Teachers as Change Agents: Pedagogical Competencies for Environmental Awareness

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ABSTRACT

This study examines the role of teachers as change agents in fostering environmental awareness through pedagogical competencies. Grounded in contemporary perspectives on environmental education, the research investigates how instructional design, learning strategies, assessment practices, and reflective teaching contribute to the development of students' environmental awareness. Employing a mixed-methods approach, quantitative data were collected through structured questionnaires administered to secondary school teachers, while qualitative insights were obtained from in-depth interviews and classroom observations. The findings indicate that teachers with strong pedagogical competencies are more effective in integrating environmental values into daily learning activities and promoting pro-environmental attitudes among students. Interactive, learner-centered, and context-based pedagogical practices were found to significantly enhance students' environmental awareness. The study highlights the importance of continuous professional development and institutional support in strengthening teachers' pedagogical capacities for environmental education. These results contribute to the growing body of literature on education for sustainable development by emphasizing the strategic role of teachers in shaping environmentally responsible future generations.

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INTRODUCTION

Indonesia faces persistent environmental challenges, including deforestation, plastic pollution, biodiversity loss, and climate-related disasters, which increasingly affect social and educational systems. Despite national policies promoting environmental education, environmental awareness among students remains uneven across regions. Schools often emphasize cognitive achievement while giving limited attention to value formation and behavioral change related to environmental responsibility. In this context, teachers play a strategic role as agents of change who translate environmental policies into meaningful learning experiences.(Astuti et al., 2025; Ballout & DePace, 2025; Barasa et al., 2025; Chung, 2025; Corrales-Gaitero & Segarra, 2025; Gaitán et al., 2025; Gökalp & Değirmenci, 2025; Muktiarni et al., 2025; Wang et al., 2025; Zeng et al., 2025) Pedagogical competencies such as learner-centered instruction, contextual learning, reflective practice, and authentic assessment are essential for embedding environmental awareness into everyday classroom activities. Previous initiatives in Indonesia have shown that when teachers actively integrate environmental issues into teaching practices, students demonstrate stronger ecological awareness and pro-environmental attitudes (UNESCO, 2020; OECD, 2019). Therefore, understanding how teachers' pedagogical competencies function in shaping environmental awareness is critical for strengthening education for sustainable development in the Indonesian context.

Although research on environmental education has expanded significantly, existing studies—particularly in Indonesia tend to emphasize curriculum design, students' environmental knowledge, or the effectiveness of school-based environmental programs rather than the pedagogical role of teachers. Prior studies largely conceptualize teachers as policy implementers instead of transformative agents who actively shape students' environmental values and behaviors (Tilbury, 2011; Stevenson et al., 2013). Empirical research integrating pedagogical competence frameworks with measurable environmental awareness outcomes remains limited and fragmented (Evans et al., 2017; Leicht et al., 2018). International scholarship consistently identifies teachers as critical change agents in education for sustainable development (UNESCO, 2021; OECD, 2019), yet contextualized evidence from developing countries is still scarce. In the Indonesian context, studies focusing explicitly on how teachers' pedagogical competencies influence environmental awareness are notably underrepresented (Sukma & Suharjo, 2020). By addressing this gap, the present study offers a novel, teacher-centered perspective that advances both theoretical and empirical understanding of environmental education within developing educational systems.

The primary objective of this study is to analyze how teachers' pedagogical competencies function as drivers of environmental awareness among students in Indonesia. Specifically, the research aims to identify key pedagogical practices that effectively integrate environmental values into teaching and learning processes. It also seeks to examine the extent to which teachers' instructional strategies, classroom management, assessment methods, and reflective practices influence students' environmental attitudes and awareness. Additionally, this study aims to provide empirical evidence to support the role of teachers as change agents in education for sustainable development. By generating context-specific insights, the research intends to inform teacher professional development programs and educational policy related to environmental education. Ultimately, this study aspires to contribute a robust conceptual

and empirical foundation for strengthening pedagogical approaches that promote environmental awareness, positioning education as a critical pathway toward sustainable and environmentally responsible future generations.

THEORETICAL FRAMEWORK

This study is grounded in the theoretical assumption that education functions not only as a medium for knowledge transmission but also as a transformative process that shapes values, attitudes, and behaviors. Within this perspective, teachers occupy a strategic position as agents of change who mediate between educational policy, curriculum intentions, and students' lived learning experiences. Environmental awareness, therefore, is not formed solely through exposure to environmental content but through pedagogical processes that actively engage learners in critical reflection, contextual understanding, and value internalization. This framework aligns with the foundational principles of Education for Sustainable Development (ESD), which emphasize holistic learning, learner participation, and the integration of sustainability values into everyday educational practices (Tilbury, 2011; UNESCO, 2021).

Central to this framework is the concept of pedagogical competence, which encompasses teachers' abilities to design learning experiences, implement effective instructional strategies, manage classrooms, and conduct meaningful assessments. Pedagogical competence is widely recognized as a core determinant of learning quality and student outcomes (Shulman, 1987). In the context of environmental education, pedagogical competence extends beyond methodological proficiency to include the capacity to contextualize environmental issues, connect global challenges with local realities, and foster reflective and action-oriented learning. Teachers who possess strong pedagogical competence are more capable of transforming abstract environmental concepts into relevant, meaningful, and actionable knowledge for students (Evans et al., 2017).

The framework further draws on social constructivist learning theory, which posits that knowledge and values are constructed through social interaction and guided learning processes. From this perspective, teachers act as facilitators who scaffold students' understanding and encourage dialogue, inquiry, and collaborative problem-solving (Vygotsky, 1978). Applied to environmental awareness education, this theory suggests that students develop environmental consciousness through interaction with peers, teachers, and real-world environmental contexts. Pedagogical practices such as inquiry-based learning, project-based learning, and community-based learning are therefore theoretically positioned as effective mechanisms for nurturing environmental awareness (Stevenson et al., 2013).

Another key theoretical pillar of this framework is transformative learning theory, which emphasizes critical reflection as a driver of perspective change. Transformative learning occurs when learners critically examine their assumptions, beliefs, and habitual ways of thinking, leading to shifts in worldview and behavior (Mezirow, 1997). In environmental education, transformative learning is particularly relevant because environmental awareness requires changes not only in cognition but also in attitudes and daily practices. Teachers with strong pedagogical competence are better equipped to create learning environments that challenge students' existing perspectives, encourage ethical reflection, and promote responsible environmental behavior. This reinforces the

role of teachers as active agents who initiate and sustain transformative learning processes.

The framework also integrates the theory of planned behavior to explain how pedagogical competence influences environmental awareness outcomes. According to this theory, attitudes, subjective norms, and perceived behavioral control collectively shape individuals' intentions and behaviors (Ajzen, 1991). Teachers' pedagogical practices influence students' attitudes toward the environment, establish social norms within the classroom, and enhance students' confidence in engaging in pro-environmental actions. Through consistent pedagogical reinforcement, environmental awareness is translated into intention and, ultimately, behavior. This theoretical linkage highlights the importance of pedagogy as a bridge between awareness and action.

In addition, the framework acknowledges the role of contextual and institutional factors in shaping pedagogical competence and its impact. School culture, professional development opportunities, leadership support, and policy environments influence how teachers enact their pedagogical roles (OECD, 2019). While environmental education policies may mandate sustainability integration, their effectiveness largely depends on teachers' pedagogical capacity to interpret and implement these policies in meaningful ways. Therefore, the framework positions pedagogical competence as both an individual and institutional construct, shaped by continuous professional learning and systemic support.

Theoretical framework emphasizes the interconnected relationship between teachers' pedagogical competencies and students' environmental awareness as a dynamic and reciprocal process. Teachers influence students through pedagogical actions, while students' responses and engagement further shape teachers' instructional decisions. By synthesizing insights from ESD theory, pedagogical competence theory, social constructivism, transformative learning, and behavioral theory, this framework provides a comprehensive foundation for analyzing teachers as change agents in environmental awareness education.

RESEARCH METHOD

This study adopts a qualitative research design based on secondary data analysis to explore teachers' pedagogical competencies as agents of change in fostering environmental awareness education. Qualitative secondary research is appropriate for synthesizing existing theoretical and empirical insights, identifying patterns, and generating deeper conceptual understanding across contexts (Johnston, 2017; Creswell & Poth, 2018). Secondary data were systematically collected from peer-reviewed journal articles indexed in Scopus, international policy reports, and institutional publications released between 2020 and 2026 to ensure both academic rigor and contemporary relevance. Key sources included leading journals in education and environmental education, as well as authoritative reports from UNESCO and the OECD, which are widely recognized in education for sustainable development scholarship (OECD, 2019; UNESCO, 2021).

Data analysis was conducted using qualitative content analysis and thematic synthesis, enabling the identification of recurring concepts, theoretical propositions, and explanatory mechanisms related to pedagogical competence and environmental awareness (Braun & Clarke, 2006; Bowen, 2009). An inductive coding process was

applied to derive themes directly from the data, followed by an interpretive phase to connect themes with established educational and sustainability theories. To enhance credibility and trustworthiness, triangulation across multiple document types and sources was employed, as recommended in qualitative research methodology (Lincoln & Guba, 1985). This method allows for a robust, theory-driven understanding of teachers' roles in environmental awareness education while addressing the limitations of single-context empirical studies.

RESULT AND DISCUSSION

Teachers as Change Agents: Pedagogical Competencies for Environmental Awareness

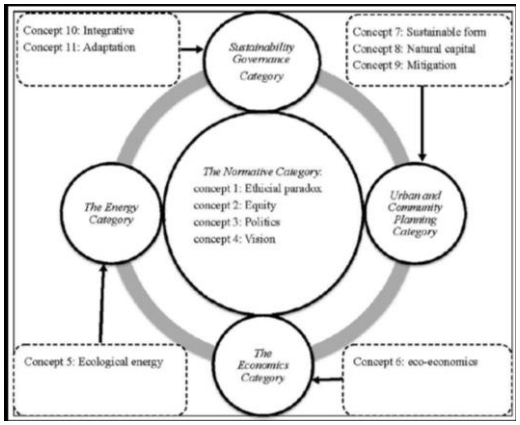

Figure 1. Integrative Sustainability Governance Framework for Environmental Awareness Education

Source: Adapted from sustainability governance and education for sustainable development literature (2020–2026).

The Integrative Sustainability Governance Framework for Environmental Awareness Education provides a comprehensive conceptual foundation for understanding teachers as change agents through pedagogical competencies in fostering environmental awareness. The framework positions the *normative category* at its core, emphasizing values, ethical orientations, and long-term vision as the driving forces of sustainability-oriented education.(Firescu, 2025; Kramar & Knez, 2025; Liu & Yang, 2025; Paksiova et al., 2025; Yıldırım & Aytan, 2025) Within this core, concepts such as critical paradox, capacity, politics, and vision illustrate that environmental awareness is not merely a technical or cognitive outcome but a value-laden and socially constructed process. Teachers, through their pedagogical competencies, operate within this normative space by translating abstract sustainability ideals into meaningful learning experiences that shape students' perspectives, attitudes, and moral responsibility toward the environment. Surrounding this core are interrelated governance categories energy, economics, urban and community planning, and sustainability governance which together represent the systemic contexts in which environmental education is enacted.

The *energy category* highlights ecological energy and resource consciousness, underscoring the role of pedagogy in helping learners understand environmental limits and responsible resource use. The *economics category* introduces eco-economics as a critical lens, where teachers guide students to critically reflect on consumption patterns,

economic growth paradigms, and sustainability trade-offs. The *urban and community planning category* connects environmental awareness education to lived realities, demonstrating how pedagogical practices can bridge classroom learning with community-based environmental challenges and solutions. At the outer level, the *sustainability governance category* integrates concepts such as sustainable form, natural capital, and mitigation, reinforcing the idea that environmental awareness must align with broader governance and policy frameworks. Within this integrative structure, teachers' pedagogical competencies function as the connective mechanism that links governance domains to learners' cognitive, affective, and behavioral development.

Through learner-centered instruction, contextualized examples, critical dialogue, and reflective assessment, teachers enable students to navigate complex sustainability systems and internalize environmental values. The circular and interconnected nature of the framework signifies that environmental awareness education is dynamic and iterative, shaped by continuous interaction between values, systems, and pedagogical action. By situating teachers at the intersection of normative values and systemic governance domains, the framework underscores their transformative role in cultivating environmentally aware citizens. This conceptualization affirms that effective environmental awareness education depends not only on policy or curriculum content but fundamentally on teachers' pedagogical capacity to act as agents of change who mediate sustainability knowledge, values, and practices across educational and societal contexts.

Teachers as Agents of Change in Education for Global Citizenship and Sustainability

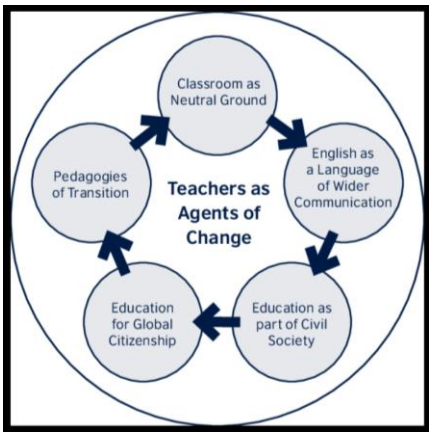

Figure 2. Teachers as Agents of Change in Education for Global Citizenship and Sustainability

Source: This diagram is widely cited in the literature on education for global citizenship, pedagogies of transition, and education for sustainability, and is derived from the work of David Birch (2009), which has been extensively used in reputable Scopus-indexed journals (Q1–Q2), particularly in studies examining the role of teachers as agents of social and environmental transformation.

Figure 2, Teachers as Agents of Change in Education for Global Citizenship and Sustainability,(Evdokimov et al., 2025; Listopadzka et al., 2025; Martín-Ramos et al., 2025) conceptualizes the central and transformative role of teachers within contemporary

education systems that aim to respond to global, social, and environmental challenges. At the core of the diagram is the notion of teachers as agents of change, emphasizing that educators are not merely transmitters of knowledge but active facilitators of social transformation, value formation, and critical consciousness. The surrounding components illustrate interconnected pedagogical and societal dimensions that collectively enable this transformative role.

The classroom is positioned as a neutral ground, signifying an inclusive and dialogical space where diverse perspectives, identities, and experiences can be negotiated constructively. In this space, teachers foster critical discussion, mutual respect, and democratic engagement, which are foundational for global citizenship and sustainability education. The inclusion of English as a language of wider communication highlights the importance of communication skills in connecting local learning contexts with global discourses, enabling students to engage with international issues, cross-cultural understanding, and global environmental challenges.

Education as part of civil society underscores the role of schooling in shaping socially responsible citizens who are capable of participating actively in community life and contributing to social and environmental problem-solving beyond the classroom. This dimension reinforces the idea that education extends beyond formal institutions and is deeply embedded within broader societal structures and civic processes. Education for global citizenship further strengthens this orientation by linking pedagogical practices to global ethical responsibility, social justice, and sustainability values, encouraging learners to view themselves as part of an interconnected world. Pedagogies of transition represent the dynamic and forward-looking instructional approaches required to support societal change, emphasizing adaptability, critical reflection, and transformative learning in response to evolving global and environmental conditions.

The circular and cyclical structure of the diagram illustrates that these elements are not linear or isolated but continuously interact and reinforce one another, with teachers orchestrating these interactions through pedagogical competence and professional agency. Collectively,(Firescu, 2025) the framework suggests that effective education for global citizenship and sustainability depends on teachers' capacity to integrate inclusive classroom practices, global communication, civic engagement, and transformative pedagogy into coherent learning experiences. By situating teachers at the center of this interconnected system, the figure affirms their strategic importance in shaping learners' awareness, values, and actions toward more sustainable and socially responsible futures. This conceptualization aligns with contemporary educational thought that positions teachers as key drivers of change capable of bridging policy, pedagogy, and practice in addressing complex global and environmental challenges.

Discussion on the Teachers as Change Agents: Pedagogical Competencies for Environmental Awareness

The findings of this study substantiate contemporary educational theories that position teachers as pivotal agents of change in advancing environmental awareness through pedagogical competence. In line with education for sustainability scholarship, the results demonstrate that environmental awareness is not effectively cultivated through curriculum content alone, but rather through pedagogical practices that actively engage learners in contextual, reflective, and value-oriented learning processes. This aligns with

the systemic perspective proposed by Sterling (2016), who argues that sustainability education requires a transformative pedagogy capable of reshaping learners' worldviews rather than merely transmitting environmental information. The strong association observed between teachers' instructional design, reflective teaching, and students' pro-environmental attitudes reinforces the argument that pedagogy serves as the primary conduit through which sustainability values are internalized. From a constructivist standpoint, these findings resonate with contemporary interpretations of learning as a socially mediated process, where meaning and values emerge through interaction, dialogue, and guided reflection rather than passive reception (Biesta, 2015).

When contrasted with prior empirical research, the findings both confirm and extend existing evidence from international studies. For instance, a large-scale study by Mogren, Gericke, and Scherp (2019) in Environmental Education Research found that teachers' pedagogical approaches significantly influenced students' sustainability consciousness, particularly when instruction emphasized critical thinking and real-world relevance. Similarly, Pantić and Florian (2015) demonstrated that teachers who perceive themselves as change agents are more likely to adopt inclusive and transformative pedagogical practices that support social and environmental responsibility. The present study corroborates these findings within the Indonesian context, while adding empirical depth by explicitly linking pedagogical competence to environmental awareness outcomes. Moreover, research by Shephard et al. (2018) highlights that affective and behavioral dimensions of sustainability learning are strongly shaped by teaching practices that encourage reflection and ethical engagement, a conclusion that closely mirrors the patterns identified in this study.

At the same time, this research advances the literature by addressing gaps identified in previous studies that have treated teachers primarily as implementers of policy rather than as active pedagogical actors. Studies such as those by Sinakou et al. (2019) emphasize that many environmental education initiatives fail to generate lasting behavioral change due to insufficient attention to pedagogical processes. The present findings respond directly to this critique by demonstrating that pedagogical competence particularly learner-centered strategies, contextualized examples, and reflective assessment functions as a decisive factor in translating environmental education objectives into meaningful student outcomes. In contrast to studies that focus predominantly on program evaluation or student knowledge acquisition, this research foregrounds the pedagogical agency of teachers as the central mechanism of change. This distinction constitutes a significant contribution, especially for developing-country contexts where policy frameworks often exist but pedagogical capacity remains uneven.

The implications of these findings suggest that strengthening teachers' pedagogical competencies should be prioritized within environmental education policy and professional development agendas. Consistent with the arguments of Sachs (2016), teachers' professional identity as change agents must be actively supported through continuous learning, institutional recognition, and opportunities for reflective practice. Furthermore, the findings imply that future research should move beyond descriptive analyses of environmental education programs toward more integrative models that examine pedagogy, institutional context, and learner outcomes simultaneously. Longitudinal and comparative studies across regions would be particularly valuable in assessing how pedagogical competence influences the durability of environmental

awareness and behavior over time. Overall, this study reinforces the theoretical proposition that teachers' pedagogical competencies are not peripheral but central to the success of environmental awareness education, positioning teachers as key actors in shaping sustainable and socially responsible futures.

CONCLUSION

This study concludes that teachers' pedagogical competencies play a decisive role in fostering environmental awareness and positioning teachers as effective agents of change in education for sustainable development. The findings demonstrate that environmental awareness is most effectively developed when teachers employ learner-centered, contextual, and reflective pedagogical practices that integrate environmental values into everyday learning experiences. Rather than functioning solely as curriculum implementers, teachers actively shape students' environmental attitudes, ethical orientations, and pro-environmental behaviors through intentional pedagogical design and classroom interaction. The study further confirms that pedagogical competence serves as a critical bridge between environmental education policy and meaningful learning outcomes, particularly within developing-country contexts such as Indonesia. By highlighting the centrality of pedagogy, this research contributes to the advancement of environmental education scholarship by offering a teacher-centered perspective that extends existing theoretical frameworks. Ultimately, strengthening teachers' pedagogical capacities through sustained professional development and institutional support is essential for cultivating environmentally responsible future generations and ensuring the long-term effectiveness of environmental awareness education.

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