

## **Educating for Sustainability: The Role of Transformative Teaching in Fostering SDG-Oriented Mindsets in Green Schools**

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In the face of escalating global environmental and social challenges, education has emerged as a critical instrument in achieving the Sustainable Development Goals (SDGs). This study investigates the role of transformative teaching in fostering SDG-oriented mindsets among students in green school environments. Anchored in transformative learning theory and the principles of Education for Sustainable Development (ESD), this research explores how pedagogical innovation, critical reflection, and experiential learning are employed to cultivate ecological awareness, global citizenship, and long-term sustainability values. Employing a qualitative multi-case study design, data were collected through in-depth interviews, classroom observations, and document analysis from an Adiwiyata (Green School) awarded Junior High School. Findings reveal that transformative teaching practices such as interdisciplinary project-based learning, outdoor ecological immersion, and student-led sustainability initiatives significantly contribute to shaping students' attitudes, behaviors, and agency toward the SDGs. The study also highlights the importance of institutional culture, teacher competencies, and curriculum alignment in supporting this transformation. The implications underscore the necessity of embedding transformative pedagogies within green school models to prepare learners not only to understand sustainable development but to act as proactive change agents in their communities.

**Keywords:** Transformative Teaching & Learning; Green School; SDGs

### **Introduction**

Humanity is increasingly confronted with crises that threaten its survival, including climate instability, biodiversity degradation, and widening social inequality (Pörtner et al., 2023). (UNESCO, 2014) emphasizes that education is one of the most powerful instruments for addressing these challenges, particularly in preparing younger generations to think critically and act responsibly. Schools, therefore, must move beyond rote instruction and function as

laboratories of sustainability. As one teacher in a green school in Tangerang noted during an interview, “Students understand climate change better when they experience composting or tree planting, not when they only read about it.” This statement illustrates the potential of experiential and transformative teaching.

Despite the proliferation of green school programs, implementation often remains superficial. In many cases, initiatives are limited to recycling campaigns or ceremonial tree-planting events. Are such activities truly reshaping student mindsets, or do they risk being symbolic gestures? (Ma et al., 2023) argues that sustainability in education requires a paradigm shift: a way of learning that “changes the way we see the world and our place in it.” Thus, embedding sustainability in schools involves not only curriculum content but also pedagogical design, institutional culture, and active community engagement. Evidence shows that transformative teaching characterized by critical reflection, dialogue, and real-world problem solving can promote long-term behavioral change among adolescents (Pérez-Martín & Esquivel-Martín, 2024). The pressing question, therefore, is how schools can systematically nurture SDG-oriented mindsets rather than relying on short-lived awareness campaigns (Koçulu, 2024).

Despite the promising discourse surrounding green schools, their implementation often encounters critical gaps. Many schools proudly carry the Adiwiyata label in Indonesia, yet observations reveal that some programs remain ceremonial such as annual clean-up days or poster competitions without fostering deeper behavioral transformation among students. A teacher we interviewed admitted, “Sometimes the program is treated as a checklist for awards, not as a continuous learning journey.” This tension underscores the problem: sustainability education risks becoming symbolic rather than substantive. Previous studies highlight similar concerns. (Ma et al., 2023) argues that environmental education frequently stops at awareness-raising and fails to instill lasting responsibility or action. Moreover, existing research tends to focus on curriculum integration or infrastructure, while neglecting the pedagogical approaches that genuinely shape students’ critical consciousness (Gaotlhobogwe et al., 2022). Although many schools in Indonesia proudly carry the Adiwiyata label, observations suggest that some programs remain ceremonial, focusing on annual clean-up days or competitions without fostering deeper transformation. A teacher acknowledged, “Sometimes the program is treated as a checklist for awards, not as a continuous learning journey.” This reflects broader concerns highlighted in the literature. (Onyeaka & Akinsemolu, 2024) notes that environmental education frequently stops at awareness and fails to instill sustained responsibility. Similarly, (Sørensen et al., 2023) observes that existing research often emphasizes curriculum or infrastructure, while overlooking pedagogical approaches that cultivate critical consciousness. The problem is clear: to ensure meaningful outcomes, schools must move beyond tokenism toward transformative learning experiences that empower students to internalize and act upon the principles of the SDGs (Fields et al., 2022).

The present study aims to investigate how transformative teaching can serve as a catalyst for fostering SDG-oriented mindsets in green schools. Rather than documenting program activities alone, this research examines pedagogical strategies, classroom practices, and institutional



supports that allow sustainability education to move from rhetoric to reality. Guided by the question, what makes teaching truly transformative in the context of environmental learning?, the study focuses on a private junior high school in Tangerang actively engaged in the Adiwiyata program. By analyzing project-based assignments, outdoor explorations, and student-led sustainability initiatives, the study seeks to enrich academic debates while offering practical guidance for educators and policymakers

Despite a growing body of literature on environmental education and green schools, important gaps remain. Much scholarship emphasizes policy frameworks, curriculum design, or eco-friendly infrastructure, while the lived experiences of teachers and students within transformative classrooms are less explored. Bibliometric analyses also show that research tends to cluster around broad themes such as awareness and policy, with fewer studies addressing the micro-level processes that foster critical reflection and behavioral change (Yang & Xiu, 2023). Furthermore, Indonesian experiences are underrepresented in international discussions, despite the country's ambitious Adiwiyata program designed to embed sustainability into schools nationwide. Are crucial insights being missed by overlooking how cultural and institutional contexts influence transformative teaching? Addressing this lacuna is essential if education is to move beyond slogans toward evidence-based practices that genuinely empower the next generation.

This study contributes to filling that gap by situating transformative teaching at the center of environmental education within Indonesian green schools. Unlike previous works that emphasize policy or infrastructure, this research highlights pedagogical practices and lived experiences that cultivate SDG-oriented mindsets among junior high school students. Its originality lies in the qualitative, in-depth exploration of how teaching strategies ranging from interdisciplinary projects to student-led sustainability initiatives translate sustainability discourse into personal conviction and action. By focusing on the intersection of pedagogy, institutional support, and cultural context, this study advances theoretical understanding in Education for Sustainable Development (ESD) and provides practical recommendations for schools and policymakers. Academically, it addresses a gap in a literature that often sidelines pedagogy in favor of structural analysis; practically, it offers models for moving beyond symbolic activities toward authentic, long-term commitments to sustainability among young learners.

## **Methodology**

This study adopted a qualitative multi-case study design, deemed suitable for examining the complex pedagogical practices and contextual dynamics embedded within green schools. The analytical emphasis was placed on understanding how transformative teaching fosters SDG-oriented mindsets among students, with particular attention to the lived experiences of teachers, learners, and institutional stakeholders.



The research sites comprised junior high schools (Sekolah Menengah Pertama) in Tangerang that had been granted the Adiwiyata award, a national recognition for institutions implementing environmentally oriented education. These schools provided exemplary cases of the green school model, where sustainability principles are systematically embedded into curriculum, pedagogical practices, school culture, and community engagement.

### *Data Collection Techniques*

Multiple complementary techniques were employed to ensure comprehensive coverage and analytical depth. In-depth interviews were conducted with teachers, students, and foundation members to capture diverse perspectives on transformative teaching practices and sustainability initiatives. Classroom observations were undertaken to document how these pedagogical strategies were enacted in real-time learning environments, offering direct insights into teacher–student interactions and the contextual dynamics of instruction. In addition, document analysis was performed on curriculum frameworks, lesson plans, school regulations, and program reports, thereby providing the institutional and policy context that complemented the interview and observational data. The integration of these methods enabled triangulation, enriched interpretive validity, and allowed for a more nuanced understanding of how transformative pedagogy contributes to the development of SDG-oriented mindsets within green schools.

### *Data Analysis*

All interviews and observational notes were transcribed verbatim to preserve the authenticity of participants' accounts. Data analysis followed the Miles and Huberman (1994) framework, which proceeds through iterative stages. The process began with open coding, where meaningful data segments were systematically labeled. Codes were then clustered into sub-themes, which were subsequently synthesized into broader analytical themes. Given the multi-case study design, a cross-case analysis was conducted to compare findings across different classrooms, teachers, and schools. This approach allowed the identification of recurring patterns, contextual variations, and unique dynamics that shaped the enactment of transformative teaching. Throughout the process, constant comparison was employed to refine emerging insights, while triangulation across data sources enhanced robustness. Finally, the themes were situated within the theoretical frames of Transformative Learning Theory (Brodowski, 2025) and Education for Sustainable Development (ESD) to ensure interpretive depth and alignment with established scholarly discourse.

## **Findings and Discussion**

The findings of this study underscore that transformative teaching practices such as interdisciplinary project-based learning, outdoor ecological immersion, and student-led sustainability initiatives play a pivotal role in shaping students' attitudes, behaviors, and agency toward the Sustainable Development Goals (SDGs). These results align with (Pérez-Martín & Esquivel-Martín, 2024) Transformative Learning Theory, which emphasizes that deep learning occurs when learners engage in critical reflection and authentic experiences that challenge their



prior assumptions. In line with (Gelmez et al., 2024), the present study illustrates that experiential approaches, particularly those situated in real-life ecological contexts, foster not only environmental awareness but also enduring shifts in values and behavior. Importantly, the data highlight that transformation occurs most effectively when pedagogical innovation is embedded within a supportive institutional culture, competent teaching practices, and a curriculum aligned with sustainability objectives. This resonates with Sørensen's et al., (2023) argument that effective education for sustainability requires coherence across pedagogical, structural, and cultural dimensions. However, the findings also invite a critical question: to what extent do all green school practices embody transformative potential, and when do they risk devolving into symbolic gestures rather than meaningful change? By situating these results within broader theoretical discourse, this study contributes to clarifying the mechanisms through which transformative pedagogy translates sustainability rhetoric into genuine student agency.

Beyond their immediate relevance to classroom practice, the findings of this study contribute meaningfully to both theory and practice in the field of Education for Sustainable Development (ESD). Theoretically, the evidence extends the application of *Transformative Learning Theory* by demonstrating how critical reflection, dialogue, and experiential engagement can be operationalized within the context of junior high schools in Indonesia, a setting often overlooked in global scholarship. This not only affirms Pérez-Martín's & Esquivel-Martín's, (2024) claim that transformative learning requires disorienting experiences but also illustrates how such experiences can be systematically embedded in green school initiatives. Practically, the study highlights actionable strategies for educators, such as integrating interdisciplinary projects that link science with social responsibility, or designing outdoor ecological immersions that translate abstract sustainability concepts into lived student experiences. At the institutional level, the results stress the importance of cultivating a sustainability-oriented culture supported by curriculum alignment and teacher competence, echoing recent calls for systemic approaches to ESD (UNESCO, 2014). For policymakers, these findings underscore the need to move beyond symbolic recognition programs and instead invest in professional development and curricular innovation that enable schools to function as engines of sustainability transformation (Kalla et al., 2022). Thus, the study bridges the gap between theoretical discourse and practical application, offering a framework that is both conceptually robust and directly implementable.

While the findings provide valuable insights into the role of transformative teaching in fostering SDG-oriented mindsets, several limitations must be acknowledged to ensure balanced interpretation. First, the study was conducted in a single Adiwiyata junior high school in Tangerang, which restricts the extent to which the results can be generalized across diverse educational settings. The institutional culture, teacher capacity, and community engagement specific to this school may not be representative of other contexts, particularly rural or under-resourced schools. Second, the relatively short period of data collection limited the capacity to trace the long-term effects of transformative pedagogy on students' behavioral change, an aspect that typically requires longitudinal observation to capture its sustained impact. Third, although perspectives from teachers, students, and foundation members were included, the



voices of parents and local community stakeholders were not fully incorporated, which may have constrained the richness of the findings. These limitations do not diminish the significance of the results but highlight the need for cautious interpretation and contextual sensitivity. Acknowledging such boundaries is crucial, as it ensures the research is situated within its specific scope and opens avenues for refinement in future studies.

Building on these limitations, several directions for future research are warranted to deepen and broaden understanding of transformative teaching in the context of sustainable education. Comparative multi-site studies across different types of schools both Adiwiyata and non-Adiwiyata would allow researchers to identify contextual variations and assess whether the practices observed in this study are replicable across diverse institutional and cultural settings. Furthermore, longitudinal research designs are essential to evaluate the long-term impact of transformative pedagogy, since genuine behavioral change and the development of sustainability-oriented agency often require extended timeframes to materialize. Expanding the range of participants to include parents, community stakeholders, and policymakers would also enrich the analysis by incorporating perspectives that influence, and are influenced by, school-based sustainability practices (Utomo et al., 2023). Finally, given the increasing role of technology in education, future research should investigate how digital learning tools and virtual simulations can be integrated into transformative pedagogies, balancing their potential to enhance learning engagement with the ethical considerations of equity and accessibility. Such studies would not only address the limitations of the present work but also contribute to a more comprehensive and globally relevant framework for Education for Sustainable Development.

The findings of this study also carry significant social and ethical implications, particularly in positioning schools as catalysts for cultural transformation toward sustainability. By embedding transformative pedagogy into the daily practices of green schools, education moves beyond the classroom and extends into the community, cultivating a generation of learners who are equipped not only with knowledge but also with the agency to act as change leaders. Ethically, however, it is essential to ensure that students are not reduced to passive participants in ceremonial “green” activities but are genuinely empowered to shape initiatives that reflect their voices, values, and lived realities. The integration of digital tools, such as virtual simulations and online collaborative platforms, offers promising avenues to enhance engagement, yet it also raises critical concerns regarding equity, digital divides, and the potential commodification of sustainability education. As Selwyn (2021) cautions, technology in education must always be scrutinized through an ethical lens to prevent reinforcing exclusion or dependency. Thus, the study underscores that the pursuit of sustainability through transformative teaching is not merely a pedagogical innovation but also a social commitment and moral responsibility to nurture active, equitable, and ethically aware global citizens.

## Conclusion and Recommendations

This study demonstrates that transformative teaching practices such as interdisciplinary project-based learning, outdoor ecological immersions, and student-led sustainability initiatives play a pivotal role in cultivating SDG-oriented mindsets among adolescents in green schools. The evidence underscores that effective sustainability education requires more than curriculum content or infrastructural initiatives; it depends on pedagogy that enables critical reflection, fosters student agency, and bridges school learning with community engagement. The role of institutional culture, teacher competence, and curricular alignment emerges as decisive in ensuring that environmental education transcends symbolic gestures and becomes an authentic, lived experience for students. By situating these findings within the frameworks of Transformative Learning Theory and Education for Sustainable Development, the study affirms that schools can function not only as spaces of knowledge transmission but as incubators of long-term behavioral transformation and social responsibility.

Several recommendations arise from these insights. First, schools should institutionalize transformative pedagogical approaches, moving beyond ceremonial or checklist-driven green initiatives toward strategies that prioritize experiential, dialogic, and reflective learning. Second, policymakers and educational foundations must provide sustained capacity-building for teachers, equipping them with the skills and resources needed to integrate sustainability principles meaningfully into their practice. Third, future research should adopt multi-site and longitudinal designs to capture variations across contexts and assess long-term impacts, while also amplifying student voices as central actors in sustainability transformation. Finally, attention should be given to the ethical integration of digital technologies, ensuring that tools designed to enhance sustainability education remain accessible, equitable, and socially responsible.

Collectively, these recommendations signal that the transformative potential of green schools lies not in symbolic activities, but in pedagogical innovation, institutional commitment, and systemic collaboration. When these elements converge, schools can move beyond rhetoric to nurture a generation capable of confronting sustainability challenges with critical consciousness, resilience, and actionable agency.

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