

RESEARCH ARTICLE

Analyzing the affective domain of environmental literacy: A quantitative study of 'Tatanen di Bale Atikan' program in elementary school

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ABSTRACT

Purpose – Environmental issues increasingly demand character-based education from an early age, yet the affective dimension of ecological literacy covering attitudes, sensitivity, and willingness to act remains understudied compared to its cognitive counterpart. This study aims to analyze the affective dimension of ecological literacy and to describe the achievement of each indicator among elementary school students during the implementation of the TdBA Program.

Method – This study employed a quantitative approach with a descriptive method and survey design, supported by triangulation. Data were collected from 100 fifth-grade students purposively from three elementary schools in Purwakarta Regency (SDN 2 Sindangkasih, $n = 30$; SDN 1 Nagrikidul, $n = 40$; SD Labschool UPI, $n = 30$), using an adapted, validated, and reliable Children's Environmental Affect Scale (13 items across 3 indicators, Cronbach's $\alpha = .909$). Data were analyzed using descriptive percentage analysis. The instrument used was an adaptation of the Children's Environmental Affect Scale (CEAS), which had been tested for validity and reliability.

Findings – The research results show that the affective dimension of students' ecological literacy as a whole falls into the "Very High" category (81,19%). By indicator, both Environmental Attitudes and Environmental Sensitivity were categorized as Very High, while Willingness to Take Action was categorized as High. The highest achievement was found in students' conviction regarding the importance of preserving natural resources, while the greatest challenge lay in the transfer of ecological behavior from school to the home environment.

Conclusion – The TdBA program has proven effective in internalizing ecological values as part of students' daily character, rather than mere knowledge. These findings affirm that local wisdom-based environmental education holds significant potential as a contextual and meaningful model for ecological literacy development at the elementary school level to sustain long-term pro-environmental behavior.

Keywords: Affective domain, environmental literacy, elementary school, TdBA.

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INTRODUCTION

Environmental issues have now become an increasingly urgent global concern with far-reaching impacts on human life. The 2023 Emissions Gap Report states that the world is on a trajectory toward a significant rise in global temperatures, underscoring the urgency of changing human behavior toward the environment (United Nations Environment Programme, 2023). In Indonesia, environmental challenges remain

concerning, as evidenced by the high national waste generation, which reaches 67 million tons per year (Kementerian Lingkungan Hidup dan Kehutanan, 2023). This fact indicates that environmental issues are not solely caused by policy and infrastructure factors but are also linked to individual character and awareness. Therefore, education plays a strategic role in instilling an environmentally conscious character from an early age, serving as a foundation for fostering sustainable behavior (Ardoin et al., 2020).

In the context of modern environmental education, the primary goal has shifted from mere cognitive mastery to the development of ecological literacy. Ecological literacy is not merely theoretical knowledge but a holistic competency encompassing an understanding of ecosystem dynamics, emotional empathy, and a readiness to act in an environmentally responsible manner (Safitri et al., 2023). In line with this concept, Maulana (2021) explains that environmentally conscious behavior is an integral part of ecological literacy that is, human attitudes and behaviors that enable people to live in harmony with nature through an understanding of the basic principles of ecology. (Maulana et al., 2021). From a broader perspective, ecological literacy also encompasses an individual's ability to address various environmental issues by understanding natural systems, demonstrating sensitivity to environmental problems, and taking responsibility for maintaining ecosystem sustainability (Lovren & Jablanovic, 2023). This concept encompasses several key dimensions: environmental knowledge, cognitive skills, attitudes (the affective dimension), and pro-environmental behavior. Among these dimensions, the affective dimension which includes attitudes, values, concern, and commitment toward the environment plays a crucial role as it forms the foundation for tangible actions in environmental conservation (Erdogan & Marcinkowski, 2015). The affective dimension of environmental literacy encompasses an individual's awareness, sense of responsibility, and emotional engagement with environmental issues, which drive the formation of sustainable ecological behavior (Kurniawan et al., 2024). Without strengthening the affective dimension, ecological literacy will remain at the level of rote memorization and be unable to drive tangible behavioral change.

A number of studies indicate that strengthening environmental literacy among students requires contextual and participatory learning experiences. In line with this, Yusuf et al. (2020) explain that environmentally conscious behavior can develop through schools' role as educational institutions that instill values and practices of environmental stewardship. This is reinforced by Rachmawati (2021) research, which shows that nature-based learning in schools effectively enhances students' understanding and awareness of the environment through out-of-classroom learning activities that encourage direct interaction with nature and foster an attitude of environmental stewardship. Similar findings were reported by Cincera, Kroufek, dan Bogner (2023) who found that student engagement in nature-based environmental education programs at school significantly influences the development of their ecological attitudes and behaviors. Similarly, a service learning based approach to environmental education has been shown to strengthen elementary student's affective engagement and awareness of environmental problems, extending its impact beyond factual knowledge alone (Merritt et al., 2024).

In Indonesia, various environmental education programs have been developed to foster ecological awareness among students, including school-based programs and the integration of local wisdom. The Purwakarta Regency Government initiated the Tatanén di Balé Atikan (TdBA) program to implement character education, as stipulated in Purwakarta Regent Regulation No. 69 of 2015 on character education (Pemerintah Kabupaten Purwakarta, 2015). The Tatanén di Balé Atikan (TdBA) program is a local wisdom-based educational policy in Purwakarta Regency aimed at strengthening character education and fostering students' ecological awareness through environment-oriented learning and the principle of "caring for the earth and learning from the earth" (Dinas Pendidikan Kabupaten Purwakarta, 2019). This program positions schools not merely as places of learning but as educational ecosystems that serve as "living laboratories" for students (Honijah et al., 2025), while simultaneously shaping students' ecological behaviors through the processes of habituation and the internalization of character values within social interactions in the school environment (Adiraharja & Suhartini, 2024). This approach aligns with growing evidence that local wisdom based environmental education effectively fosters student's environmental care character (Asrial et al., 2021), as demonstrated by similary locally rooted programs such as the integration of Tenggerese conservation values in East Java (Naila et al., 2025) and the ethnopedagogical transformation of local ecological beliefs into classroom learning in Central Java (Sukirno & Sriyanto, 2026). In its implementation, this habituation process can be practiced through various environment-based learning activities, such as caring for plants, managing the school garden, and wisely utilizing waste.

Although various studies have demonstrated the importance of environmental literacy in education, most research remains dominated by cognitive aspects, while affective dimensions—such as attitudes and emotional engagement with the environment have not received commensurate attention in either the curriculum or teaching practices (Lovren & Jablanovic, 2023). In fact, various studies indicate that affective dimensions play a crucial role in bridging the relationship between environmental knowledge and pro-environmental behavior in daily life (Lasso, 2021).

The novelty of this study lies in its effort to bridge this gap through a more in-depth analysis of the affective dimension of elementary school students' ecological literacy in the implementation of environmental education programs based on local wisdom, using the standardized Children's Environmental Affect Scale (CEAS) developed by Erdogan and Marcinkowski (2015), as an extension of the conceptual framework introduced by Frank C. Leeming et al. (1995). Based on this, this study was designed to address the following main research questions: (1) What is the level of the affective dimension of elementary school students' ecological literacy in the implementation of the Tatanén Program at Balé Atikan (TdBA)? (2) What are the achievement levels of the indicators of the affective dimension of elementary school students' ecological literacy in the implementation of the Tatanén Program at Balé Atikan (TdBA)?. This study aims to analyze and describe the profile of the affective dimension of elementary school students' ecological literacy through the implementation of the Tatanén Program at Balé Atikan (TdBA). Specifically, this study

focuses on measuring students' levels of ecological literacy and examining their performance on each indicator of the affective dimension that emerged during the implementation of the program. The results of this study are expected to provide an empirical picture of the development of students' ecological attitudes and to contribute to the development of environmental education programs based on local wisdom in elementary schools.

METHOD

The field study employs a quantitative approach, using descriptive methods and a survey design. It is empirical in nature, as data were collected directly from respondents in the field by measuring students' attitudes, sensitivity, and intentions toward the environment in the context of implementing the Tatanén Program at Balé Atikan (TdBA) in Purwakarta Regency. The research stages include: (1) development and validation of instruments, (2) instrument pilot testing, (3) data collection via questionnaires, interviews, and documentation, and (5) descriptive analysis and interpretation of data.

The research was conducted from April to May 2026 at three elementary schools in Purwakarta Regency, namely SDN 2 Sindangkasih, SDN 1 Nagrikidul, and SD Labschool UPI Purwakarta. These three schools were selected because they have been implementing the TdBA program fully and systematically for more than two years.

The population of this study consisted of all fifth-grade students at SDN 2 Sindangkasih, SDN 1 Nagrikidul, and SD Labschool UPI Purwakarta. The research subjects were 100 fifth-grade students from these three elementary schools, selected using purposive sampling, consisting of 30 students from SDN 2 Sindangkasih, 40 students from SDN 1 Nagrikidul, and 30 students from SD Labschool UPI Purwakarta. The purposive criterion required that the schools had actively and consistently implemented the TdBA program for more than two years, ensuring that fifth grade students had received sufficient exposure to the program to develop measurable affective dimensions.

Calculation formula:

Percentage per indicator = $\frac{\text{total actual score obtained by all respondents on the indicator}}{(\text{number of items in the indicator} \times \text{number of respondents} \times \text{maximum Likert scale score})} \times 100\%$

Overall percentage = $\frac{\text{total actual score across all 13 items}}{(13 \text{ items} \times \text{number of respondents} \times \text{maximum Likert scale score})} \times 100\%$

This study uses survey data as its primary quantitative data, obtained from a Likert-scale questionnaire that measured the levels and achievement of students' affective dimensions of ecological literacy in a comprehensive and standardized manner. This instrument was selected because its demonstrated validity ($r_{\text{table}} = .444$, with 13 of 15 items retained) and high reliability (Cronbach's $\alpha = .909$) allows for standardized, comparable measurement across a relatively large number of respondents. Additionally, supporting data consisting of interviews with fifth-grade teachers and students was used to explore contexts, perceptions, and experiences that cannot be captured through surveys

alone, as well as documentation of student activities, which was used to verify the alignment between survey data and actual conditions in the field. These three data sources were integrated through a triangulation procedure operationalized as follows: (1) survey results were first analyzed to identify the indicators and individual items with the highest and lowest achievement percentages; (2) these quantitative patterns then guided the semi-structured interview protocol, directing specific questions to teachers and students about the items showing notably high or low scores; (3) interview responses were examined for convergence or divergence with the survey findings; and (4) documentation of student activities was used as corroborating evidence for both the survey and interview accounts. This procedure ensured that triangulation functioned not merely as the use of three data sources, but as a systematic cross-verification process that strengthened the credibility of the interpretation (Creswell & Creswell, 2018; Sugiyono, 2019).

This research instrument uses indicators of the affective dimension of ecological literacy by adapting the Children's Environmental Affect Scale (CEAS) based on Leeming's concept (Leeming et al., 1995) which was subsequently adapted by Erdogan & Marcinkowski (2015) regarding the affective dimension of environmental literacy, namely: (1) environmental attitudes, which are students' beliefs and views regarding the importance of protecting the environment; (2) environmental sensitivity, which is students' emotional response or empathy toward the condition of the surrounding ecosystem; and (3) willingness to take action, which is students' behavioral commitment to contribute to environmental conservation efforts. The scale used is a four-point Likert scale, consisting of strongly disagree, disagree, agree, and strongly agree. This four-point scale was used to avoid respondents' tendency to choose neutral options, thereby ensuring the data can be easily interpreted (Widoyoko, 2012; Zebua & Astuti, 2024). The initial instrument consisted of 15 items that were first content-validated through expert judgment by experts in science and environmental education, focusing on the alignment of indicators with the items and the readability of the language for elementary school students. Construct validity testing was conducted empirically on 20 fifth-grade students from different homerooms within the research sample using Pearson's Product-Moment correlation via SPSS, with a r -table threshold of 0.444 at a 5% significance level. The validity test results indicated that 13 items were valid and 2 were eliminated, yielding a final instrument comprising 13 items distributed as follows: 4 items for Environmental Attitude, 4 items for Environmental Sensitivity, and 5 items for Intention to Act. The reliability test using Cronbach's alpha yielded 0.909, indicating that the instrument has a very high level of reliability and is suitable for collecting research data.

Data collection was conducted directly at each school at different times. Questionnaires were distributed to all fifth-grade students in paper form and completed independently in a single session lasting approximately 30 minutes, supervised by the researcher, a research assistant, and the homeroom teacher. After the questionnaires were completed, semi-structured interviews were conducted in person with student representatives and fifth-grade teachers to explore their perceptions regarding the implementation of the TdBA program. Data analysis in this study was conducted using

descriptive statistics in Microsoft Excel and SPSS to ensure the accuracy of the calculations. The analysis stages included: checking the completeness of the instruments, scoring using the Likert scale, reverse-scoring for negative items, and calculating the percentage of achievement for each item and indicator. The resulting percentages were then interpreted into five categories based on the criteria of [Riduwan and Kuncoro \(2018\)](#), which include: **Very High** (81–100%), **High** (61–80%), **Moderate** (41–60%), **Low** (21–40%), and **Very Low** (0–20%). To strengthen the findings, the questionnaire results were corroborated by interview data and documentation through descriptive triangulation. Furthermore, the analysis results were visualized using tables and diagrams to facilitate the interpretation and conclusion of the research findings.

RESULTS AND DISCUSSION

Results

Level of the Affective Dimension of Ecological Literacy

This study analyzed the affective dimension profile of elementary school students' ecological literacy through the implementation of the Tatanen di Bale Atikan (TdBA) program. Data were collected from 100 fifth-grade students at three elementary schools in Purwakarta Regency using the Children's Environmental Affect Scale (CEAS), which had been adapted and was found to be valid and reliable.

Figure 1.

Illustrates the direct and supervised administration of the questionnaire at each school



The results of the data analysis were categorized into five groups based on the criteria established by [Riduwan and Kuncoro \(2018\)](#), which include: **Very High** (81–100%), **High** (61–80%), **Moderate** (41–60%), **Low** (21–40%), and **Very Low** (0–20%).

The following table summarizes students' ecological literacy in the affective dimension for each indicator.

Table 1.

Achievement of Affective Dimension Indicators for Students' Ecological Literacy

No.	Indicator	Percentage	Category
1	Environmental Attitudes	82,19%	Very High
2	Environmental Sensitivity	82,06%	Very High
3	Willingness to Take Action	79,70%	High
Total		81,19%	Very High

Note: The total percentage (81.19%) is calculated based on the overall mean score of all questionnaire items (weighted average across all items)

Source: Data processed by researchers, 2026

Based on the data analysis, the environmental attitude indicator achieved the highest score of 82.19% (very high), followed by the environmental sensitivity indicator at 82.06% (very high) and the intention to act indicator at 79.70% (high). As for the distribution of individual scores, 51 students fell into the very high category, 48 into the high category, and only 1 into the moderate category. Furthermore, the total score for the affective dimension of students' ecological literacy was 81.19%, placing it in the very high category.

Achievement of Affective Dimension Indicators

Table 2.

Achievement Per Indicator of Affective Dimension Statements of Ecological Literacy

Indicator	Sub-Indicator	Code	Percentage	Category
Environmental Attitudes	Views on the protection of natural resources.	P1	88,50%	Very High
	Attitudes toward pollution and environmental damage.	P2	81,25%	Very High
		P3	77,75%	High
	Concern for biodiversity.	P4	81,25%	Very High
	Positive feelings/affection toward nature.	P5	79,50%	High
Environmental Sensitivity	Empathy for the condition of the surrounding environment.	P6	84,25%	Very High
		P7	83,50%	Very High
	Willingness to participate in environmental solutions.	P8	81%	Very High
Willingness to Take Action	Willingness to participate in environmental solutions.	P9	77,50%	High
		P10	76,25%	High
	Personal commitment to preventive actions.	P11	79,50%	High
		P12	83%	Very High
	Willingness to influence others.	P13	82,25%	Very High

Source: Data processed by researchers, 2026

Further analysis was conducted to examine the achievement percentages for the sub-indicators and each statement item comprising each indicator. The results of this analysis are presented in Table 2.

From the table 2 show that, 8 items (P1, P2, P4, P6, P7, P8, P12, P13) fell into the Very High category (81–100%), while the remaining 5 items (P3, P5, P9, P10, P11) fell into the High category (61–80%); none of the items fell below the High threshold. This pattern indicates that students' affective responses were consistently strong across nearly all aspects of ecological literacy, with items in the Very High category reflecting near-uniform endorsement of environmental care and empathy, while the High category items though comparatively lower still represent a majority-positive orientation rather than an area of concern.

Based on the analysis results, the Environmental Attitude indicator showed that item P1 received the highest score and item P3 the lowest. For the Environmental Sensitivity indicator, item P6 received the highest score, and item P5 the lowest. For the Intention to Act indicator, item P12 achieved the highest score, and item P10 achieved the lowest score. Although there were variations among the items, all scores fell within the High to Very High range.

These findings are supported by data from interviews with teachers and students:

Environmental Attitudes

In the Environmental Attitudes indicator, the statement on maintaining soil fertility and water availability (P1) achieved the highest score, 88.50% (Very High). Meanwhile, the statement regarding the impact of plastic waste on the school environment (P3) received the lowest score, 77.75% (High). This is reinforced by interviews with teachers regarding the importance of preserving ecosystems. Miss IN noted that the school has a system where each class is assigned its own plot of land, which serves as a key catalyst for fostering students' sense of care: "Since each class has its own garden (raised beds), students become more responsible for maintaining and caring for them."

Furthermore, another teacher noted a shift in students' attitudes toward caring for the ecosystem (the school garden): "Students have actually demonstrated critical thinking; for instance, when they see a lot of weeds in the garden, they immediately pull them out and pick up the trash. They say that the weeds are polluting the garden they've been tending" (Miss TA).

The teacher's statement aligns with Student A's remark that, *"I feel a responsibility to take care of my surroundings, such as watering plants, applying fertilizer, and picking up trash around the school garden to keep it clean."*

Nevertheless, interview data indicate that students still demonstrate critical attitudes when faced with instances of pollution in their school garden environment. Miss TA explained the students' critical-responsive attitude upon witnessing pollution:

"There was an incident where someone was burning trash behind the school, and the smoke drifted toward the school. They thought it would damage the garden, and in a spontaneous reaction, they immediately threw stones (at the source of the smoke)."

This critical awareness is also reflected in their emotional expressions:

"I get upset when I see people littering in the school garden, especially when they pollute the garden we've been taking care of. I'll tell them off so they don't do it again because I don't like seeing trash polluting the place either" (Student C).

The students' critical awareness of the trash problem aligns with concrete efforts integrated into the TdBA program, one of which is the construction of compost bins to support independent organic waste management. This activity reflects an attitude of environmental care and equips students with practical skills in managing waste wisely, as shown in Figure 2.

Figure 2.

Making Portable Compost Bins during TdBA activities



Environmental Sensitivity

In the Environmental Sensitivity indicator, the item regarding students' concern for the animals and plants around them (P6) achieved the highest score of 84.25% (Very High), followed by the item regarding the comfort of the school's green garden (P7). Meanwhile, the statement regarding the joy of growing plants from small seeds to maturity (P5) achieved the lowest score of 79.50% (High).

Students' emotional connection when interacting directly with plants has proven to be strong, as Miss SI noted: "Students are always enthusiastic and happy when carrying out the process from seed sowing to planting. They even dig the holes themselves and bring their own gardening tools from home." *This aligns with Student C's statement: "I feel happy seeing the seeds I planted myself grow and continue to grow until they can finally be harvested."*

Additionally, Miss IN observed that the planting process stimulates students' critical thinking:

"Since the plants recommended for planting are usually vegetables, students sometimes notice changes in wilting vegetables, and that's when they start wondering why and what to do. That's where empathy and critical thinking emerge in the students; the teacher simply guides them on the next steps to take." This is also consistent with the plant-saving actions described by Student A: "I feel sad when the plants wilt. What I usually do is water them immediately, trim the wilted parts, and move the plant so it can get enough sunlight."

Willingness to Take Action

Meanwhile, regarding the Willingness to Take Action indicator, the items related to social aspects specifically, the intention to encourage peers to use tumblr and to manage harvests wisely (P12 and P13) achieved the highest scores of 83% (Very High) and 82.25% (Very High). Meanwhile, the item regarding the intention to grow plants at home (P10) received the lowest score of 76.25% (High).

This independent willingness to take action serves as a positive habit, as Miss SI explained: "For example, the children already know that on Tuesdays, the schedule includes cleaning the garden after the habit-forming activity. So, because this routine has been established for a long time, the children are already accustomed to carrying it out on their own (initiatively) without needing to be instructed again. They even store their cleaning supplies and gardening tools neatly in the classroom on their own."

Other initiatives, such as processing the harvest wisely, were sparked by the TdBA 'Panen Karya' activity. Miss SI continued: "Each class has different plants, and they were so excited during the harvest. Like during the tomato harvest yesterday, they were enthusiastic and said they wanted to make tomato juice; even the students' parents supported them by bringing blenders to school, and then we drank the juice together and shared it with others."

Student A also reflected on the experience: "The most memorable part was when we got to see each other's harvests. I'm happy to have learned about various plants and to know that plants can be processed and have many benefits for all of us."

Based on confirmation from Miss TA during an interview, who stated that: "At home, some children try simple gardening by using discarded plastic bottles as containers. However, there are also those who still cannot do it at home due to limited space or land."

Despite limited space or land, students' desire to plant at home remains high: "After participating in the TdBA activity, I want to try planting on my own at home from small seeds. I want to plant tomatoes and chili peppers, and previously I've already tried planting strawberries, galangal, and onions" (Student A).

In addition, the internalization of TdBA values also influences how students consume their daily meals, as explained by a teacher: "At home, children and their parents have at least begun to apply the TdBA eating principles ensuring food is clean and ensuring it is finished. In fact, children are now also getting into the habit of bringing their own food

and drink containers from home and no longer bringing plastic snack wrappers from home to school" (Miss IN).

Discussion

The findings indicate that although there are variations in scores across individual items, overall performance generally falls within the High to Very High range. The affective dimension of students' ecological literacy as a whole falls into the Very High category (81.19%). This indicates that the environment-based habit-forming program consistently implemented in schools is able to optimally foster students' affective aspects and demonstrates that the TdBA program has successfully become a learning space that not only focuses on cognitive aspects but is also capable of fostering students' ecological sensitivity and concern through direct engagement with their real-world environment. These findings reinforce the argument that local wisdom-based environmental education which involves direct experience, habituation, and the internalization of values can consistently foster a strong affective dimension of ecological literacy among elementary school students (Ardoin et al., 2020;). This is consisRachmawati, 2021tent with the view of Ardoin et al. (2020), who assert that effective environmental education must include direct experiences with nature. These findings are also in line with the perspective of Erdogan and Marcinkowski (2015), who assert that the affective dimension of environmental literacy develops optimally through repeated and meaningful environment-based learning experiences. Furthermore, these high achievements support the findings of Cincera, Kroufek, and Bogner (2023), who noted that student engagement in nature-based environmental education programs influences the development of their ecological attitudes and behaviors. In the context of the TdBA program, activities such as caring for plants in the school garden, managing the harvest, and wisely utilizing waste are forms of habituation that encourage the tangible internalization of ecological values in students' daily lives.

In the Environmental Attitudes indicator (82.19%), the statement regarding maintaining soil fertility and water availability (P1) achieved the highest score of 88.50% (Very High). This reflects that students are already convinced of the importance of preserving natural resources in their surrounding ecosystem (the school garden). Although relatively high, this score indicates that students' awareness of the impact of plastic waste pollution still needs to be improved, given that environmental education related to plastic needs to be systematically designed starting in elementary school (Liu et al., 2023). Meanwhile, the statement item regarding the impact of plastic waste on the school environment (P3) achieved the lowest score of 77.75% (High). Although classified as high, this result indicates that students' awareness of the impact of plastic waste pollution still needs to be improved, given that environmental education related to plastic needs to be systematically designed starting at the elementary school level (Liu et al., 2023). Thus, the Environmental Attitude indicator shows that the TdBA program has successfully fostered students' beliefs and perspectives regarding the importance of protecting

the environment, particularly through the class-based land ownership system, which instills a sense of personal responsibility. Although awareness of plastic pollution still needs to be strengthened, students have demonstrated critical and responsive attitudes, which serve as a crucial foundation for the development of more consistent pro-environmental behaviors.

In the Environmental Sensitivity indicator (82.06%), the statement regarding students' concern for the animals and plants around them (P6) achieved the highest score of 84.25% (Very High). This reflects that students have developed empathy and positive affection toward nature and the living things around them. The environmental sensitivity indicator, which encompasses emotional responses to ecosystems, is a crucial component of ecological literacy because it bridges the gap between knowledge and concrete action (Lovren & Jablanovic, 2023). Meanwhile, the statement regarding the enjoyment of growing plants from small seeds to maturity (P5) achieved the lowest score of 79.50% (High), indicating that not all students fully experienced the gardening process from start to finish; consequently, the emotional bonds formed during the planting process tend to be unevenly distributed among all students. Thus, the Environmental Sensitivity indicator shows that direct and repeated interaction with plants in the TdBA program has successfully fostered students' empathy and positive affection toward nature. Although not all students had a full gardening experience, a sense of concern for the condition of the plants and the surrounding environment has been established and is reflected in the students' initiatives to care for and save the plants on their own.

Meanwhile, regarding the Willingness to Take Action indicator (79.70%), the items related to social aspects specifically, the intention to encourage peers to use Tumblr and to manage crop yields wisely (P12 and P13) achieved the highest scores of 83% (Very High) and 82.25% (Very High), respectively. This indicates that elementary school students have the potential to serve as agents of change in their surrounding communities. Students not only possess personal commitment but are also prepared to encourage others to adopt pro-environmental behaviors. This aligns with Ardoin et al., 2020, who emphasize that effective environmental education must build and enhance attitudes, values, and environmental knowledge, as well as collaboratively develop individuals' skills to take positive environmental actions. The statement item regarding the intention to plant plants at home (P10) achieved the lowest score of 76.25% (High). This finding indicates that there are specific challenges in facilitating ecological transfer from the school environment to the home environment. As stated by Jia and Yu (Jia & Yu, 2021), the development of children's environmentally friendly behavior requires systemic support, active involvement, and positive role modeling from various parties, such as the family at home, and should not rely solely on school programs. These findings are consistent with the results of a study by (Alindra et al., 2025), which identified that community engagement and ongoing professional development remain areas requiring attention in the implementation of TdBA. This indicates that strengthening the synergy between

schools, families, and communities is essential so that the ecological values fostered at school can be sustained in the home environment. Thus, the Willingness to Take Action indicator shows that the TdBA program has successfully fostered students' commitment to taking pro-environmental actions, both individually and socially, although transferring these behaviors to the home environment remains a challenge.

The implications of these findings highlight the importance of maintaining and expanding similar nature-based programs, raising awareness of pollution issues caused by waste, and emphasizing the need to strengthen learning ecosystem strategies that can bridge the affective values cultivated in school so that students can independently apply them in their daily lives, both at home and in the community. However, this study has limitations regarding its sample scope, which involved only three elementary schools in Purwakarta Regency with relatively homogeneous characteristics of TdBA implementation; thus, these findings cannot yet be broadly generalized to different school or regional contexts. Additionally, this study measured the affective dimension at a single point in time, so it cannot yet describe the longitudinal development of students' affective dimensions. Therefore, future research is recommended to expand the sample scope to schools with varying levels of TdBA implementation, explore the role of family and community involvement as factors supporting the transfer of ecological behaviors from school to home, and examine the longitudinal development of students' affective dimensions of ecological literacy to obtain a more comprehensive picture.

CONCLUSION

Based on the research findings, the affective dimension of elementary school students' ecological literacy, in the implementation of the Tatanen program at Bale Atikan, falls into the "Very High" category overall (81,19%), with Environmental Attitudes and Environmental Sensitivity categorized as Very High and Willingness to Take Action categorized as high. The highest scores were found in indicators related to belief in the importance of conserving natural resources and empathy toward surrounding living beings. Meanwhile, the greatest challenge lies in transferring students' ecological behaviors from the school environment to their homes. These findings answer the study's research questions by showing that the TdBA program is able to internalize ecological values as an integral part of students' daily character, rather than as mere cognitive knowledge.

On the other hand, locally-based environmental programs like TdBA are highly relevant to consider as part of the direction for developing more contextual and meaningful environmental education at the elementary school level. Practically, schools implementing similar programs are encouraged to maintain and expand nature-based habituation activities such as class-based garden management, waste processing, and harvest sharing while also designing strategies that explicitly bridge the values fostered at school with practices at home, given that the transfer of ecological behavior beyond the school environment remains the most persistent challenge.

Future research is recommended to expand the sample scope to schools with varying levels and durations of TdBA implementation to improve generalizability, to explore the role of family and community involvement as factors supporting the transfer of ecological behavior from school to home, and to examine the longitudinal development of students' affective dimensions of ecological literacy beyond a single point in time.

DECLARATIONS

Author Contributions

Hafsari, D.D., Conceptualization, Methodology, Writing - Original Draft, Editing and Visualization; **Nuraeni, F.**, Conceptualization, Writing-Review, Editing, Validation and Supervision; **Alindra, A.L.**, Conceptualization, Writing-Review, Editing, Validation and Supervision.

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Conflict of Interest

The authors declare no conflict of interest.

Declaration of AI Use

AI tools were used during the preparation of this manuscript to improve with language refinement and writing clarity under full author supervision and critical review. All content, data, analysis, and conclusions remain the sole responsibility of the authors.

Additional Information

This study was conducted with due regard to ethical principles in accordance with applicable research procedures. Data collection involved human participants (elementary school students and teachers) and was conducted based on official research permits issued by the Indonesia University of Education to SDN 2 Sindangkasih, SDN 1 Nagrikidul, and SD Labschool UPI Purwakarta. Consent was obtained from the respective schools prior to data collection, ensuring that the research and data collection could be carried out properly.

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