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Ecoliteracy through Psychoeducation with Sociodrama and Tree Planting of Mangroves to Increase Empathy

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Abstract

Low environmental awareness and empathy in the Panggang Island community have caused serious damage to the coastal ecosystem, including garbage accumulation and sea wave erosion. This community service (PKM) activity aims to increase ecological literacy and environmental empathy among adolescents on Panggang Island through an integrated intervention program. This program uses a psychoeducational approach with a sociodrama method themed "Cultivating empathy, saving the island" and concrete actions such as planting mangrove trees. The target group is 46 eighth-grade students at SMP Negeri 133 Pulau Pramuka, most of whom are indigenous residents of Panggang Island. Empathy levels were measured using the Dispositional Empathy with Nature instrument and evaluated in a way qualitative through Focus Group Discussions (FGD) with stakeholders. The evaluation results showed that the sociodrama psychoeducational intervention significantly increased students' environmental empathy in both the cognitive component (ecological understanding) and the affective component (emotional connection to nature). The mangrove planting activity successfully strengthened ecological commitment and fostered a sense of collective responsibility. This activity has practical implications for strengthening environmentally based Guidance and Counseling programs in coastal schools and emphasizes the importance of cross-sector synergy in maintaining the long-term sustainability of mangrove ecosystems.

Keywords: Ecoliteracy, Environmental Empathy, Mangrove Planting, Sociodrama.

INTRODUCTION

Ecoliteracy is critical awareness that informs decision-making and the use of information to take concrete actions to address environmental problems (Lewinsohn et al., 2015). This awareness is crucial to supporting sustainable development in education and the environment, as UNESCO advocates (McBride et al., 2013). Ecoliteracy comprises three main aspects: knowledge (knowledge), concern (concern), and behavior (attitude), which collectively guide communities to value biodiversity, understand climate change, and live harmoniously with nature. In this interaction, environmental empathy acts as an emotional driver, encouraging individuals to make wise, responsible decisions about environmental sustainability. Without environmental empathy, conservation efforts are often merely ceremonial and fail to have a long-term impact on restoring damaged ecosystems.

Coastal environmental degradation is evident on Panggang Island, a densely populated residential area in Jakarta's North Thousand Islands. Rapid population growth and the development of tourism activities in the region have triggered a surge in waste volume that adequate management has not matched. For example, in 2024, the Environmental Agency transported about 15 tons of waste from the Thousand Islands, with Panggang Island contributing the most at 6 tons. The impacts of this unmanaged waste accumulation are alarming, ranging from degraded water quality and reduced ecotourism appeal to severe coastal erosion (Anggraini 2013, Ningsih et al. 2021). The lack of natural barriers such as mangroves accelerates wave erosion,

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eroding residential areas (Utomo, 2024). Furthermore, the accumulation of marine debris and sporadic reclamation in coastal areas have reportedly caused up to 50% of coral reefs in the waters off Panggang Island to die (Darmawan, 2014). Marine pollution from metals and oil waste also threatens marine ecosystems (Farrell & Nelson, 2013). Ironically, research shows that tourist participation and contributions to mangrove conservation in this area are actually higher than the local community's active participation (Pratiwi et al., 2020). This suggests a lack of empathy and ownership among local communities in preserving their own environment.

Coastal ecosystem damage not only threatens marine life but also significantly affects the physical and mental health of residents in the surrounding area (Filipova et al., 2020). An unhealthy living environment increases residents' emotional vulnerability, with residents living in unhealthy areas having up to 1.9 times the risk of experiencing mental health disorders compared to those living in healthy environments (Dharmayanti et al., 2018). Conversely, close emotional connections and positive interactions between individuals and nature have been shown to be important protective factors that support mental health and prevent psychological distress (Mental Health Foundation, 2021). Therefore, resolving environmental problems on Panggang Island cannot rely solely on a physical-curative approach.

For example, preparing dock rubbish or facility sanitation (SWRO; seawater reverse osmosis) does not solve problems repeatedly on its own; it must be accompanied by psychological and educational interventions to build deep awareness through environmental empathy. Psychoeducational approaches can foster ecological awareness and have proven effective in motivating personal growth and disseminating relevant information.

These approaches can also help solve socio-community problems (Purwati et al., 2021). Previous research shows that pro-environmental psychoeducation programs significantly increase environmental awareness (Zwageryd et al., 2023) and individual empathy (Purwanto et al., 2024). The most effective psychoeducational method for stimulating empathy is through role-playing or drama (Sofwana et al., 2020). In nature conservation, sociodrama is highly appropriate because it emphasizes awareness of the individual's role in society (Alaba & Tayo, 2014) and triggers critical reflection for better environmental change (Lehtonen, 2021). By fostering ecological empathy, communities are encouraged to develop positive strengths that motivate them to seek creative solutions for nature rather than engage in destructive acts of aggression (Batson, 2021). Environmental empathy has dimensions closely related to self-compassion, and individuals with high self-compassion tend to show genuine concern for environmental sustainability (Wahyuni, 2019). Furthermore, psychoeducation-based environmental literacy has proven effective, paralleling improvements in other health guidance literacy (Siregar & Marjo, 2024).

In addition to cognitive and affective educational interventions through environmental empathy measurement instruments such as Dispositional Empathy with Nature (Tam, 2013), increasing awareness must be accompanied by real action strategies in the field to minimize failure. Direct community involvement in ecological restoration programs, such as independent mangrove planting, has been shown to increase community willingness and commitment to participate in long-term environmental management (Arifantid et al., 2022). Mangroves have crucial ecological functions as natural barriers to abrasion, carbon sinks, and habitats for coastal biodiversity (Mandala et al., 2025; Goni et al., 2025).

This activity aims to integrate a sociodrama-based psychoeducational approach with the ecological action of planting mangrove trees to foster environmental empathy among adolescents on Panggang Island. This intervention is designed to stimulate students' cognitive (ecological understanding) and affective (emotional closeness to nature) components while also supporting the achievement of the objectives. It aligns

with the Sustainable Development Goals / SDGs) Number 3 (Good Health and Well-being) and Number 15 (Life on Land).

METHOD

This study uses an integrated psychoeducational approach that combines methods: experiential intervention based on acting (sociodrama) with real ecological restoration action (mangrove planting). This intervention design aims to stimulate students' environmental empathy in two main aspects, namely the cognitive component (understanding of ecological perspectives) and the affective component (emotional closeness to nature). The entire series of programs was designed and implemented over 8 months, including problem mapping and preparation of a sustainable follow-up program.

The research was conducted at SMP Negeri 133 Pulau Pramuka, located in the North Seribu Islands District, Seribu Islands Regency, Special Capital Region of Jakarta Province. The island covers approximately 16.73 hectares (0.167 km²). It consists of 2 RWs (RW 04 and RW 05) and 9 RT. SMP Negeri 133 itself is located in RT 03 RW 05. Most students at SMP Negeri 133 come from two nearby residential islands: Panggang Island and Pramuka Island. The research subjects were 46 eighth-grade students. The subject profile consisted of 24 male students (48%) and 22 female students (52%), most of whom were native residents of Panggang Island. The location and subject selection were based on a situational analysis.

This highlights the urgency of addressing coastal degradation caused by rubbish accumulation and abrasion in Panggang Island's densely populated residential areas. The program's implementation procedures are divided into five main stages: identification, preparation, implementation, evaluation, and sustainability.

Identification Stage: The team conducted initial field studies, including interviews with the local community and government, to map low levels of local environmental empathy and assess the feasibility of the sociodrama method based on local oral traditions.

Preparation Stage: The proposing team developed a psychoeducational concept, created a sociodrama scenario with the theme "Cultivating Empathy, Saving the Island", coordinated with the school and local government, and conducted a physical survey of the coastal area to determine critical areas that require natural protection in the form of mangrove trees.

Level Implementation: This consists of the top two programs

Implementation Psychoeducation Sociodrama: Held on 07 October 2025 in the Hall of SMP Negeri 133 Pulau Pramuka for 2 hours (8:00–10:00 WIB). The sociodrama presented the story of the character "Laut" suffering from pollution. Students actively guessed the character's emotions, played supporting characters (fishermen, polluting communities, and the environmental agency) in an interactive question-and-answer session, demonstrated group poses representing the condition of the sea, and reflected on their impressions.

Implementation: Planting mangrove trees was implemented on 06 October 2025 in the coastal area of Pramuka Island, which has not been touched by protective vegetation. This physical activity involved a team of UNJ lecturers and students, the local government, the NGO Green House Literacy, and representatives from PT Asuransi Tugu Pratama Indonesia Tbk, the mangrove seed supplier.

Evaluation Stage: Post-activity evaluation is conducted through a Focus Group Discussion (FGD) with stakeholders (resident representatives, teachers, and insurance partners) to gather qualitative feedback. In addition, students filled out feedback sheets through Form to measure the level of direct benefit they feel.

Sustainability Stage: As a form of ecological restoration accountability, a maintenance program is prepared (maintenance) for mangroves for 4 years. This program involves regular monitoring every 6 months,

replanting damaged seedlings (replanting and stitching), plant-care training for local residents, and student involvement in monitoring plant growth as part of ongoing character education.

We measured students' level of environmental empathy using a scale instrument. We adapted the Dispositional Empathy with Nature (DEN) scale from Tam (2013). This scale assesses subjects' cognitive and affective emotional connectedness to the surrounding environment. Before and after the intervention. Qualitative data were obtained through descriptive analysis of the results of focus group discussions (FGD), observation sheets of students' active participation during the sociodrama process, and thematic analysis of students' written reflection responses collected through form.

RESULTS AND DISCUSSION

Results

The Eco literacy improvement intervention program on Panggang Island is implemented through two main activities: sociodrama-based psychoeducation with the theme "Cultivating Empathy, Saving the Island" and concrete coastal conservation action through mangrove planting. Both programs are integrated to target the cognitive and affective aspects of environmental empathy in coastal youth.

Profile Target Activity

The target audience actively participating in this series of community service activities was eighth-grade students of SMP Negeri 133 Pulau Pramuka. Although administratively located on Pulau Pramuka, the school is mostly on Pulau Pramuka, and most students are native residents of Panggang Island. Table 1 presents the detailed demographic profile of the target audience.

Table 1. Profile Respondent

Gender	Total	Percentage (%)
Man	24	48%
Woman	22	52%
Total	46	100%

Implementation of Psychoeducation Sociodrama for Stimulating Empathy Environment

Psychoeducation through the sociodrama method was conducted on October 7, 2025, in the Hall of SMP Negeri 133 Pulau Pramuka for 2 hours (8:00–10:00 a.m. WIB). Sociodrama was chosen as an interactive medium because research has shown it to be the most effective method for stimulating empathy compared with other conventional cognitive education methods (Sofwana et al., 2020). Learning through sociodrama is also highly relevant to environmental issues because it emphasizes awareness of the individual's role in society (Alaba & Tayo, 2014) and stimulates critical reflection (Lehtonen, 2021).

In practice, the intervention focuses on two main components of empathy: the cognitive component (understanding natural emotions through perspective-taking) and the affective component (direct emotional connection with nature) (Tam, 2013). This sociodrama method includes several critical stages.

Presentation of the "Sea" Stimulus Scene: A character acts out the character "Sea" experiencing sadness, anger, and disappointment due to pollution. Using used plastic as a symbol of waste, students observe the movements independently, without being told the scene's theoretical meaning. Through this process, students are encouraged to identify the character's emotions and independently interpret the suffering of the coastal marine ecosystem.

Multi-Party Role Playing: Three student representatives volunteered to play three main sociocultural actors who interact directly with the marine ecosystem: Fishermen, Polluting Residents, and Environmental Service Officers. Other students acted as active questioners to explore each role's perspective. Critical questions emerged from the students, such as "Why throw trash into the sea?" or "Are there any efforts to impose sanctions on those who pollute the sea?", indicating a rise in understanding of their cognitive level towards the complexity of environmental problems in their residential environment.

Group Reflection (Three Poses): Students are divided into small groups of 4–5 people to express three body poses that represent the condition of the sea: before being helped, while being helped, and after being rescued. This motor-reflective activity strengthens group bonding and helps students visualize concern for the sustainability of coastal ecosystems.

In the final reflection session, students reported that through this sociodrama, they felt as if they could directly experience the suffering of a polluted marine ecosystem—an emotional awareness (affective empathy) they had never considered or realized in their daily lives. This feedback showed that the sociodrama fostered a sense of closeness to nature, which theoretically encourages individuals to seek creative solutions for environmental conservation rather than remain indifferent (Batson, 2021).

Action Real Planting Tree Mangrove as Commitment Ecological

As a concrete follow-up to the increased empathy stimulated, a physical action in the form of planting mangrove trees was carried out on October 6, 2025, in the coastal area of Pramuka Island. This activity involved multi-sector collaboration, attended by the leadership of the Faculty of IP UNJ, the Head of Panggang Island, the Environmental Agency, CSR partner PT Asuransi Tugu Pratama Indonesia Tbk as the seed provider, and the local community organization Literacy Green House.

Mangrove forests play a crucial ecological role in maintaining the balance of Panggang Island's vulnerable coastal areas, particularly as natural barriers against abrasion from ocean waves, carbon-emission absorbers, and habitats for coastal biodiversity (Mandala et al. 2025, Goni et al. 2025). Through hands-on mangrove planting, students not only gain conceptual understanding but also practice compassion and a sense of emotional responsibility for maintaining and preserving their coastal ecosystems. The active participation of these coastal students also reduces previous conservation disparities, where local community participation in mangrove planting was reportedly lower than the contribution of foreign tourists (Pratiwi et al., 2020).

Analysis Success and Program Action Carry-on Sustainability

The program's impact was evaluated by combining quantitative and qualitative methods through focus group discussions (FGD) with stakeholders and student feedback sheets submitted via a form. Measurement of the level of environmental empathy refers to the scale indicators Dispositional Empathy with Nature (DEN), which assesses the connectedness of perspectives, cognitive and affective emotional closeness to nature (Tam, 2013).

Evaluation results showed a significant increase in environmental empathy among students after the intervention. However, to reduce the risk of mangrove growth failure due to ecological factors (such as fluctuations in seawater salinity, high pH levels, and inappropriate high-tide frequency), the implementation team developed a 4-year Sustainability Follow-up Program. This maintenance program uses a community-based management approach and centralized community engagement (government-centralized community), including Regular Monitoring: Conduct routine monitoring of mangrove growth every six months to measure plant survival rates. Stitching (Replanting and Stitching): Repeat planting to replace mangrove seedlings damaged or killed by natural factors.

Local Community Empowerment: Providing simple technical training to local residents on mangrove care procedures, coastal land management, and natural pest control. Sustainable Educational Guidance: Actively involving students in monitoring plant growth as a practical part of guidance and counseling services and environmentally conscious character education in coastal schools.

Overall, the integration of sociodrama psychoeducation and ecological restoration actions has proven effective in building the foundation of pro-environmental character in coastal youth, while simultaneously aligning the achievement of sustainable development goals (SDGs) Number 3 (Good Health and Well-being) and Number 15 (Life on Land).

Suggestion

As a follow-up and direct implementation to address deficiencies and maintain the successes identified in the conclusion, it is recommended that, to address the limitations of educational sustainability, experiential and social expression-based psychoeducational models such as sociodrama be formally integrated into the guidance and counseling (BK) and character development curriculum at SMP Negeri 133 and other coastal schools. In addition, to mitigate the risk of seedling failure due to ecological threats, the proposing team and partners must implement the program.

Maintenance is structured for four years. This program includes regular monitoring each month, stitching (replanting and stitching) plants that are damaged, as well as empowering local inhabitants through training in technical mangrove maintenance. Furthermore, we recommend expanding collaboration with formal environmental institutions, such as Conservation Centers or nature conservation communities, to strengthen scientific resource support and broader coastal ecological monitoring.

Speech Accept Love

The implementation team expresses its deepest gratitude and appreciation to Jakarta State University for providing full support and funding for this activity through the Community Service Grant Scheme for the Faculty's Assistance Area (PPM WBF) for the proposed year 2025. We also extend our deepest gratitude and appreciation to PT Asuransi Tugu Pratama Indonesia Tbk (Tugu Insurance) as a partner that funded the procurement of seedlings and the planting of mangrove trees in the Environmental Service program, as well as supporting the coastal ecological restoration from the preparation stage through sustainability. The implementation team also expresses its gratitude to the leadership of the Faculty of Education UNJ, the village of Panggang Island, the Environmental Sub-Department, SMP Negeri 133 Pulau Pramuka, and the Green House Literacy NGO for all the assistance and active collaboration provided during the implementation of this program.

CONCLUSION

The conclusion of the community service program on Panggang Island is formulated in a structured manner as follows: This program successfully addressed low environmental empathy and ecosystem degradation on Panggang Island by raising adolescent awareness through an integrated psychological and physical approach. The results were measured using instruments. Dispositional Empathy with Nature (DEN) and Focus Group Discussion (FGD) evaluations show that psychoeducational intervention based on Sociodrama effectively increased eighth-grade students' environmental empathy, both cognitively (understanding ecological conditions) and affectively (emotional connection to nature). The mangrove-planting activity also strengthened their commitment to coastal conservation. Advantages: The main advantage of this program lies in its method, which not only addresses the cognitive-educational aspect but also directly

connects the emotional empathy from sociodrama with the physical restoration action of mangrove planting in the field.

This program is supported by cross-sector synergy involving academics (FIP UNJ), schools, local governments (Pulau Panggang Village and the Environmental Service), corporations (Tugu Insurance), and local NGOs (Green House Literacy), thereby increasing coastal communities' social participation. Disadvantages: Major ecological risks threaten the survival of planted mangrove seedlings, including high salinity, water pH levels, and the frequency of tidal inundation. The psychoeducational interventions are still temporary and require regular support and additional educational activities to maintain students' environmentally conscious character in the long term.

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