



Nurturing Ecological Citizenship: Integrating Panglima Laot Values into School Co-Curricular Programs in Aceh

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Abstract

The integration of local wisdom into formal education has become increasingly important in addressing challenges related to cultural preservation, character development, and environmental sustainability. In Aceh, Panglima Laot is a traditional maritime institution that embodies values of leadership, cooperation, responsibility, deliberation, social justice, and environmental stewardship. However, despite its important role in Acehnese society, the educational potential of Panglima Laot has not been systematically integrated into elementary school co-curricular programs. This study aims to explore how Panglima Laot values can be integrated into elementary school co-curricular programs and to examine their contribution to strengthening students' character and environmental awareness. A qualitative case study approach was employed in several coastal elementary schools in Banda Aceh. Data were collected through semi-structured interviews with Panglima Laot leaders, school principals, teachers, students, and parents, complemented by observations, focus group discussions, and document analysis. Data were analyzed using the interactive model of Nurmala, V., et al., (2025). The findings reveal that Panglima Laot values can be effectively integrated into co-curricular activities through beach clean-up campaigns, mangrove planting projects, maritime cultural literacy programs, environmental conservation initiatives, and community-based learning activities. The implementation of these activities contributed to the development of students' responsibility, cooperation, environmental awareness, and appreciation of local cultural heritage. The study also found that collaboration between schools and community stakeholders strengthened the effectiveness of local wisdom-based learning. The study implies that integrating Panglima Laot values into co-curricular programs provides an innovative model for local wisdom-based education that supports character education, environmental sustainability, and the preservation of Acehnese maritime culture. The findings offer practical insights for educators, curriculum developers, and policymakers seeking to incorporate indigenous knowledge and local wisdom into elementary school education.

Keywords: Panglima Laot, Local Wisdom, Co-Curricular Program, Character Education, Environmental Awareness



Introduction

The integration of local wisdom into formal education has become an increasingly important strategy for promoting culturally responsive learning, character development, and environmental sustainability (Putranti, A. D., 2025). In many parts of the world, educational institutions are encouraged to incorporate indigenous knowledge and local cultural practices into teaching and learning processes to ensure that education remains relevant to students' social and cultural contexts (Ramli, R., et al., 2025). In Indonesia, this agenda has gained greater prominence through the implementation of the Merdeka Curriculum, which emphasizes contextual learning and the utilization of local resources to strengthen students' competencies and character (Raihani, R., 2025). Within the Acehnese context, Panglima Laot represents a unique maritime institution that embodies centuries-old traditions of marine governance, environmental stewardship, and social cohesion, making it a valuable educational resource for elementary schools (Rahmah, S., & Yulifar, L., 2025).

Previous studies have highlighted the significance of local wisdom in fostering students' cultural identity, environmental awareness, and social responsibility (Giyono, G., et al., 2026). Research on Panglima Laot has primarily focused on its role in customary law, fisheries management, conflict resolution, and marine conservation (Gayo, A., et al., 2025). These studies demonstrate that Panglima Laot contributes substantially to sustainable marine resource management through customary regulations, collective decision-making, and community participation. Furthermore, scholars have argued that indigenous institutions can serve as effective mechanisms for environmental governance and cultural preservation (Aswita, D. et al., 2023).

Despite the growing body of literature on Panglima Laot, there remains a significant gap concerning its educational application within formal schooling. Existing studies tend to examine Panglima Laot from legal, sociological, anthropological, or environmental perspectives, while little attention has been paid to its potential contribution to curriculum development and educational innovation. Moreover, research investigating the integration of maritime local wisdom into elementary school co-curricular programs remains limited. Consequently, there is insufficient understanding of how Panglima Laot values can be transformed into structured educational experiences that promote character formation and environmental literacy among young learners.

Therefore, this study aims to explore the integration of Panglima Laot values into elementary school co-curricular programs and examine their contribution to character education and environmental awareness. Specifically, this study seeks to answer the following research questions: (1) What values embedded in the Panglima Laot institution are relevant to elementary education? (2) How can these values be integrated into elementary school co-curricular programs? (3) How do students, teachers, and community members perceive the implementation of Panglima Laot-based co-curricular activities? and (4) What educational outcomes emerge from the implementation of such programs?

To address these questions, this study employs a qualitative case study design. The research was conducted in selected elementary schools located in coastal areas of Banda Aceh where interactions between schools and maritime communities are relatively strong. Data were collected through semi-structured interviews, observations, focus group discussions, and document analysis involving Panglima Laot leaders, school principals, teachers, students, and parents. The collected data were analyzed using the interactive model proposed by Nurmala, V., et al., (2025), which includes data condensation, data display, and conclusion drawing.

This study contributes to the growing discourse on local wisdom-based education by offering an alternative model for integrating indigenous knowledge into formal educational settings. The findings are expected to enrich the fields of social studies education, environmental education, character education, and culturally responsive pedagogy. Furthermore, the study supports global educational agendas related to Education for Sustainable Development (ESD) and the Sustainable Development Goals (SDGs), particularly Goal 4 on quality education and Goal 14 on marine sustainability (Jurdana, D. S., & Agbaba, R., 2023).

Several key terms are used throughout this study. Panglima Laot refers to the traditional maritime institution recognized under Acehese customary law that regulates fishing activities, resolves disputes among fishermen, and promotes marine conservation. Local wisdom refers to the body of knowledge, values, beliefs, and practices developed by a community through long-term interaction with its environment (Nasir, M., et al., 2022). Co-curricular programs are structured educational activities conducted outside regular classroom instruction but designed to complement curricular objectives and support students' holistic development (Abrams, C., et al., 2022). Character education refers to educational efforts aimed at developing moral values, ethical behavior, and social responsibility among learners.

The remainder of this article is organized into five sections. Following this introduction, the theoretical framework presents the conceptual foundation underpinning the study. The literature review discusses relevant scholarly works on local wisdom, character education, environmental education, and Panglima Laot. The methodology section explains the research design, participants, data collection procedures, and analytical techniques. The findings and discussion section presents the research results and interprets them in relation to existing literature. Finally, the conclusion summarizes the key findings, outlines the study's contributions and limitations, and provides recommendations for future research and educational practice.

Theoretical Framework

This study is primarily grounded in Social Constructivist Theory developed by Vygotsky (Z., & Yanto, Y., 2023) and strengthened by the principles of Place-Based Education (PBE) proposed by Smith (Yemini, M., 2023). These theoretical perspectives provide a comprehensive framework for understanding how local wisdom can be transformed into meaningful educational experiences within elementary school co-curricular programs.

Social Constructivist Theory posits that knowledge is actively constructed through social interaction, cultural participation, and engagement with authentic learning environments (Raturi, S., 2023). Learning is not merely the transmission of information from teachers to students; rather, it is a socially mediated process in which learners develop understanding through interactions with more knowledgeable members of society. Within this perspective, cultural institutions and community practices serve as important learning resources that shape students' cognitive and social development.

Complementing social constructivism, Place-Based Education (PBE) emphasizes the use of local communities, cultures, environments, and experiences as the foundation for teaching and learning (Yemini, M., 2023). Soucy, A., (2024) argues that education should reconnect learners with the places in which they live by utilizing local knowledge systems and community-based experiences. Through place-based learning, students develop a deeper understanding of their cultural identity, environmental responsibilities, and civic engagement.

The combination of Social Constructivism and Place-Based Education is particularly relevant for examining the integration of Panglima Laot values into elementary school co-curricular programs (Rasidi, R., 2025). Panglima Laot is not merely a traditional institution but also a living cultural system through which knowledge, values, norms, and environmental ethics are transmitted across generations (Permatasari, C., et al., 2023). Consequently, students can learn directly from authentic community practices rather than solely from textbook-based instruction.

Social Constructivist Theory provides the conceptual foundation for understanding how students internalize values through interactions with Panglima Laot leaders, teachers, fishermen, and community members (Nithideechaiwarachok, B., & Chano, J., 2024). Simultaneously, Place-Based Education explains why the coastal environment and maritime culture of Aceh constitute meaningful educational contexts that enable students to connect classroom learning with real-world experiences. Together, these theories offer a rigorous framework for analyzing how local wisdom contributes to character education and environmental awareness (Ramli, R., et al., 2025).

Furthermore, both theories align with the objectives of the Merdeka Curriculum, which encourages contextual, experiential, and culturally responsive learning (Zainuddin, Z., 2025). The integration of Panglima Laot values through co-curricular activities such as beach conservation projects, maritime cultural literacy programs, and community engagement

initiatives reflects the principles of learning through participation and place-based experiences (Fanny, S. T., 2026). The application of these theories in the present study is operationalized through several constructs that guide data collection and analysis.

From Social Constructivist Theory, the construct of social interaction is operationalized through students' participation in collaborative activities involving Panglima Laot leaders, teachers, and community members (Tarigan, M. I., & Gaol, H. S. L., 2025). This construct is used to examine how interactions facilitate the development of responsibility, cooperation, and leadership among students.

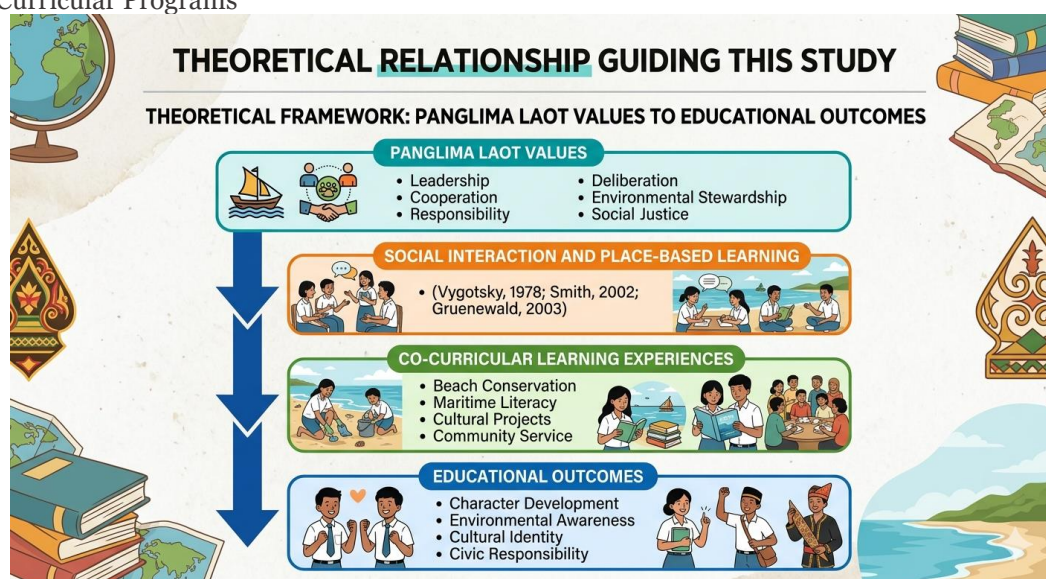
The construct of cultural mediation is operationalized through the transmission of Panglima Laot values, customs, and maritime traditions during co-curricular activities. This construct is used to categorize learning experiences that promote cultural identity and appreciation of local heritage.

The construct of experiential learning is operationalized through direct student involvement in environmental conservation activities such as beach clean-up campaigns, mangrove planting, and coastal observation projects (Montebon, R., 2026). This construct is used to identify how hands-on experiences influence environmental awareness and sustainable behavior.

From Place-Based Education, the construct of sense of place is operationalized through students' understanding of coastal ecosystems, maritime culture, and community life. This construct is used to assess the extent to which students develop emotional and intellectual connections to their local environment.

The construct of community engagement is operationalized through partnerships between schools, Panglima Laot institutions, parents, and local communities. This construct is utilized to analyze how community participation supports educational outcomes and strengthens local wisdom-based learning. The theoretical relationship guiding this study can be summarized as follows:

Figure 1: Conceptual Framework of Panglima Laot Value Integration in Elementary School Co-Curricular Programs



Accordingly, Social Constructivism and Place-Based Education serve as complementary frameworks that explain how local wisdom can be transformed into educational practices capable of fostering students' character, environmental literacy, and cultural sustainability within elementary schools.

The theoretical foundation of this study is rooted in Social Constructivism Theory and Place-Based Education Theory, which emphasize the role of social interaction, cultural participation, and contextual learning in knowledge construction (White, S., 2025). Social constructivism argues that learning occurs through engagement with social and cultural environments, while Place-Based Education highlights the importance of utilizing local communities and environments as educational resources. In addition, Culturally Responsive Pedagogy (Ogodo, J. A., 2024) and Education for Sustainable Development (Zhou, L., & Saearani, M. F. T., 2025) provide complementary perspectives by emphasizing the integration of cultural heritage and

sustainability values into educational practices. According to these theories, meaningful learning is achieved when students actively engage with authentic social and environmental contexts. Key factors within these frameworks include cultural relevance, community participation, environmental awareness, experiential learning, and social responsibility. These factors are particularly relevant to the values embodied in the Panglima Laot institution.

Various approaches and theoretical models have been developed to facilitate the integration of local wisdom into formal education. Culturally Responsive Pedagogy focuses on aligning educational experiences with students' cultural backgrounds (Caingcoy, M. E., 2023). Place-Based Education emphasizes learning through direct engagement with local communities and environments (Jaikrasen, P., & Ketsing, J., 2025). Education for Sustainable Development promotes knowledge, skills, values, and attitudes necessary for sustainable living (MuhammedZein, F., & Abdullateef, S. T., 2025). Meanwhile, Social Constructivism highlights collaborative learning and cultural mediation (Nithideechaiwarachok, B., & Chano, J., 2024). These approaches contain interconnected dimensions, including cultural identity, environmental literacy, civic participation, social interaction, and experiential learning. In the context of this study, these dimensions are adapted to explore how Panglima Laot values can be integrated into elementary school co-curricular programs.

The development of Place-Based Education originated from concerns about the disconnection between formal schooling and local community life. Soucy, A., et al., (2024) proposed that educational experiences should be rooted in the places where students live, while Schlosberg, D., et al., (2024) expanded the framework by incorporating critical perspectives on culture, environment, and social justice. Similarly, scholars of culturally responsive education have argued that learning becomes more effective when it reflects students' cultural realities (Alamsyah, T. P., et al., 2025). Previous studies have integrated these frameworks to investigate environmental education, indigenous knowledge transmission, and community-based learning (Shabalala, N. P., 2025). In various contexts, researchers have adapted these models to connect local traditions and indigenous knowledge systems with formal educational practices. Therefore, integrating Panglima Laot values into co-curricular programs aligns with a growing international trend toward contextual and culturally responsive education.

The conceptual framework adopted in this study provides a systematic approach for understanding how local wisdom can be transformed into educational experiences. Social Constructivism offers a formal framework for explaining how students acquire knowledge and values through social interaction, while Place-Based Education explains how learning is enhanced through direct engagement with local environments and communities (Fitrianto, I., & Farisi, M., 2025). These frameworks are particularly suitable for examining educational initiatives that seek to connect indigenous cultural institutions with formal schooling. Consequently, the framework can be applied to investigate how Panglima Laot values are transmitted, internalized, and practiced through co-curricular activities in elementary schools.

The material object of this study is Panglima Laot, a customary maritime institution that has existed in Aceh for centuries. Historically, Panglima Laot has functioned as a community-based governance system regulating fishing activities, mediating disputes among fishermen, and promoting marine conservation (Tarigan, M. I., & Gaol, H. S. L., 2025). The institution embodies values such as leadership, responsibility, cooperation, deliberation, justice, and environmental stewardship. These values have enabled coastal communities to maintain social harmony and sustainable resource management across generations. As an indigenous institution, Panglima Laot represents a rich source of local wisdom that can be utilized to support educational objectives related to character formation and environmental awareness.

The context of this study is elementary education in coastal communities of Banda Aceh. The implementation of the Merdeka Curriculum provides opportunities for schools to develop contextual learning experiences through curricular, co-curricular, and extracurricular activities. Coastal communities in Aceh possess strong maritime traditions that influence daily life, economic activities, and cultural practices. However, many students are increasingly disconnected from local cultural heritage due to modernization, globalization, and the dominance of textbook-centered learning. Consequently, there is a need for educational initiatives that reconnect students with their cultural environment while simultaneously promoting

environmental sustainability. Co-curricular programs based on Panglima Laot values may provide such opportunities through experiential and community-based learning.

Previous studies on Panglima Laot have predominantly focused on marine governance, customary law, fisheries management, conflict resolution, and environmental conservation (Rahmawati, R., & Afriandi, F., 2024). While these studies highlight the social and ecological significance of the institution, they rarely examine its role in formal education. Existing research on local wisdom-based education generally focuses on curriculum integration, environmental learning, or cultural preservation but seldom addresses maritime customary institutions as educational resources. Therefore, the current study differs from previous research by specifically investigating the integration of Panglima Laot values into elementary school co-curricular programs. This focus is important because it addresses a significant gap in the literature and contributes to the development of innovative educational models that support character education, environmental literacy, cultural sustainability, and community engagement in elementary schools.

Methods

Research Design

This study employed a qualitative case study design to explore the integration of Panglima Laot values into elementary school co-curricular programs in coastal communities of Aceh. A qualitative case study was selected because it enables researchers to investigate a contemporary phenomenon within its real-life context and to gain an in-depth understanding of participants' experiences, perceptions, and practices (Halimah, S., et al., 2025). The study sought to understand how local wisdom embedded in the Panglima Laot institution can be transformed into educational experiences that foster character development and environmental awareness among elementary school students. This approach was considered appropriate because the phenomenon under investigation is closely connected to cultural, social, and educational contexts that cannot be separated from the setting in which they occur.

Data Sources

The primary data sources consisted of key stakeholders involved in the implementation and transmission of Panglima Laot values within educational and community settings. Participants were selected through purposive sampling based on their knowledge, experience, and involvement in coastal education and maritime cultural practices.

The participants included:

1. Two Panglima Laot leaders from coastal areas of Banda Aceh who possess extensive knowledge regarding customary maritime governance, environmental conservation, and traditional values.
2. Three elementary school principals responsible for curriculum implementation and school-community partnerships.
3. Six elementary school teachers involved in co-curricular and environmental education programs.
4. Twelve students from Grades 4–6 who participated in school-based environmental and cultural activities.
5. Six parents representing coastal community households.
6. Two officials from local education and cultural institutions involved in promoting local wisdom-based education.

The research was conducted in three coastal elementary schools located in Banda Aceh and Aceh Besar, areas recognized for their strong maritime traditions and active interactions with the Panglima Laot institution. Secondary data sources included school documents, co-curricular activity plans, curriculum guidelines, local regulations concerning Panglima Laot, photographs, field notes, and relevant academic literature.

Instrument

The primary research instrument was the researcher, consistent with qualitative inquiry principles (Kumari, D., & Journal, S., 2025). To support data collection, several instruments were developed based on the theoretical framework of Social Constructivism and Place-Based Education.

A semi-structured interview guide was designed to explore participants' perceptions regarding Panglima Laot values, educational practices, environmental awareness, and community involvement. The interview questions were validated through expert review involving one social studies education expert, one curriculum expert, and one expert in Acehnese customary institutions.

Observation protocols were developed to document student participation, teacher practices, interactions with community members, and the implementation of co-curricular activities. In addition, document analysis sheets were used to examine curriculum documents, activity reports, and educational policies related to local wisdom integration. The instruments were considered appropriate because they enabled the collection of rich and contextual data aligned with the study's objectives.

Data Collection and Procedure

Data collection was conducted over a four-month period from January to April 2026. The procedure consisted of five stages.

First, researchers obtained formal permission from schools, community leaders, and relevant educational authorities. Preliminary visits were conducted to establish rapport with participants and gain an understanding of the local context.

Second, semi-structured interviews were conducted individually with Panglima Laot leaders, principals, teachers, parents, and government representatives. Each interview lasted approximately 45–90 minutes and was audio-recorded with participant consent.

Third, non-participant observations were carried out during co-curricular activities, including environmental conservation projects, beach clean-up campaigns, maritime cultural literacy programs, and community-based learning activities. Field notes and photographs were used to document observations.

Fourth, focus group discussions (FGDs) were conducted with groups of students to explore their experiences and perceptions regarding Panglima Laot-based learning activities.

Finally, relevant documents such as curriculum plans, school policies, activity reports, and local regulations were collected and analyzed to triangulate findings from interviews and observations.

Data Analysis

Data analysis followed the interactive model proposed by Nurmala, V., et al., (2025), consisting of data condensation, data display, and conclusion drawing/verification.

The first stage involved transcribing all interviews verbatim and organizing field notes and documents into a digital database. Researchers repeatedly read the data to gain familiarity with participants' narratives and identify preliminary patterns.

The second stage involved open coding, during which meaningful units of information were identified and labelled. Similar codes were grouped into broader categories related to Panglima Laot values, educational practices, environmental awareness, character development, and community participation.

The third stage involved thematic analysis to develop major themes emerging from the data. Data displays, including matrices and conceptual maps, were used to identify relationships among categories.

The final stage involved verifying findings through continuous comparison across data sources and participant groups. Themes were refined until a coherent interpretation of the phenomenon was achieved.

Accuracy

Several strategies were employed to ensure data accuracy and validity. Content validation of interview instruments was conducted through expert judgment involving specialists in social studies education, curriculum studies, and Acehese customary institutions.

Pilot interviews were conducted prior to the main study to assess question clarity and relevance. During data collection, researchers used audio recordings, detailed field notes, and document verification to minimize errors and omissions.

Triangulation of data sources, methods, and participant groups was employed to verify the consistency of findings. Furthermore, preliminary interpretations were discussed among the research team to reduce individual bias and improve analytical accuracy.

Trustworthiness

The trustworthiness of the study was established through the criteria of credibility, transferability, dependability, and confirmability proposed by Kakar, Z., et al., (2023).

Credibility was ensured through prolonged engagement in the field, triangulation, member checking, and peer debriefing. Participants were invited to review interview summaries and preliminary findings to confirm the accuracy of interpretations.

Transferability was enhanced by providing rich and detailed descriptions of the research context, participants, and educational settings, enabling readers to determine the applicability of findings to similar contexts.

Dependability was achieved through maintaining an audit trail documenting all research procedures, methodological decisions, coding processes, and analytical memos.

Confirmability was established by preserving research records, field notes, interview transcripts, and analytical documentation, thereby allowing external review of the research process and findings.

Ethical Review

This study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki and national research ethics guidelines. Ethical approval was obtained from the Research Ethics Committee of the Graduate School, Universitas Syiah Kuala. Prior to participation, all participants received detailed information regarding the purpose of the study, voluntary participation, confidentiality, and the right to withdraw at any stage without consequences. Written informed consent was obtained from adult participants, while parental consent and student assent were secured for all student participants. To protect privacy, pseudonyms were used in all transcripts and reports. Audio recordings, transcripts, and digital files were stored securely and were accessible only to the research team. No identifying information is disclosed in this publication.

Findings

Analysis of interview transcripts, observations, focus group discussions, and document reviews revealed four major themes regarding the integration of Panglima Laot values into elementary school co-curricular programs. These themes include: (1) identification of educational values embedded in Panglima Laot, (2) implementation of Panglima Laot-based co-curricular activities, (3) development of students' character and environmental awareness, and (4) strengthening school-community partnerships.

Educational Values Embedded in Panglima Laot

The findings indicate that Panglima Laot contains several educational values relevant to elementary education. These include leadership, cooperation, responsibility, deliberation, social justice, and environmental stewardship.

Participants consistently emphasized that Panglima Laot is not merely a customary institution regulating fishing activities but also serves as a source of moral and social values. One Panglima Laot leader stated:

“Panglima Laot teaches us that the sea is not only a source of livelihood but also a trust that must be protected for future generations.” (PL-01)

Similarly, a teacher explained:

“The values practiced by Panglima Laot are closely related to the character education goals promoted in schools, especially responsibility, cooperation, and environmental care.” (T-03)

Document analysis of local customary regulations further demonstrated that conservation principles and collective responsibility are central components of Panglima Laot governance.

Table 1: Educational Values Identified from Panglima Laot

Value	Description	Educational Relevance
Leadership	Guiding and coordinating community activities	Student leadership development
Cooperation	Collective decision-making and mutual assistance	Collaborative learning
Responsibility	Sustainable use of marine resources	Personal and social responsibility
Deliberation	Conflict resolution through discussion	Democratic citizenship
Social Justice	Equal treatment among fishermen	Fairness and inclusivity
Environmental Stewardship	Protection of marine ecosystems	Environmental awareness

Integration into Co-Curricular Activities

The second finding shows that schools integrated Panglima Laot values through various co-curricular activities. These activities included beach clean-up campaigns, mangrove planting programs, maritime cultural literacy projects, environmental observation activities, and visits to fishing communities.

Observation data revealed active student participation in environmental conservation initiatives. During beach clean-up activities, students worked collaboratively to collect waste and categorize recyclable materials. Teachers reported that these activities provided opportunities for experiential learning beyond classroom instruction.

One school principal stated:

“Students become more enthusiastic when learning takes place directly in the community. They feel connected to their environment and local culture.” (SP-02)

Students also expressed positive perceptions regarding the activities:

“I learned that keeping the beach clean helps fish and other animals live safely.” (ST-07)

These findings indicate that Panglima Laot values can be effectively translated into practical educational experiences through co-curricular programs.

Development of Character and Environmental Awareness

A prominent finding of this study is the positive influence of Panglima Laot-based activities on students’ character development and environmental awareness.

Teachers reported observable changes in students’ behavior following participation in environmental and cultural activities. Students demonstrated increased responsibility in maintaining school cleanliness, greater willingness to work collaboratively, and stronger respect for community traditions.

One teacher observed:

“Students who participated regularly became more disciplined and showed greater concern for environmental issues both at school and at home.” (T-05)

Similarly, a parent explained:

“My child now reminds family members not to throw garbage into rivers because he learned about protecting the sea from school activities.” (P-02)

Focus group discussions revealed that students developed a stronger understanding of the relationship between environmental conservation and community well-being. Many participants associated marine protection with the sustainability of future livelihoods.

Strengthening School–Community Partnerships

The fourth theme concerns the collaboration established between schools and community stakeholders. The involvement of Panglima Laot leaders, fishermen, parents, and local organizations created authentic learning opportunities that strengthened educational outcomes.

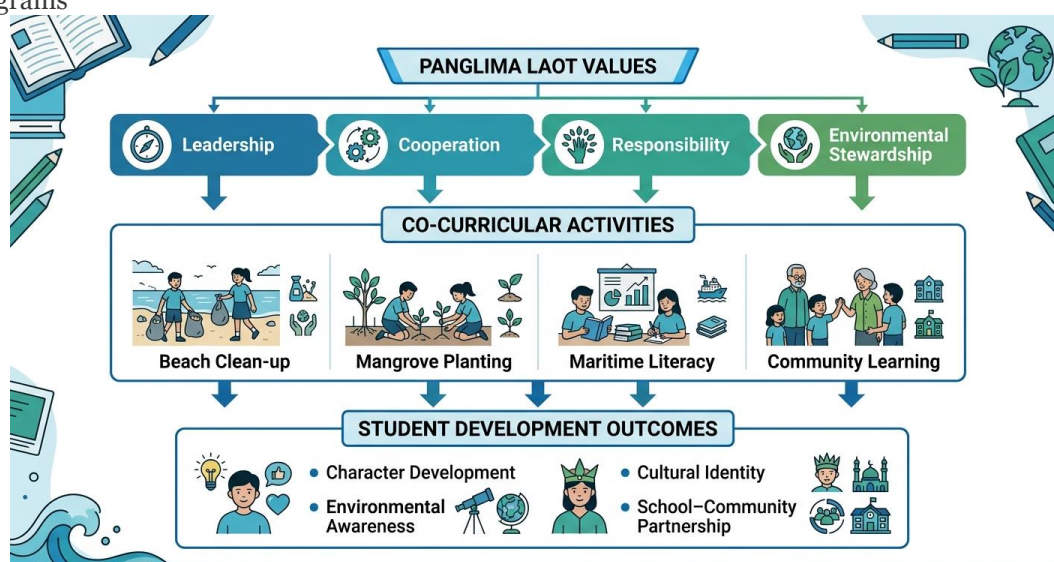
Interview data indicate that community participation enhanced the credibility and relevance of learning activities. Students viewed Panglima Laot leaders as role models and sources of practical knowledge.

According to one principal:

“Partnerships with Panglima Laot make learning more meaningful because students interact directly with people who practice these values in everyday life.” (SP-01)

The findings suggest that effective integration of local wisdom requires sustained collaboration between educational institutions and community stakeholders.

Figure 2: Model of Panglima Laot Value Integration in Elementary School Co-Curricular Programs



The overall findings demonstrate that Panglima Laot values can be effectively integrated into elementary school co-curricular programs through experiential and community-based learning activities. Such integration contributes to character education, environmental literacy, cultural identity formation, and stronger relationships between schools and coastal communities.

Discussion

The present study explored how Panglima Laot values can be integrated into elementary school co-curricular programs and how such integration contributes to students' character development and environmental awareness. The findings support the growing body of literature emphasizing the importance of local wisdom-based education in fostering contextual, meaningful, and culturally responsive learning experiences (Wayan, N., et al., 2025). The integration of indigenous knowledge into formal education has been widely recognized as an effective strategy for connecting students with their cultural heritage while simultaneously promoting sustainable development and environmental responsibility (Rasmawan, R., et al., 2025).

The findings indicate that Panglima Laot embodies a set of educational values, including leadership, cooperation, responsibility, deliberation, social justice, and environmental stewardship. These values were successfully integrated into co-curricular activities such as beach clean-up programs, mangrove planting, maritime literacy projects, and community-based learning initiatives. This finding directly addresses the first and second research questions by demonstrating that local maritime wisdom can be translated into educational practices that are relevant to elementary school students.

One particularly important finding is that students developed stronger environmental awareness and social responsibility through direct engagement with coastal conservation activities. This result is consistent with Place-Based Education theory, which argues that meaningful learning occurs when students interact with authentic local environments and community issues (Soucy, A., et al., 2024). The findings also support Nithideechaiwarachok, B., & Chano, J., (2024) Social Constructivist Theory, which emphasizes the role of social interaction and cultural mediation in the construction of knowledge and values. Through interactions with Panglima Laot leaders, fishermen, teachers, and community members, students were able to

internalize cultural values and environmental ethics in ways that traditional classroom instruction alone may not achieve.

An interesting finding emerging from this study is the role of Panglima Laot leaders as educational resources and community mentors. While previous research has primarily described Panglima Laot as a customary institution responsible for fisheries management and conflict resolution (Tarigan, M. I., & Gaol, H. S. L., 2025), the present study demonstrates that the institution also possesses significant educational potential. This finding expands the conceptual understanding of Panglima Laot beyond its traditional governance functions and highlights its relevance within contemporary educational contexts.

Another noteworthy result concerns the strengthening of school-community partnerships. Previous studies on local wisdom-based education have often emphasized curriculum integration but have provided limited discussion regarding the active involvement of traditional institutions in educational processes (Wayan, N., S., et al., 2025). The present findings reveal that collaboration between schools and Panglima Laot leaders enhanced the authenticity and relevance of learning experiences. Students not only learned about local values but also observed how those values are practiced within community life. This suggests that community participation is a critical factor in the successful implementation of local wisdom-based education.

However, some findings diverge from previous assumptions regarding students' familiarity with local culture. Several teachers reported that many students possessed only limited knowledge of Panglima Laot before participating in the co-curricular programs. This observation suggests that modernization, technological change, and globalization may be contributing to a gradual disconnection between younger generations and local cultural traditions. While previous studies often assume that local wisdom is naturally transmitted within communities (U., Milandari, B. D., et al., 2026), the present findings indicate that intentional educational interventions may be increasingly necessary to sustain cultural continuity.

The findings can be explained through the interaction between experiential learning, social participation, and cultural engagement. Co-curricular activities provided opportunities for students to move beyond passive learning and become active participants in environmental conservation and community life. Through direct experiences, students were able to connect abstract values such as responsibility and stewardship with observable environmental realities. This process aligns with experiential learning theory, which suggests that knowledge becomes more meaningful when learners actively engage with real-world situations (Rahmi, W., 2024).

Nevertheless, the findings should be interpreted cautiously. The study was conducted in a limited number of coastal elementary schools located within Aceh, where maritime traditions and community engagement remain relatively strong. Consequently, the transferability of the findings to urban schools or regions with different cultural contexts may be limited. Furthermore, because the study employed a qualitative case study design, the findings provide depth of understanding rather than statistical generalizability.

Based on the findings, a broader hypothesis may be proposed: the integration of indigenous institutions and local wisdom into co-curricular educational programs contributes positively to character formation, environmental literacy, and cultural identity among elementary school students. Future quantitative and mixed-method studies could examine this hypothesis by measuring the impact of local wisdom-based educational interventions across larger and more diverse populations.

The implications of this study are both theoretical and practical. Theoretically, the study contributes to the literature on Social Constructivism, Place-Based Education, and local wisdom-based learning by demonstrating how indigenous institutions can function as educational resources within formal schooling. Practically, the findings provide evidence for policymakers, curriculum developers, and school leaders that co-curricular programs can serve as effective mechanisms for integrating local culture into elementary education. Such initiatives support the objectives of character education, environmental education, and Education for Sustainable Development.

Overall, the findings suggest that Panglima Laot-based co-curricular programs represent a promising educational innovation capable of connecting schools with local communities,

strengthening students' environmental awareness, and preserving Acehese maritime heritage. Future research should investigate the long-term impacts of these programs, develop measurable indicators of character and environmental outcomes, and explore the adaptation of similar local wisdom-based models in different cultural and geographical contexts.

Conclusion

This study aimed to explore the integration of Panglima Laot values into elementary school co-curricular programs and to examine how such integration contributes to students' character development, environmental awareness, and cultural identity. By focusing on the educational potential of a traditional maritime institution in Aceh, the study sought to bridge the gap between local wisdom and formal education within the context of elementary schools.

The findings revealed that Panglima Laot embodies educational values that are highly relevant to contemporary schooling, including leadership, cooperation, responsibility, deliberation, social justice, and environmental stewardship. These values were successfully integrated into co-curricular activities such as beach clean-up campaigns, mangrove planting programs, maritime cultural literacy projects, and community-based learning initiatives. The study further demonstrated that participation in these activities enhanced students' environmental awareness, strengthened character formation, fostered appreciation of local culture, and promoted meaningful interactions between schools and coastal communities.

The findings contribute to the growing body of knowledge on local wisdom-based education, Place-Based Education, and Social Constructivist learning by providing empirical evidence that indigenous institutions can function as valuable educational resources within formal schooling. The study extends previous research on Panglima Laot, which has largely focused on fisheries governance, customary law, and marine conservation, by highlighting its educational dimensions and potential contributions to elementary education.

The significance of this study lies in its development of a conceptual model for integrating maritime local wisdom into school-based co-curricular programs. The findings demonstrate that local cultural institutions can play an important role in supporting character education, environmental literacy, and culturally responsive learning. Consequently, the study offers a practical pathway for implementing the objectives of the Merdeka Curriculum and Education for Sustainable Development within coastal communities.

Despite these contributions, several limitations should be acknowledged. The study was conducted in a limited number of coastal elementary schools in Aceh, which may restrict the transferability of the findings to other geographical and cultural contexts. In addition, the qualitative case study design prioritized depth of understanding rather than statistical generalization. Nevertheless, these limitations do not diminish the value of the findings; instead, they highlight the contextual nature of local wisdom-based educational practices and provide a foundation for future investigations.

Future research should employ mixed-methods or quantitative approaches to measure the effectiveness of Panglima Laot-based educational programs on students' character development, environmental behavior, and academic outcomes. Comparative studies involving different regions, indigenous institutions, or cultural contexts may also provide broader insights into the role of local wisdom in education. Furthermore, longitudinal research is needed to examine the long-term impacts of such programs on students and communities.

Based on the findings, several recommendations can be proposed for educational practice and policy. First, schools, particularly those located in coastal areas, should systematically integrate Panglima Laot values into co-curricular and project-based learning activities. Second, curriculum developers and educational authorities should provide guidelines and learning resources that facilitate the incorporation of local wisdom into school programs. Third, stronger partnerships should be established between schools, Panglima Laot institutions, community organizations, and local governments to support authentic and sustainable learning experiences. Finally, policymakers should recognize indigenous knowledge systems as strategic educational assets that contribute to cultural preservation, environmental sustainability, and the development of responsible future citizens.

Ethics approval

Ethical approval was not required for this study because it involved minimal-risk educational research and did not include medical interventions or sensitive personal data. Nevertheless, the study was conducted in compliance with the Declaration of Helsinki. Informed consent was obtained from all participants, while parental consent and student assent were secured for all student participants. Participants' anonymity, confidentiality, and right to withdraw from the study at any stage were fully protected throughout the research process.

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Competing interests

All the authors declare that there are no conflicts of interest regarding the publication of this article. The authors have no financial, professional, personal, or institutional relationships that could be perceived as influencing the research process, data interpretation, or conclusions presented in this study.

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Underlying data

Derived data supporting the findings of this study are available from the corresponding author on reasonable request.

Declaration of artificial intelligence use

This study used artificial intelligence (AI) tools and methodologies in the following capacities: 4. Manuscript writing support: AI-based language models, including ChatGPT, were employed to: a. Language refinement (improving grammar, sentence structure, and readability of the manuscript); b. Content summarization (assisting in summarizing findings and conclusions in a concise manner); c. Technical writing assistance (providing suggestions for structuring complex academic descriptions more effectively). The AI tool was used solely as a writing-support instrument during manuscript preparation. No AI tools were used for data collection, data analysis, interpretation of findings, or decision-making related to the research results. We confirm that all AI-assisted processes were critically reviewed by the authors to ensure the integrity, accuracy, and reliability of the manuscript. The final decisions, interpretations, arguments, and conclusions presented in this article were solely made by the authors, who take full responsibility for the content of the publication.

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