis Testing

Hypothesis testing was carried out to assess the direct impact of each independent variable on the adoption decision. This involved analyzing the path coefficient values, their significance levels, and the direction of the relationships as seen in Figure 1.

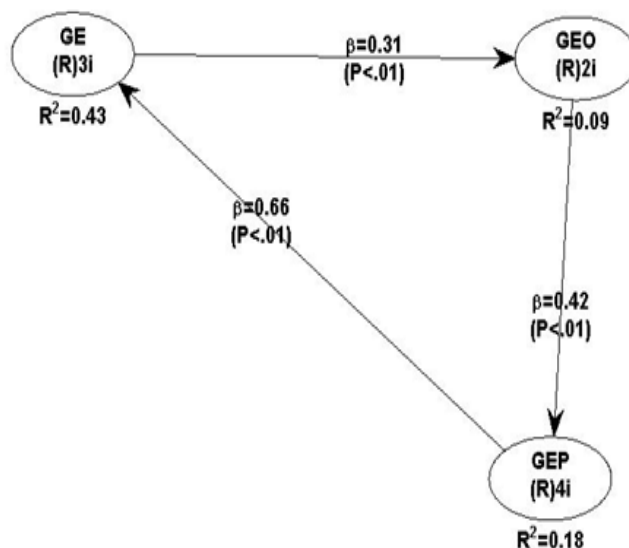


Figure 1. Research Model (processed data developed by the authors)

The results of this study reveal that Green Education (GE) has a significant positive influence on students' Green Entrepreneurial Orientation (GEO), with a path coefficient of 0.305 ($p < 0.01$). This finding suggests that environmental sustainability education effectively cultivates students' mindset and readiness toward green entrepreneurship. The strong statistical significance highlights the critical role of integrating green education into school curricula to foster environmentally conscious entrepreneurial attitudes. By embedding sustainability principles into learning experiences, students develop the foundational orientation needed to pursue green entrepreneurial initiatives.

Moreover, the study shows that Green Entrepreneurial Orientation (GEO) positively impacts Green Entrepreneurship Practices (GEP), with a path coefficient of 0.423 ($p < 0.01$).

This indicates that students who possess a strong green entrepreneurial mindset are more likely to translate their orientation into practical, sustainable business activities. These findings emphasize the importance of nurturing entrepreneurial attitudes as a precursor to active engagement in green practices. Additionally, Green Entrepreneurship Practices (GEP) strongly influences Green Education (GE) directly, demonstrated by a path coefficient of 0.659 ($p < 0.01$).

Table 5. Hypothesis Testing (processed data developed by the authors)

Hypothesis	Path	Coefficient	p-value	Notes
H1	Green Education (GE) → Green Entrepreneurial Orientation (GEO)	0.305	< 0.01	Accepted (Significant - Positive)
H2	Green Entrepreneurial Orientation (GEO) → Green Entrepreneurship Practices (GEP)	0.423	< 0.01	Accepted (Significant - Positive)
H3	Green Entrepreneurship Practices (GEP) → Green Education (GE)	0.659	< 0.01	Accepted (Significant - Positive)

4. Discussions

4.1. The Influence of Green Education (GE) on Green Entrepreneurial Orientation (GEO)

The findings indicate that GE has a significant positive effect on GEO, as demonstrated by a path coefficient of 0.305 ($p < 0.01$). This result confirms Hypothesis 1 (H1) and emphasizes the critical role of environmental education in shaping students' green entrepreneurial mindset. From a theoretical perspective, this relationship aligns with Kolb's (1984) Experiential Learning Theory, which posits that knowledge is most effectively internalized through cycles of concrete experience, reflection, conceptualization, and active experimentation [28]. In the context of SMP Alam Arridho Semarang, students' direct interaction with nature, through project-based and outdoor learning, facilitates the transformation of environmental awareness into cognitive and behavioral orientations toward green entrepreneurship.

The relatively modest R^2 value for GEO (0.085) indicates that while green education makes a meaningful contribution to shaping students' green entrepreneurial orientation, its explanatory power remains limited. This finding implies that other factors, such as family influence, peer interactions, school culture, or personal value [may exert additional influence on students' development of green entrepreneurial mindsets.] Consequently, integrating environmental education with social, motivational, and contextual dimensions could further enhance students' orientation toward sustainability.

An example of the school's experiential learning approach can be observed in Figure 2, which illustrates students engaging in hands-on environmental activities.]



Figure 2. Students engage in hands-on learning - activities (developed by the authors)

The school's nature-based context amplifies the impact of GE by serving as a "living laboratory", where students observe firsthand the relevance of sustainability and environmental stewardship. This direct engagement not only deepens their conceptual understanding but also fosters emotional, ethical, and value-based connections to nature, which are critical antecedents of entrepreneurial intention in green ventures. Supporting evidence indicates that green entrepreneurial orientation is significantly shaped by educational experiences that emphasize sustainability knowledge, skills, and attitudes particularly when reinforced by institutional and curricular support [23]. The integration of experiential learning within a nature-based setting thus creates a powerful synergy, enabling students to translate environmental awareness into innovative, proactive entrepreneurial actions.

These insights highlight the importance of a holistic educational approach that bridges theory and practice. In practical terms, the results underscore the need to embed sustainability topics, eco-innovation projects, and environmental ethics into formal curricula to cultivate entrepreneurial thinking that is both economically viable and ecologically responsible.

4.2. The Influence of Green Entrepreneurial Orientation (GEO) on Green Entrepreneurship Practices (GEP)

The findings reveal that Green Entrepreneurial Orientation (GEO) has a significant positive effect on Green Entrepreneurship Practices (GEP), as evidenced by a path coefficient of 0.423 ($p < 0.01$). This result confirms Hypothesis 2 (H2) and highlights the importance of cultivating a strong green entrepreneurial orientation to promote the implementation of sustainable business practices. The result aligns with prior studies suggesting that GEO reflects the integration of entrepreneurial innovativeness, proactiveness, and risk-taking with ecological consciousness. Such integration enables individuals and organizations to develop environmentally friendly products, processes, and services that mitigate ecological degradation while simultaneously enhancing economic performance [29]. Hence, adopting a green entrepreneurial mindset encourages students and

enterprises to pursue sustainable practices that not only address environmental challenges but also generate competitive advantages in increasingly eco-conscious markets [30].

The considerable influence of GEO on GEP is strongly supported by the curriculum approach at SMP Alam Ar Ridho Semarang, which integrates experiential and nature-based learning. The curriculum pillars of “Belajar Bersama Alam” (Learning with Nature) and “Belajar Bersama Kehidupan” (Learning with Life) facilitate direct engagement with natural environments and real-world sustainability challenges. This experiential immersion fosters entrepreneurial attitudes rooted in green innovation, proactiveness, and risk-taking—core dimensions of GEO [31]. Through project-based initiatives such as composting, waste management, and green product ventures, students acquire not only practical skills but also the motivation and confidence to apply their entrepreneurial mindset toward sustainable endeavors. This transformation from orientation to practice directly reflects the strong positive path coefficient observed in the model, empirically validating the hypothesized relationship between GEO and GEP.



Figure 3. Green Entrepreneurial Practices by Making Organic Snacks (developed by the authors)

Source: developed by the authors (2025)

SMP Alam Ar Ridho’s curriculum pillars, including Akhlaq (moral character), Leadership, Scientific Logic, and Business, create a holistic educational ecosystem that nurtures both values and competencies. The business pillar encourages creativity, financial literacy, and risk-taking through direct involvement in sustainable business activities aligned with Islamic values and environmental stewardship. This comprehensive educational design ensures that students not only form a green entrepreneurial orientation but also actively engage in green entrepreneurship practices, such as managing eco-friendly projects and socially responsible ventures [7]. Consequently, the

curriculum’s integration of experiential learning, leadership development, and business acumen provides a fertile ground for the observed strong influence of GEO on GEP, preparing students to become innovative and responsible green entrepreneurs.

In theoretical terms, the significant influence of GEO on GEP underscores the behavioral translation of green entrepreneurial orientation into concrete sustainability actions. Practically, these results highlight the importance of designing entrepreneurship curricula that move beyond theoretical instruction toward experiential learning frameworks capable of transforming environmental values into entrepreneurial practices.

4.3. The Influence of Green Entrepreneurship Practices (GEP) on Green Education (GE)

The findings reveal that Green Entrepreneurship Practices (GEP) have a significant positive effect on Green Education (GE), as evidenced by a path coefficient of 0.659 ($p < 0.01$). This result confirms Hypothesis 3 (H3) and underscores a reciprocal and dynamic relationship between practice and education, wherein students’ engagement in sustainable entrepreneurial activities directly enriches and shapes the educational process. The strong coefficient value indicates that hands-on green entrepreneurship experiences serve as a major driver in enhancing students’ environmental understanding and learning outcomes.

When students actively participate in green entrepreneurial activities—such as waste reduction projects, sustainable product development, or eco-friendly business initiatives—they gain firsthand knowledge and skills that deepen their understanding of environmental issues [32]. This experiential involvement transforms learning from a theoretical exercise into a process of real-world problem-solving and innovation, thereby reinforcing the foundations of effective green education.

This finding aligns with recent empirical evidence demonstrating that entrepreneurship education grounded in experiential practice enhances students’ environmental awareness, technological capability, and long-term commitment to sustainability. By engaging students directly in the creation and management of green ventures, educational programs move beyond abstract instruction to foster critical thinking, collaboration, and environmental responsibility—all essential elements of sustainable learning ecosystems [33].

Furthermore, the impact of GEP on GE suggests that green entrepreneurial activities serve as catalysts for curriculum development and pedagogical innovation within educational institutions [34]. As students engage in sustainable business practices, educators are prompted to adapt and enrich curricula to

reflect emerging environmental challenges and entrepreneurial solutions, creating a feedback loop that continuously improves green education quality and relevance [35]. Such a reciprocal dynamic between practice and education is vital in shaping a generation of learners who are not only environmentally literate but also capable of transforming sustainability knowledge into tangible actions and innovations. In theoretical terms, the significant influence of GEP on GE validates experiential learning theory by demonstrating that practical entrepreneurial engagement acts as a conduit for deeper environmental cognition and value internalization. From a practical standpoint, these findings emphasize the importance of institutionalizing hands-on green entrepreneurship projects within school curricula as a means to cultivate environmentally responsible, creative, and future-ready young leaders.

5. Conclusion

5.1 Summary of the Main Findings

This study demonstrates that at SMP Alam Arridho, Green Education (GE) and Green Entrepreneurship Practices (GEP) function as central pillars of the school's eco-educational philosophy rather than as peripheral activities. The empirical analysis confirms that GE has a significant positive effect on Green Entrepreneurial Orientation (GEO), both directly and indirectly through GEP. Furthermore, GEP exerts a strong positive influence on GE, highlighting a reciprocal and dynamic relationship between educational processes and practical engagement. This mutual reinforcement aligns with Kolb's Experiential Learning Theory, illustrating how concrete green entrepreneurial experiences—such as sustainable agriculture, waste management, and eco-friendly product development—transform abstract environmental knowledge into applied learning outcomes. Through this mechanism, students not only strengthen their environmental awareness and skills but also cultivate critical thinking, creativity, and a proactive mindset essential for sustainable entrepreneurship.

5.2 Comparison with Previous Studies

The results of this study are consistent with previous research emphasizing the pivotal role of environmental and entrepreneurial education in fostering sustainable mindsets among youth [e.g., 16, 17, 23]. Similar to earlier findings, the present study confirms that experiential and project-based learning approaches significantly enhance students' engagement in green innovation and entrepreneurship [29, 31]. However, this research extends prior work by providing empirical evidence from a junior high school context, a relatively underexplored educational stage. Most prior studies have focused on university students,

whereas this study highlights that early exposure to integrated green education and entrepreneurship practice can foster sustainable orientations even among younger learners.

5.3 Theoretical and Practical Implications

From a theoretical perspective, these findings contribute to the growing body of literature on Green Entrepreneurial Orientation by integrating it with experiential learning frameworks. The reciprocal influence between GE and GEP demonstrates that green entrepreneurship is not merely an educational output but also an active pedagogical process that reinforces learning itself. This insight advances theoretical understanding of how environmental and entrepreneurial competencies co-evolve in educational environments.

From a practical standpoint, the findings underscore the importance of embedding sustainability-oriented entrepreneurship within both formal curricula and informal learning experiences. Schools should move beyond treating green initiatives as extracurricular activities and instead adopt holistic, project-based approaches that allow students to engage directly with real-world sustainability challenges. The case of SMP Alam Arridho illustrates how early, integrated exposure to green business practices can nurture environmental ethics, creative problem-solving, and responsible innovation—qualities essential for shaping future green leaders and change agents.

5.4 Recommendations and Suggestions for Future Research

Despite its valuable insights, this study has limitations that open avenues for further research. The focus on a single, nature-based school may constrain the generalizability of findings across different educational contexts. Additionally, the cross-sectional design limits the ability to assess long-term impacts on students' entrepreneurial behavior and environmental commitment. Future research should employ longitudinal or mixed method approaches to capture developmental changes over time. Comparative studies across urban and rural schools, or across different cultural and educational systems, would enrich understanding of contextual influences on GEO, GE, and GEP. Moreover, exploring the roles of teacher training, institutional support, and educational policy frameworks would provide deeper insights into how green entrepreneurship education can be effectively scaled and sustained within broader educational systems.

Declarations

Author Contributions

The following statements should be used:

Conceptualization, I.S.M. and R.K.A.; methodology, I.S.M. and R.K.A.; software, C.S.C.; validation, M.H. and N.M.; formal analysis, I.S.M.; investigation, R.K.A.; resources, N.M.; data curation, M.H.; writing—original draft preparation, I.S.M.; writing—review and editing, I.S.M. and R.K.A.; visualization, R.K.A.; supervision, C.S.C.; project administration, M.H. and N.M. All authors have read and agreed to the published version of the manuscript.

Data Availability Statement

Data available on request due to restrictions, e.g., privacy or ethical: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to [insert reason here].

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Institutional Review Board Statement

Informed consent was obtained from all subjects involved in the study.

Conflicts of Interest

The author declares that there is no conflict of interests regarding the publication of this manuscript.

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