


# Fostering environmental awareness through ecological art to enhance creativity in primary school students



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## ABSTRACT

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The escalating environmental challenges, such as climate change and biodiversity loss, highlight the urgent need for education systems to foster environmental awareness and action in younger generations. This study investigates the integration of Ecological Art into the Pancasila Student Profile Strengthening Project (P5) in two Indonesian primary schools in contrasting ecological settings: a mountainous region and a coastal area. Employing a qualitative approach, the research examines how local ecological contexts influence students' creativity, environmental awareness, and collaboration. Data were collected through observations, interviews, and document analysis to evaluate the role of Ecological Art in addressing local and global ecological concerns. Findings demonstrate that using natural materials such as bamboo and clay in the mountainous school reinforced connections to cultural heritage and sustainability. Conversely, the coastal school's focus on recycling plastic waste underscored the urgency of combating pollution. Ecological art engages students emotionally and socially, fostering environmental consciousness and creative problem-solving skills. However, limited resources and insufficient teacher training were identified as barriers to broader implementation. This research highlights the potential of Ecological Art as a pedagogical tool to enhance sustainability education through place-based learning and community engagement. Recommendations are provided for educators and policymakers to adapt curricula to local ecological and cultural contexts, contributing to the broader discourse on transformative education for sustainability.



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## 1. Introduction

Integrating ecological art in primary school curricula can potentially cultivate environmental awareness and creativity among young students. Artistic approaches to ecological literacy can effectively engage students with environmental concepts and issues, ultimately promoting a deeper connection to the natural world. Such efforts are particularly important as they bridge cognitive learning with emotional and practical engagement [1], [2]. Research suggests that the symbiotic relationship between art and ecology within an outdoor learning environment, such as the Forest School model, can empower students in various ways [3]. Students may become "scientists/artists," making discoveries through collaborative efforts and infusing art and science as they explore their surroundings [4]. This integration of disciplines enhances their academic growth and nurtures their environmental consciousness [3].

Furthermore, using materials from the natural environment and the purposeful integration of sustainable practices in the curriculum can foster a sense of environmental stewardship,

helping students develop a personal commitment to sustainability [2]. One study highlights implementing a model for teaching environmental education through art, where the environment was utilized as both context and content. This approach emphasized art-making from natural materials, multidisciplinary connections, and exploring multiple perspectives [5]. This model provided valuable learning experiences beyond traditional classroom boundaries by immersing students in outdoor settings. The outcomes of this study suggest that moving beyond the classroom into the landscape can foster a deeper understanding and appreciation for the natural world. Therefore, integrating ecological art into primary school curricula emerges as a powerful tool for cultivating environmental awareness and creativity [6].

The global environmental crisis, characterized by climate change, biodiversity loss, deforestation, and unsustainable resource exploitation, has underscored the urgent need for transformative educational strategies [7]. Modern education systems are increasingly tasked with cultivating environmental awareness and fostering proactive attitudes toward sustainability among younger generations. While international frameworks such as the United Nations' Sustainable Development Goals (SDGs) advocate for integrating sustainability into educational curricula, the operationalization of these goals remains fraught with challenges, particularly in primary education [8], [9]. These challenges necessitate innovative approaches that transcend traditional teaching methodologies and address the cognitive, emotional, and social dimensions of learning. Traditional environmental education often emphasizes theoretical content, neglecting the experiential and interdisciplinary aspects essential for fostering meaningful engagement [10], [11]. For instance, while students may acquire knowledge about environmental degradation, they frequently lack opportunities to apply it creatively or engage with ecological issues personally. This lack of practical application inhibits the transformative potential of environmental education, reducing its efficacy in fostering active participation and critical thinking. To address these shortcomings, educational frameworks must adopt holistic approaches integrating diverse disciplines and encouraging experiential learning. Students are unlikely to develop the skills or motivation necessary to address global environmental challenges without such integration.

Ecological art has emerged as a compelling pedagogical framework that aligns art education with environmental advocacy [1], [12]. By integrating natural and recycled materials into artistic practices, Ecological Art promotes sustainability, creativity, and critical reflection [13], [14]. This interdisciplinary approach fosters a deeper connection to ecological issues, enabling students to engage with environmental challenges through cognitive and affective lenses [14]. The emphasis on collaborative creativity further enhances students' social skills, while artistic activities' tactile and sensory nature anchors environmental awareness in tangible experiences [15]–[17]. Research highlights the potential of Ecological Art to transcend cognitive learning by cultivating emotional and social connections to ecological concerns, fostering a more profound and enduring commitment to sustainability. The potential of Ecological Art is particularly relevant in the context of the United Nations' SDGs, particularly Goal 4 (Quality Education) and Goal 13 (Climate Action) [18], [19]. Art-based ecological initiatives provide a practical means of addressing these goals by embedding sustainability into the curriculum and empowering students as agents of environmental change [20], [21]. However, despite its promise, the practical implementation of Ecological Art in primary education remains underexplored. One notable study on this topic is the work of Saraiva and Azevedo [22], which provides a compelling exploration of the subject [22].

Significant gaps exist in understanding how this approach can be effectively integrated into diverse ecological and cultural contexts. Addressing these gaps requires localized, empirical studies that examine the interplay between Ecological Art and primary education. Indonesia presents a compelling case for exploring the potential of Ecological Art in primary education. As a nation characterized by immense ecological and cultural diversity, Indonesia offers unique opportunities for contextualizing sustainability education [8], [23]. The Pancasila Student Profile Strengthening Project (*Proyek Penguatan Profil Pelajar Pancasila*, or P5) under the Independent Curriculum provides a structured platform for integrating sustainability into education. Through P5, students engage with local ecological contexts, blending traditional ecological knowledge with contemporary sustainability practices [24]. However, the extent to which P5 incorporates principles of Ecological Art remains unclear, representing a critical gap in its implementation. Indonesia's diverse ecological landscapes, ranging from mountainous

regions to coastal areas, offer distinct opportunities for incorporating Ecological Art into education. Schools in mountainous areas, for example, often have access to natural resources such as bamboo, clay, and other materials that can inspire sustainable artistic projects. These resources can be used to create artworks that reflect local ecological narratives, fostering a sense of place and environmental stewardship. Coastal schools, in contrast, grapple with pressing issues such as plastic pollution, which presents unique opportunities for recycling initiatives and creative reuse of waste materials. By aligning artistic practices with these ecological contexts, educators can cultivate both environmental awareness and creative problem-solving skills among students.

Despite these opportunities, significant barriers hinder the widespread adoption of Ecological Art in Indonesian primary schools. Limited teacher training, inadequate resources, and a lack of awareness about the pedagogical potential of Ecological Art are common challenges. Furthermore, existing research often prioritizes theoretical discussions over practical applications, leaving educators with few concrete strategies for implementing Ecological Art in diverse educational settings. This disconnect between theory and practice underscores the need for empirical studies that document best practices, identify challenges, and evaluate the impact of Ecological Art on students' learning outcomes. Such studies are essential for translating the theoretical potential of Ecological Art into actionable strategies that can be implemented across varied educational contexts. Local ecological and cultural contexts play a crucial role in shaping the effectiveness of Ecological Art as an educational tool. Global discourses on sustainability education frequently emphasize the importance of contextual relevance but rarely explore how specific ecological and cultural narratives can enhance both environmental and artistic learning outcomes [25], [26]. Sustainability education must move beyond a one-size-fits-all approach to address diverse communities' unique ecological challenges and cultural identities. In Indonesia, this involves integrating traditional ecological knowledge—such as indigenous practices of sustainable resource management—into modern educational frameworks. By doing so, educators can create learning experiences that are not only relevant to students' lived experiences but also empowering in their potential to address real-world ecological issues [27]–[29]. Integrating Ecological Art into P5 activities offers a promising pathway for achieving these goals. By leveraging local ecological resources and cultural narratives, educators can design art-based projects that resonate with students' immediate environments while addressing broader sustainability objectives. A coastal school might engage students in creating art installations from collected marine debris, transforming waste into symbols of environmental advocacy. Similarly, a mountainous school could focus on bamboo crafts that highlight the sustainable use of local resources. These projects enhance students' artistic skills and foster a sense of agency and responsibility toward their ecological surroundings. The urgency of addressing these gaps is amplified by the need for evidence-based practices that can inform educational policies and teacher training programs; without empirical data on how Ecological Art functions in diverse contexts, its full potential remains unrealized. Investigating its application within P5 activities provides an opportunity to explore how local ecological contexts influence the effectiveness of art-based sustainability education. The findings could offer valuable insights into how educational strategies can be tailored to align with global sustainability goals and local realities.

## 2. Method

This study employs a qualitative research approach to explore the implementation of Ecological Art within the Pancasila Student Profile Strengthening Project (P5) in two primary schools located in contrasting ecological regions: mountainous and coastal areas in Indonesia. The qualitative design was chosen to capture the depth of participants' experiences and to understand the complexities of integrating art and sustainability within the specific environmental contexts of these schools. A case study methodology was employed to provide an in-depth analysis of the practices in each school and how local ecological resources influence the teaching and learning of sustainability through art [30], [31]. The research was conducted at two schools located in Kebumen Regency, Central Java, Indonesia: Public Elementary School 1 Gondanglegi, situated in a mountainous region, and Kalijoyo 2 Public Elementary School, located in a coastal area. The two schools were selected due to their distinct ecological challenges and opportunities. Public Elementary School 1 Gondanglegi is rich in natural

resources such as bamboo and clay, which can be used for creating art projects. In contrast, Kalijoyo 2 Public Elementary School faces significant environmental issues, particularly concerning plastic waste, which presents both a challenge and an opportunity for creative recycling. Participants in this study included 30 students from grade 4 at both schools, four teachers directly involved in the P5 activities, two school principals, and six parents who provided additional insights into the impact of the projects on students and the community.

Data were collected using multiple methods to ensure comprehensive insights into the phenomena under study. Non-participatory observations were conducted over three months to capture how ecological art was implemented during the P5 activities. The observations focused on how students engaged with natural and recycled materials, collaborated with peers, and communicated environmental messages through artwork. In addition to observations, semi-structured interviews were conducted with teachers, principals, and parents. These interviews explored their perspectives on integrating Ecological Art into the curriculum, the challenges faced, and the observed impact on students' creativity and environmental awareness. Interviews were audio-recorded and transcribed verbatim for analysis.

Furthermore, document analysis was carried out, focusing on school records, project plans, and student portfolios to understand the structure and goals of the P5 activities. This provided additional context for interpreting the observations and interview data. Student-created artworks formed a central component of the data collection process. The artworks were documented through photographs and analyzed for their use of natural and recycled materials, creativity, and the extent to which they conveyed environmental conservation messages. A rubric based on the principles of Ecological Art—such as material choice, sustainability, and artistic expression—was developed to guide the evaluation of the artworks.

The data analysis process followed a thematic approach, which involved coding and categorizing data into themes based on the five dimensions of Ecological Art: the use of natural materials, the promotion of sustainable development, collaborative activities, the utilization of recycled materials, and the communication of environmental messages. These themes were identified both a priori, based on the literature and theoretical framework, and inductively, as they emerged from the data. Thematic analysis was conducted manually, and the findings were continuously refined through an iterative process of coding and re-coding [32]. The study also incorporated validation procedures to ensure the credibility of the findings. Data triangulation was employed by comparing findings across different sources: observations, interviews, and document analysis.

Additionally, member checking was carried out by sharing preliminary findings with a subset of participants to verify the accuracy of interpretations. Peer debriefing, in which other researchers reviewed the data and analysis, was also used to enhance the trustworthiness of the results. Ethical considerations were carefully followed throughout the study, and informed consent was obtained from all participants. This ensured that participation was voluntary and that confidentiality was maintained at all stages of the research. While this study provides valuable insights into implementing Ecological Art in primary education, it has limitations. The focus on two schools in specific ecological contexts limits the generalizability of the findings to other regions. However, the study's in-depth exploration of these two cases contributes to a broader understanding of how local ecological contexts can shape educational practices in sustainability and creativity.

### 3. Results and Discussion

#### 3.1 Results

Integrating Ecological Art into the Pancasila Student Profile Strengthening Project (P5) revealed significant findings regarding its impact on students' environmental awareness, creativity, and cultural identity. The data collected from two primary schools in contrasting ecological settings—Public Elementary School 1 Gondanglegi (mountainous) and Kalijoyo 2 Public Elementary School (coastal)—highlight their local contexts' varied approaches and outcomes. Observations during the implementation of P5 revealed that students in both schools actively engaged in creative projects that utilized their surrounding resources. In Public Elementary School 1 Gondanglegi, abundant natural materials, such as bamboo, clay, and dried leaves, influenced the choice of materials for artistic creations. Approximately 90% of the

projects in this school incorporated these materials, often drawing inspiration from traditional crafts. For instance, students created intricate bamboo wind chimes and clay sculptures depicting local flora and fauna. One student explained, “We chose bamboo because it’s strong and part of our everyday life. It felt right to use something that represents our area.” Quantitative data on the material usage underscore these differences (see Table 1).

In contrast, Kalijoyo 2 Public Elementary School faced challenges related to plastic waste and limited access to natural materials. This scarcity led students to repurpose recycled items, with 95% of projects relying on plastic bottles, wrappers, and other non-biodegradable materials. Observations documented projects such as mosaics made from colorful wrappers and functional items like eco-bricks. These creations often juxtaposed clean and polluted environments to highlight environmental issues. One teacher noted, “The students showed remarkable creativity in finding ways to transform waste into something beautiful. It’s a skill they can carry into their daily lives.”

**Table 1.** Quantitative data on material usage

Material Type	Mountainous School (%)	Coastal School (%)
Natural Materials	90	45
Recycled Materials	30	95
Mixed Materials	20	60

Student engagement extended beyond material selection to include collaborative efforts in designing and executing projects. Observations in both schools revealed a dynamic process of teamwork, where students divided roles, negotiated ideas and supported each other during the creation process. For example, in Public Elementary School 1 Gondanglegi, a group of students created a mural depicting the local ecosystem. The mural featured clay imprints of leaves and animals, symbolizing the area’s interconnectedness of plants and wildlife. One student shared, “We wanted to show how everything in nature is connected, just like how we worked together on this project.” Similarly, in Kalijoyo 2 Public Elementary School, students collaborated on projects that addressed pressing local issues, such as plastic pollution. A standout example was an installation depicting a sea turtle entangled in plastic waste, accompanied by the slogan “Save Our Oceans.” This project involved collecting plastic from the school grounds and surrounding areas, an activity students described as both eye-opening and rewarding (see Fig.1). “It made me realize how much plastic is everywhere,” one student remarked. “But it also showed me we can do something about it.”



**Fig. 1.** Kalijoyo 2 Public Elementary School students collected waste from the beach, which was later transformed into three-dimensional art.

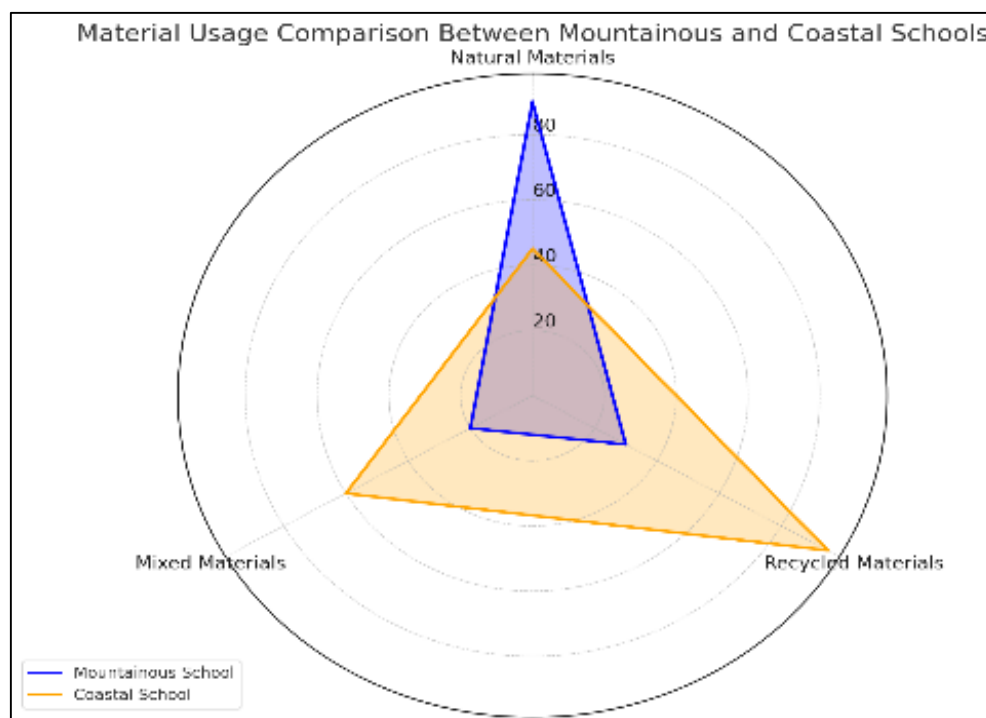
The role of teachers in facilitating these projects was pivotal. Observations showed that teachers guided students in connecting ecological themes to artistic expression, often encouraging them to draw from their cultural heritage. In Public Elementary School 1 Gondanglegi, teachers incorporated lessons on traditional bamboo weaving into the art projects, linking cultural preservation with sustainability. Meanwhile, teachers in Kalijoyo 2 Public Elementary School focused on raising awareness about waste management, framing the art projects as a solution to a local problem.

Artworks produced during the P5 projects consistently carried strong environmental messages, blending visual symbolism with explicit advocacy. For instance, in Public Elementary School 1 Gondanglegi, clay banners advocated for forest conservation. Their craftworks largely utilized plants from their surrounding environment (see Fig.2). These banners featured imprints of leaves from endangered trees, paired with slogans such as “Protect Our Forests.”



**Fig. 2.** A craft and painting created by students at Public Elementary School 1 Gondanglegi depicting the interconnectedness of plants in the ecosystem and an environmental conservation campaign.

In Kalijoyo 2 Public Elementary School, students created a series of posters illustrating the life cycle of plastic, from production to pollution, and the potential for recycling. These artworks were displayed around the school, serving as reminders of the students’ commitment to sustainability. Thematic analysis of the artworks revealed key areas of focus, including conservation, pollution, and the relationship between humans and nature. Fig. 3 illustrates the distribution of these themes, with pollution and conservation being the most prominent.



**Fig. 3.** Distribution of Environmental Themes in Artworks

Interviews with students, teachers, and parents further highlighted the impact of these projects. Many students reported an increased awareness of environmental issues and a sense of pride in their ability to address these challenges creatively. One Public Elementary School 1 Gondanglegi student reflected, “I used to see trees as just something in the background. Now I

realize they are important for everything, including us.” In Kalijoyo 2 Public Elementary School, a student shared, “I feel like I’m helping the environment by making art from waste. It makes me think twice before throwing something away.” Teachers also observed changes in their students’ attitudes and behaviors.

A teacher in Public Elementary School 1 Gondanglegi noted, “The students became more curious about their surroundings. They started asking questions about the plants and animals they used in their projects.” In Kalijoyo 2 Public Elementary School, teachers reported a noticeable reduction in littering around the school, attributing this change to the student’s involvement in waste-based art projects. Document analysis provided additional insights into the planning and execution of the P5 projects. School records and lesson plans revealed a structured approach to integrating Ecological Art into the curriculum.

Teachers outlined specific goals for each project, such as enhancing creativity, promoting teamwork, and raising environmental awareness. Student portfolios documented the evolution of their ideas, from initial sketches to final presentations, showcasing their thought processes and problem-solving abilities. Beyond the classroom, the P5 projects had a ripple effect on the broader community. Parents and community members often participated in the projects, providing materials, sharing traditional techniques, and offering feedback on the final artworks. One Public Elementary School 1 Gondanglegi parent remarked, “These projects brought us closer as a community. It was wonderful to see how the children learned from us and how we learned from them.” The combination of creativity, collaboration, and advocacy evident in the P5 projects underscores the potential of Ecological Art to transform primary education. By engaging with local resources and addressing environmental challenges, students developed artistic skills and cultivated a sense of responsibility and connection to their surroundings.

### 3.2 Discussion

Integrating Ecological Art into the Pancasila Student Profile Strengthening Project (P5) offers a nuanced perspective on the intersection of environmental education, creativity, and cultural identity. Data collected from two contrasting ecological settings—Public Elementary School 1 Gondanglegi (mountainous) and Kalijoyo 2 Public Elementary School (coastal)—revealed that local contexts significantly shape the implementation and outcomes of such initiatives. This discussion critically examines these findings, drawing on educational theories and prior research to contextualize the role of Ecological Art in fostering environmental awareness and advocacy. The use of local materials in Public Elementary School 1 Gondanglegi reflects place-based education principles, as Smith articulated [33]. Students predominantly used natural resources such as bamboo, clay, and dried leaves, with 90% of their projects incorporating these elements.

The bamboo wind chimes and clay sculptures created by the students embody a deep connection to their cultural heritage and the surrounding ecosystem. Figure 2 highlights one such creation—a mural combining traditional crafts and environmental messaging. This focus on local materials enhances students’ ecological literacy and aligns with the theories of environmental learning, which posit that tangible interactions with natural resources foster a profound appreciation for sustainability [34], [35]. However, the uncritical use of natural resources, even renewable ones, necessitates an ethical evaluation of sustainability [36]. While bamboo and clay are renewable, their overuse can deplete local ecosystems, suggesting a need for critical engagement with resource management within educational contexts.

In contrast, Kalijoyo 2 Public Elementary School demonstrated remarkable adaptability by repurposing recycled materials to address pressing local environmental challenges, particularly plastic pollution. Approximately 95% of the students’ projects utilized discarded items such as plastic bottles and wrappers, reflecting resourcefulness and ecological advocacy. A standout project, depicted in Figure 1, features a turtle-shaped piggy bank designed as a tube, creatively crafted to symbolize the importance of saving money and marine life. This powerful visual juxtaposition of pollution and marine life illustrates Dewey’s principle of experiential learning, wherein students acquire knowledge through direct, meaningful interactions with their environment [37], [38]. By transforming waste into art, students raised awareness about pollution and engaged in creative problem-solving and advocacy. However, focusing solely on individual actions, such as recycling, risks overshadowing systemic environmental issues like

corporate accountability and unsustainable production cycles [39]–[41]. Thus, while these projects were impactful locally, they highlight the need to incorporate broader critical discussions about structural environmental change into the curriculum.

The collaborative nature of the P5 projects played a pivotal role in their success, underscoring Vygotsky's [42] theory of social constructivism, which emphasizes learning through interaction and collaboration [43], [44]. In Public Elementary School 1 Gondanglegi, students collectively designed a mural depicting the interconnectedness of plants and wildlife, incorporating clay imprints of leaves and animals to symbolize ecological balance (see Fig. 2). This process not only enhanced their understanding of biodiversity but also developed teamwork, negotiation, and conflict resolution skills. Similarly, in Kalijoyo 2 Public Elementary School, students worked together on recycling-based art projects, such as posters illustrating the lifecycle of plastic and installations addressing marine pollution (see Fig. 1). These collaborative efforts align with Freire's concept of dialogic education, where knowledge is co-constructed through interaction and shared experiences [45], [46]. However, observations revealed instances where dominant voices overshadowed quieter students, highlighting the need for teacher mediation to ensure equitable participation and inclusivity within group dynamics. Artistic outputs from both schools carried strong environmental messages, blending visual symbolism with explicit advocacy. In Public Elementary School 1 Gondanglegi, clay banners advocating forest conservation featured imprints of leaves from endangered trees, paired with slogans such as "Protect Our Forests" (see Fig. 2). These artworks, showcased in Figure 2, not only raised awareness about local environmental issues but also reinforced cultural preservation by integrating traditional motifs. Similarly, the students in Kalijoyo 2 Public Elementary School created posters and mosaics that highlighted the detrimental lifecycle of plastic, emphasizing the importance of recycling and pollution reduction (see Fig. 1). Art serves as a unique mode of representation, capable of conveying complex ideas that transcend linguistic barriers [20]. However, the effectiveness of these messages depends on the audience's ability to interpret the embedded symbolism. To enhance accessibility, future projects could incorporate multimodal elements, such as written explanations or interactive exhibits, to broaden their impact and ensure comprehension across diverse audiences.

The role of teachers was instrumental in bridging ecological themes with artistic expression, demonstrating the interplay between pedagogy and advocacy. In Public Elementary School 1 Gondanglegi, teachers incorporated lessons on traditional bamboo weaving, connecting cultural heritage with environmental sustainability. Meanwhile, Kalijoyo 2 Public Elementary School educators framed art projects as solutions to pressing local issues, such as plastic waste management. These pedagogical approaches reflect the adaptability and agency of teachers as mediators between curriculum objectives and contextual realities [47], [48]. However, as noted during observations, the challenges of resource limitations and insufficient teacher training underscore the need for systemic support, including professional development programs that equip educators with the skills to effectively implement interdisciplinary and sustainability-focused curricula [49], [50]. Beyond the classroom, the ripple effects of the P5 projects extended into the broader community, fostering intergenerational learning and collective action. Parents and community members contributed materials, shared traditional techniques, and provided feedback on the students' artworks. This communal involvement aligns with Bronfenbrenner's ecological systems theory, which emphasizes the interplay between individual development and broader social contexts [51], [52]. For instance, a parent from Public Elementary School 1 Gondanglegi remarked on the reciprocal learning during the projects, noting how the children's engagement with traditional crafts revitalized their appreciation for local heritage. Similarly, in Kalijoyo 2 Public Elementary School, the projects raised community awareness about waste management, evidenced by a noticeable reduction in littering around the school grounds. These outcomes highlight the potential of Ecological Art to transcend its educational objectives, fostering social cohesion and collective responsibility toward sustainability [22], [53], [54]. Integrating Ecological Art within the P5 framework reveals its significant role as a pedagogical tool that fosters creativity, environmental awareness, and cultural identity. The contrasting approaches and outcomes observed in Public Elementary School 1 Gondanglegi and Kalijoyo 2 Public Elementary School illustrate its adaptability to diverse ecological and cultural contexts. However, the findings also highlight areas for further exploration, such as addressing resource sustainability, ensuring equitable participation in collaborative projects, and incorporating



systemic environmental perspectives into the curriculum. This study underscores the importance of harmonizing local relevance with broader sustainability goals, paving the way for more inclusive and impactful educational strategies [55].

#### 4. Conclusion

This study highlights the transformative potential of Ecological Art as a pedagogical approach in primary education, effectively bridging environmental awareness, creativity, and cultural identity. By integrating local ecological contexts into artistic practices, the Pancasila Student Profile Strengthening Project (P5) enabled students to critically and creatively engage with their surroundings. Projects in the mountainous and coastal schools demonstrate how place-based resources and ecological challenges shaped students' artistic processes, from crafting bamboo wind chimes to repurposing plastic waste into impactful installations. These efforts fostered ecological consciousness and celebrated cultural heritage, showcasing the adaptability of Ecological Art to diverse contexts. However, while these projects emphasized symbolic representation and awareness, their pathways to actionable advocacy remained limited, underscoring the need for systemic strategies to address broader environmental challenges. Collaborative efforts among students, teachers, and communities enriched the projects, fostering teamwork and meaningful engagement. Yet, disparities in group dynamics, including uneven participation, highlighted the complexities of fostering inclusive collaboration, reinforcing the critical role of educators in ensuring equitable processes. The implications of this study extend beyond the classroom, offering valuable insights for integrating ecological and cultural dimensions into interdisciplinary education. Scaling such initiatives requires systemic support, including resource allocation, professional development for teachers, and curriculum integration. Additionally, incorporating multimodal approaches to ecological communication could enhance accessibility and impact. Future research should investigate its scalability across diverse educational contexts, examine long-term influences on students' ecological behaviors, and explore the potential of digital tools to amplify its reach. These pathways highlight the ongoing relevance of Ecological Art in addressing global sustainability challenges through innovative and locally grounded practices.

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