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# Designing A Culture-Based Learning Model for Sustainability: Regional Contextualization Using SEA-PLM Indicators in Indonesia and Malaysia

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**ABSTRACT**

Improving the quality of basic education in ASEAN remains challenging despite widespread teacher training initiatives. Reports from UNESCO and ASEAN (2016–2025) highlight the lack of contextualization in educational programs, leading to weak implementation of Education for Sustainable Development (ESD) in classrooms. This study employed an Educational Design Research (EDR) approach to develop a conceptual model of culture-based learning in harmony with nature. The research was conducted in two phases. Phase 1 involved a comparative analysis of Indonesia's *Kurikulum Merdeka* and Malaysia's KSSR Semakan 2017, combined with classroom observations and interviews at two culturally significant primary schools: SD Model Aulady (Ciamis, Indonesia) and Sekolah Kebangsaan Sikuati (Sabah, Malaysia). Phase 2 focused on designing and validating a conceptual prototype integrating local wisdom—*Kagaluhan* (Indonesia) and *Sumuku–Tagal* (Malaysia)—into the SEA-PLM framework. Findings from Phase 1 revealed shared challenges, including limited pedagogical readiness, inadequate infrastructure, and weak integration of cultural and environmental content. In Phase 2, the resulting model successfully mapped local values into the four SEA-PLM domains: interconnectedness, environmental sustainability, equity and peace, and active global citizenship. The model was further supported with thematic learning materials and contextualized literacy assessments. The study demonstrates that regional contextualization through local wisdom can enhance the relevance and effectiveness of ESD implementation. The proposed model contributes to SDG 4 (Quality Education) by promoting a culturally grounded, student-centered, and sustainability-focused pedagogy for primary education across ASEAN.



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## 1. INTRODUCTION

Southeast Asia has emerged as a major driver of global economic growth, with regional GDP consistently outpacing the world average over the past decade (Alam et al., 2023; Nguyen, 2022; Tan et al., 2024). However, this rapid development presents a critical dilemma: the tension between economic advancement and ecological sustainability. The region is highly vulnerable to the adverse effects of climate change, including extreme weather events, rising sea levels, and biodiversity loss—largely driven by unsustainable human activities (Zeraibi et al., 2021). A Germanwatch report identifies three ASEAN countries among those with the highest economic losses and fatalities from climate-related disasters (Ding & Beh, 2022). These conditions highlight the urgent need for a new development paradigm—one that balances economic prosperity with environmental stewardship and long-term social resilience (Nepal et al., 2021).

The ecological crisis in ASEAN not only threatens natural systems but also undermines the foundations of human development (Long & Ngoc, 2023; Shaikh et al., 2025). Non-inclusive growth models have exacerbated social inequalities, accelerated environmental degradation, and diminished the quality of life for many communities (Suriyankietkaew & Nimsai, 2021). In countries like Indonesia and Malaysia, large-scale deforestation for plantations and paper production accounts for nearly half of national carbon emissions—surpassing even those from fossil fuels (Sasmito et al., 2025). These challenges underscore the need for educational approaches that foster ecological literacy and sustainability values from an early age, particularly through primary education (AlAli et al., 2025; Aquije Mansilla, 2025; Fuertes-Camacho et al., 2025).

In this context, education becomes a strategic force in transforming societies toward sustainable development. The Education for Sustainable Development (ESD) framework emphasizes the integration of environmental, economic, and social dimensions within learning processes, enabling students to move beyond passive understanding toward active participation in solving sustainability challenges (Veckalne & Tambovceva, 2022; Hajdukiewicz & Pera, 2020). Research indicates that environmental and culture-based education at the primary level can significantly impact young learners: increasing environmental knowledge by 27%, enhancing pro-environmental attitudes by 31%, and fostering real behavioral changes in waste management and energy use among 80% of students (Malazonia et al., 2021; Panjaitan et al., 2025). These findings affirm that primary education plays a crucial role in shaping responsible, empathetic, and critically aware future citizens.

However, implementing ESD effectively in Southeast Asia requires a pedagogical transformation that bridges global sustainability frameworks with local cultural wisdom. In ASEAN member states such as Brunei Darussalam, Indonesia, Malaysia, the Philippines, and Timor-Leste, ESD must transcend standardized knowledge delivery and instead promote learning that is embedded in local realities. This includes honoring indigenous worldviews, social traditions, and community practices that reflect sustainable relationships with the environment (Foo Ng et al., 2023; Oe et al., 2022). One promising strategy is the integration of cultural values into national and regional curricula. For example, in Indonesia, the Sundanese philosophical concept of Kagaluhan—which embodies principles like mutual cooperation (gotong royong), respect for elders, harmony with nature, and cultural pride—can serve as a pedagogical foundation for contextual and participatory learning (Martín-Sánchez et al., 2022; Saripudin, 2023; Umar et al., 2025). This aligns with learner-centered education, where students engage with their environment in culturally meaningful ways (Li, 2023).

To operationalize such approaches across ASEAN, a conceptual model is needed that unifies local cultural wisdom with global sustainability benchmarks. Indonesia and Malaysia, with their cultural richness and shared educational challenges, offer fertile ground for developing such a model. As neighboring countries with aligned policy interests, they are well-positioned to collaboratively design a culturally grounded and ecologically responsive learning framework (Kioupi & Voulvoulis, 2022). In this effort, the Southeast Asia Primary Learning Metrics (SEA-PLM) provides a valuable foundation. SEA-PLM is a regionally developed assessment framework focused on primary students (Grade 5, ages 10–11), measuring competencies in literacy, numeracy, and global citizenship (Ahmed et al., 2025; Aung

& Ogawa, 2025). Importantly, it reflects ASEAN values and aligns closely with the goals of ESD and Global Citizenship Education (GCED) under Sustainable Development Goal 4 (Quality Education).

The Southeast Asia Primary Learning Metrics (SEA-PLM) framework evaluates students' competencies across four key domains that align closely with the principles of Education for Sustainable Development (ESD) and Global Citizenship Education (GCED). First, it emphasizes the concept of *interconnectedness* between humans and the environment, encouraging learners to understand their relationship with and responsibility toward natural ecosystems. Second, the domain of *environmental sustainability and ecological responsibility* focuses on fostering awareness and behaviors that support long-term ecological balance. Third, the framework highlights *equity, justice, and peace* as essential ethical foundations for nurturing inclusive, respectful, and harmonious societies. Lastly, SEA-PLM promotes *active global citizenship*, which encourages students to engage in meaningful, real-world actions that contribute to social and environmental sustainability both locally and globally. These domains serve as the foundation for developing holistic, culturally relevant, and sustainability-oriented learning models across the ASEAN region.

Based on this framework, the present study aims to develop a conceptual model of culture-based learning in harmony with nature, integrating the local wisdom of Indonesia and Malaysia into SEA-PLM and ESD frameworks. By doing so, the study aspires to make a novel contribution to the advancement of contextual, culturally relevant pedagogy in Southeast Asian primary education—ultimately nurturing a generation that is globally aware, environmentally responsible, and rooted in the cultural richness of their communities.

## 2. METHODS

This study employed the Educational Design Research (EDR) approach (McKenney, 2024; Turucz et al., 2021), which is well-suited for developing and validating educational innovations through iterative cycles that link theory, design, and practice. The main research objective was to develop a conceptual model of *culture-based learning in harmony with nature* that integrates local cultural values of Indonesia and Malaysia within the frameworks of Education for Sustainable Development (ESD) and the Southeast Asia Primary Learning Metrics (SEA-PLM). Two guiding research questions were formulated:

1) How can local cultural values be mapped and integrated into the SEA-PLM domains to strengthen contextual learning for sustainability?
2) What pedagogical characteristics define a culturally rooted, student-centered, and sustainability-oriented learning model for primary education in ASEAN?

### *2.1 Research Design and Phases*

Following the EDR framework, the study consisted of two main phases:

1) Preliminary Research, and
2) Development or Prototyping Phase

Each phase involved systematic data collection, expert validation, and iterative reflection to refine the conceptual model.

### *2.2 Preliminary Research*

This phase aimed to identify contextual needs and curriculum gaps in sustainable primary education across Indonesia and Malaysia. A systematic literature review was conducted covering international and regional policies related to ESD, Global Citizenship Education (GCED), and SEA-PLM, including the ASEAN Socio-Cultural Community Trend Report (2025). In parallel, a comparative document analysis examined the *Merdeka Curriculum* (Indonesia) and the *KSSR Semakan 2017* (Malaysia) to determine similarities and differences in the treatment of literacy, numeracy, and global citizenship competencies.

The field study involved two purposively selected partner schools, SD Model Aulady (Ciamis, Indonesia) and Sekolah Kebangsaan Sikuati (Kudat, Sabah, Malaysia). Site selection was based not only on cultural relevance but also on accessibility for cross-country collaboration, teacher training readiness, and administrative support for pilot implementation. Data collection used non-participatory classroom observation, semi-structured interviews with teachers and school leaders, and curriculum document reviews. Triangulated findings revealed key issues: limited integration of cultural and environmental values, low digital resource availability, and varying teacher preparedness in applying contextual pedagogy. These findings served as empirical foundations for model design in the next phase.

### *2.3 Development or Prototyping Phase*

This phase focused on developing and validating the Conceptual Model of Culture-Based Learning in Harmony with Nature. The prototype integrated four SEA-PLM domain, interconnectedness, environmental sustainability, equity and peace, and active global citizenship with local wisdom: *Kagaluhan* (Ciamis, Indonesia) and *Sumuku–Tagal* (Sabah, Malaysia).

To ensure methodological rigor, a hybrid qualitative-deliberative approach was used to map cultural values to SEA-PLM domains. The process combined:

1) Expert judgment from five ESD and curriculum specialists;
2) A coding scheme developed from thematic analysis of cultural texts and curriculum competencies; and
3) A two-round Delphi validation, refining the correspondence between local values and SEA-PLM indicators until expert consensus exceeded 80%.

The mapped framework was translated into prototype learning materials, including thematic reading texts, project-based learning activities, and local-content literacy assessments.

### *2.4 Data Analysis and Validation*

Data were analyzed using qualitative reflective analysis following Plomp's iterative model. The process included:

1) Descriptive coding of observation and interview data to identify themes of pedagogical practice and contextual barriers;
2) Axial coding to connect cultural values with SEA-PLM competencies; and
3) Reflective synthesis integrating theoretical insights and field feedback.

Validity was strengthened through data triangulation (literature, curriculum, and field context) and method triangulation (document analysis, interviews, expert assessment). Reliability was ensured through inter-expert consensus and feedback verification with practitioners at both partner schools.

The final product of this iterative design process is a validated Conceptual Model of Culture-Based Learning in Harmony with Nature, providing a theoretically grounded and contextually adaptive framework for sustainable primary education in the ASEAN region.

## 3. FINDINGS AND DISCUSSION

### *3.1 Curriculum Analysis and Field Context*

Although the percentage of trained teachers in ASEAN countries is higher than the global average, the increase in the quantity of training has not been directly proportional to the quality of education and learning in the classroom (ASEAN Socio-Cultural Community Trend Report, 2025). Professional development programs in the region are generally "one-size-fits-all" and not locally relevant, focusing more on formal qualifications than on strengthening contextual pedagogical skills (Nemakhavhani, 2024) . This creates a gap between teachers' theoretical knowledge and practical skills in implementing 21st century learning that demands creativity, collaboration, digital literacy and student-centered approaches (Fitria et al., 2025).

In response, Indonesia implemented Kurikulum Merdeka while Malaysia implemented KSSR Semakan (revised KSSR 2011). Both initiatives faced similar challenges on the ground. SD Model Aulady in Ciamis district (5.2 km from the supporting university) and Sekolah Kebangsaan Sikuati Kudat Sabah, as research partner schools, faced three main challenges in implementation: teachers' low pedagogical readiness in operationalizing the new curriculum and authentic assessment, limited infrastructure and learning technology, and suboptimal stakeholder participation (Veeramanickam et al., 2025; Zhao & Qi, 2023). Both schools also still rely on a teacher-centered teaching approach with limited understanding of the official curriculum documents (DSKP). These convergent challenges indicate that regional contextualization in curriculum development requires implementation strategies tailored to the capacity of local schools (Niles, 2025).

At the regional level, the Southeast Asia Primary Learning Metrics (SEA-PLM) by Asadullah et al., (2025) serves as a standardization tool to assess the core competencies of Literacy, Numeracy, and Global Citizenship in Grade 5 students. The Global Citizenship domain is designed to integrate the ASEAN Core Values (peace, justice, equality, rule of law, sustainability) from the ASEAN Charter, so that SEA-PLM is not just an evaluation tool but an instrument for building a globally proficient generation according to the principles of the ASEAN community. The 2019 assessment in six countries (Cambodia, Laos, Malaysia, Myanmar, Philippines, Vietnam) showed clear disparities across countries and within socio-economic contexts, with Vietnam and Malaysia showing higher achievement in literacy and numeracy. Factors such as family socio-economic status, pre-school access, parental support and school conditions have a strong influence on learning outcomes (ASEAN Socio-Cultural Community Trend Report, 2025). These findings suggest that achieving quality basic learning requires a holistic approach beyond school access, encompassing improved learning quality and a collaborative school-family-community ecosystem.

Although Indonesia relies on the National Assessment for Grade 6 primary school students, rather than SEA-PLM, the principles remain relevant. SEA-PLM applies two fundamental principles different from PISA: first, regional contextualization adapts learning measurement to specific ASEAN cultural values, policies and contexts; second, focus on primary school level (11 years old) versus PISA on Senior High School (15 years old). This difference is significant according to Piaget's theory that students in the Concrete Operational phase (7-11 years old) are able to think logically, understand cause and effect, and relate abstract concepts to concrete experiences through hands-on activities, so learning based on developmental stages increases learning effectiveness, critical thinking, and concept understanding (Bernardo et al., 2022). Regional Contextualization is in line with Education for Sustainable Development (ESD), integrating meaningful and relevant learning with students' real life while preventing abstract learning disconnected from the socio-cultural-environmental context. Thus, the adoption of SEA-PLM principles in Indonesia's assessment system reinforces a regionally contextualized, culturally responsive and competency-based approach to learning. Figure 1 illustrates the application of Regional Contextualization in the construction of SEA-PLM reading literacy assessment questions. The second principle of SEA-PLM has positive implications for learners because in this phase, children begin to be able to think logically, understand cause-and-effect relationships, and link abstract concepts with concrete experiences through hands-on activities.

| | Afghanistan | Vietnam | Philippines | Nepal |
|---|---|---|---|---|
| |  |  | | |
| **Climate** | arid to semi-arid; freezing winters and hot summers | tropical in south; monsoonal in north | usually hot and humid | subtropical in south; cool summers and severe winters in north |
| **Geography** | landlocked and mountainous | the fertile Mekong River delta covers a large part of south western Vietnam | made up of 7,107 islands | landlocked; contains eight of the world's 10 highest peaks |
| **Main crops** | wheat, fruits, nuts; wool, sheepskins | paddy rice, coffee, rubber, cotton; fish | sugarcane, coconuts, rice | rice, corn, wheat, sugarcane, milk |
| **Typical exports (goods sold to other countries)** | fruits and nuts, carpets, saffron | crude oil, marine products, rice, coffee, rubber; garments | electronic equipment, transport equipment, garments | carpets, clothing, leather goods |
| **Wildlife** | the Marco Polo sheep: it has the longest horns of any sheep | the saola (a kind of antelope): one of the world's rarest mammals | the Philippine Eagle: the largest eagle in the world | the one-horned rhinoceros: the world's fourth largest land mammal |

**Figure 1**. Example of Regional Contextualization in SEA-PLM Application to Reading Literacy Assessment

Quantitatively, the 2019 SEA-PLM assessment results provide an objective picture of basic learning outcomes in Southeast Asia and their strategic role in guiding regional education policy. Assessment data across six countries (Cambodia, Laos, Malaysia, Myanmar, Philippines and Vietnam) show significant variations in literacy, numeracy and global citizenship achievements, with Vietnam and Malaysia showing the highest performance exceeding ASEAN standards, while the remaining countries remain below the regional average. A comparison of SEA-PLM 2019 and PISA 2022 scores in figure 2 reveals a strong correlation between the quality of learning at the primary level and student achievement at age 15, indicating that a strong academic foundation in primary school has direct implications for PISA performance. Vietnam shows the most consistency, surpassing OECD standards in both assessments, while Malaysia maintains stable ASEAN standards. Indonesia, despite participating in PISA, still performs below the regional average, signaling an urgent need for improvement in the quality of primary learning. These discrepancies underscore that SEA-PLM is not simply a quantitative evaluation tool, but an important diagnostic instrument for countries to identify early learning gaps and design effective educational interventions.

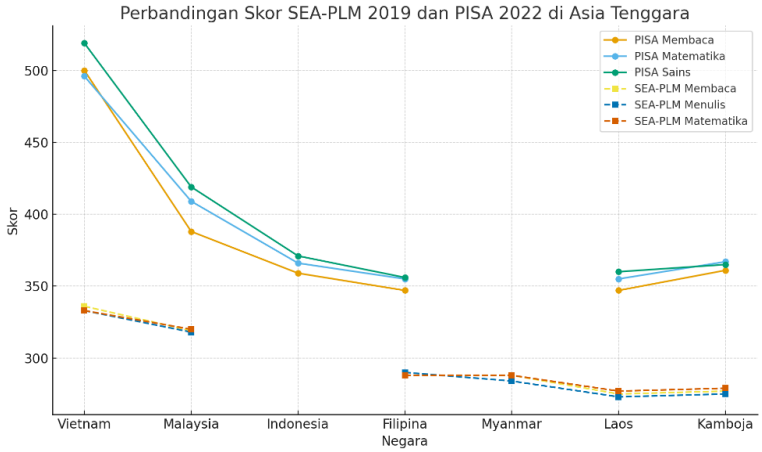


**Figure 2.** Comparison of SEA-PLM and PISA Country Scores

Furthermore, Khalifé et al. (2022) revealed that the SEA-PLM has successfully integrated the Education for Sustainable Development (ESD) dimension in basic learning assessments, measuring not only academic competencies but also students' attitudes towards sustainability issues, social responsibility, environmental care, and cultural tolerance. Findings show a positive correlation between high literacy levels and students' awareness of global and environmental issues, reflecting the effectiveness of the integration of ESD values in the primary curriculum. Social factors such as family involvement, school support, and teachers' pedagogical quality were shown to strengthen sustainability value-based learning. Thus, SEA-PLM operates as a dual-function instrument that simultaneously evaluates the effectiveness of education policies and strengthens the implementation of ESD in the region, ensuring learning is oriented not only towards academic outcomes but also towards the formation of caring, critical, and sustainable citizens.

Based on the results of the study, it can be concluded that strengthening the quality of basic education in the ASEAN region needs to integrate local values and sustainable learning principles as measured through the SEA-PLM. Local values such as kagaluhan that reflect noble character, gotong royong, simplicity, and social responsibility can be synergized with the SEA-PLM framework that emphasizes literacy, numeracy, and global citizenship. This synergy is an important foundation for strengthening *Education for Sustainable Development* (ESD) so that learning is not only oriented towards academic achievement, but also forms a generation that is cultured, caring, and globally competitive. Therefore, the two partner schools, SD Model Aulady (Ciamis Regency, Indonesia) and Sekolah Kebangsaan Sikuati Kudat (Sabah, Malaysia) need to prepare the implementation of learning that is in line with the SEA-PLM concept, namely contextual learning, student-centered, strengthening local values, and contributing to sustainable education goals at the regional level.

### *3.2 Conceptual Model Design (Prototyping)*

#### 3.2.1 Prototyping Conceptual Model; Regional Contextualization through Kagaluhan-Indonesian

At this stage, a conceptual learning design is developed based on the results of the phase 1 literature review to develop a prototype of a culture-based learning model that reflects the *Regional Contextualization* principle of SEA-PLM by embedding Kagaluhan values as the core of local character education. Values such as *gotong royong, hormat ka sepuh, harmoni dengan alam,* dan *tanggung jawab sosial* form the pedagogical basis for creating a harmonious relationship between people, culture and the environment(Wibawa & Awaliah, 2023). This prototype is designed to be implemented in SD Model Aulady (Ciamis, Indonesia) and Sekolah Kebangsaan Sikuati Kudat (Sabah, Malaysia) as a form of contextual learning that integrates literacy, numeracy and global citizenship with local cultural wisdom to support the goals of Education for Sustainable Development *(ESD)* at the regional level.

The design draws on the socio-cultural context of Ciamis and Kedah, including philosophy, geography and economic potential. Ciamis, once the center of the 7th-century Kingdom of Sunda Galuh, gave birth to Kagaluhan values derived from the word *Galuh,* meaning "jewel" or "heart's core," reflecting ancient Sundanese wisdom as expressed in *Sanghyang Siksa Kandang Karesian* and *Amanat Galunggung* (Shuhufi & Purkon, 2023). These values gave direction to people's lives, including in economic policy during the Dutch colonial period under Raden Adipati Wiradikusumah II, when people switched from growing coffee to coconuts in accordance with the *Patanjala* principle that emphasizes the balance of man and nature. This shift gave rise to the coconut symbol in the emblem of Ciamis Regency, reflecting the community's resilience, welfare, and agrarian identity. This history becomes the conceptual basis for the integration of Kagaluhan values with SEA-PLM and ESD principles in the development of local culture-based sustainable learning models. This is the basis of the conceptual model of the integration of Kagaluhan values, SEA-PLM, and ESD, along with the integration table of these values.

**Table 1:** Integration of Kagaluhan, SEA-PLM, and ESD Values in Contextual Learning

| Kagaluhan Value | SEA-PLM | ESD | Description |
|---|---|---|---|
| "The lake is told by swans, the forest is told by elephants; the sea is told by fish, the flower is told by bees." | *Interconnectedness* between humans and the environment | Ecosystem integration and reciprocal relationship | Instilling awareness that all elements of nature are interdependent and function for the sustainability of life. Learning is directed towards local culture-based *ecoliteracy*, linking ecosystems with Sundanese Galuh wisdom through nature observation, social reflection, and understanding the cause and effect of human actions on the environment. |
| Patanjala System "*Patan"* = water, *"Jala" = river***.** Our good deeds will not be in vain if we follow the flow of the river." | *Environmental sustainability* and ecological responsibility | Preservation and sustainable management of resources | Teaching ecological ethics through the concept of three forest functions: *leuweung larangan* (protected), *leuweung tutupan* (limited), and *leuweung garapan* (productive). Learning is contextualized through conservation projects, *eco-mapping*, and local zoning-based learning park management to instill human-nature balance. |
| Tritangtu (Sang Prabu, Sang Rama, Sang Disi) | *Equity, justice, and peace* as the foundation of global ethics | Social justice, equality and social harmony | Internalize the value of balancing the roles of leaders, people and protectors of the country. This teaching strengthens the concepts of participatory democracy and social justice. Implementation is done through democracy simulations, class deliberations, and case studies of participation-based leadership and collective responsibility. |
| The teachings of harmony and self-control (*"Be harmonious in behavior and purpose."*) | *Active global citizenship* for socio-environmental sustainability | Collaboration, empathy and community empowerment | Fostering harmonious, empathic, and collaborative attitudes in the face of differences. Learning is directed towards cross-class social-environmental projects, dialogue forums, and real actions based on the values of *silih asah, silih asih, silih asuh* to form ethical and responsible global citizens. |

**Table 2.** Regional Contextualization Profile Galuh Ciamis

| Aspect | Ciamis (Galuh Land) |
|---|---|
| Climate | Humid tropical climate with high rainfall. The community maintains a balance between nature and daily life through environmentally friendly farming traditions. |
| Geography | Located in the southeastern part of West Java, it consists of mountains, valleys and streams. The forest area is divided into protection, buffer and cultivated areas to maintain the sustainability of nature. |
| Main Crops | Rice, coconut and secondary crops are the main sources of food. Agriculture is carried out with attention to the balance between human needs and the preservation of land and water. |
| Typical Products | Known for rice, palm sugar, coconut, and handicrafts such as bamboo weaving and traditional weaving that support the local economy. |
| Wildlife / Ecology | Forests and rivers are home to a variety of flora and fauna. The community's relationship with nature is maintained through the custom of respecting areas that are considered sacred and should not be destroyed. |
| Social Harmony | Social life is based on the spirit of gotong royong and deliberation. Residents maintain harmonious relationships and respect each other in solving common problems. |

The implementation of the table can be used into texts that aim to test reading literacy skills, here are two examples of simple texts from the Kagaluhan matrix of SEA-PLM and ESD combinations at the elementary school level.

**Table 3.** Reading Literacy Text 1: Preserving Nature with the Wisdom of the Ancestors

| Component | Description |
|---|---|
| Reading Text Title | *Menjaga Alam dengan Kearifan Nenek Moyang* |
| Reading Text Content | In recent years, many areas in Ciamis Regency have experienced flooding during the rainy season. In the news, it was mentioned that floods often occur because forests in mountainous areas are cut down and the soil can no longer absorb water properly. As a result, rainwater rushes into the river and overflows into residential areas.However, did you know that the ancestors of the Sundanese people have had a way to prevent this for a long time? They recognize the *Patanjala* system, which is a rule of life that imitates the flow of river water. This means that humans must live in balance and not destroy nature. In this system, the forest is divided into three parts: forbidden forest (should not be disturbed because it is a source of water), closed forest (can be used a little), and cultivated forest (can be used for farming).Although this teaching sounds like an ancient and mystical belief, it is actually very reasonable. Modern science proves that protecting forests and water sources can indeed prevent floods and keep life sustainable. |
| Integration of SEA-PLM and ESD Competencies | 1. Reading Literacy: understanding the content, meaning and message in informative texts.<br>2. ESD (Education for Sustainable Development): instilling the value of environmental conservation and local wisdom in maintaining the balance of nature. |
| Linkage of Local Values | *Patanjala* system as a Sundanese cultural heritage in preserving forests and water sources. |
| Cognitive Level | C3 - Understanding and Application |
| Evaluation Question | 1. Why do floods often occur in the Ciamis region, according to the text?<br>2. Explain how the *Patanjala* system helps maintain the balance of nature!<br>3. In your opinion, how can we apply the teachings of our ancestors today? |

**Table 4.** Reading Literacy Text 2: The History of the Coconut Tree in the Coat of Arms of Ciamis

| Component | Description |
|---|---|
| Reading Text Title | *Sejarah Pohon Kelapa di Lambang Ciamis* |
| Reading Text Content | Have you ever seen the symbol of Ciamis Regency? In it there is a picture of a coconut tree. This symbol is not only a symbol, but also a story about the hard work of the people of Ciamis to protect nature and develop their region.During the Dutch colonial period, the people of Ciamis were obliged to plant coffee. However, Regent Raden Adipati Aria Wiradikusumah saw that coffee was not suitable for Galuh soil. He negotiated with the colonial government to replace the coffee crop with coconuts, which were more beneficial to the people.The coconut plant brought a big change. Almost every part of it can be used, from the leaves to the fruit. In its heyday, the Guan Hin Coconut Oil Factory was established in Ciamis. The factory produced around 6,000 liters of coconut oil per month and became an important trading center in East Priangan. From the rest of the processing, people made galendo, a typical Ciamis snack that is still known today.The coconut trade helped build the Ciamis Great Mosque, the Square, and the Cirahong Bridge. All of these are proof that humans and nature can strengthen each other if guarded wisely. |
| Integration of SEA-PLM and ESD Competencies | 1. Reading Literacy: understanding historical texts and local economy.<br>2. ESD: instilling the value of sustainable economy and wise utilization of natural resources. |
| Linkage of Local Values | The history of coconut in Ciamis emblem as a symbol of hard work, economic independence, and environmental preservation. |

| | |
|---|---|
| Cognitive Level | C3 - Understanding and Application |
| Evaluation Question | 1. Why did R.A.A. Wiradikusumah choose to replace coffee plants with coconut?<br>2. How much coconut oil does Guan Hin Factory produce every month?<br>3. Name two economic and social benefits that Ciamis people gained from coconut! |

### 3.2.2 Prototyping Conceptual Model; Regional Contextualization through Sabah-Malaysia community values

Sabah is a region rich in cultural heritage and complex natural ecosystems. Among the many indigenous tribes such as the Kadazan-Dusun, Rungus, Murut and others, there is a system of traditional wisdom that places people, nature and spirit as part of a single entity. In their view, forests, rivers, rice fields, and mountains are not only economic resources, but spiritual and social spaces that must be preserved (Ramamoorty & Abdullah, 2020). For example, the Kadazan-Dusun community believes that farming rice fields must be based on respect for the greater "creation" and mutual care between humans and the surrounding environment (Pimid et al., 2020). Such systems are also recognized through traditional arrangements such as zoning of forest and river use that are managed by local communities based on ancestral knowledge. Thus, values such as balance, reciprocity and responsibility to nature and fellow humans are important pillars in the lives of Sabahans. Although seemingly old-fashioned and tradition-based, this approach is relevant to today's challenges in environmental conservation and sustainable development.

In terms of social and economic policy, the traditional wisdom of the people of Sabah has concrete implications for their way of life and resource management to this day. Indigenous communities such as the Kadazan-Dusun, Murut and Rungus view land, forests and rivers as not only economic resources, but also part of a living system that must be maintained in balance. In their view, the relationship between humans, nature and ancestral spirits is interrelated and inseparable. One form of application of this value can be seen in the traditional ethnoconservation system, such as the prohibition of forest clearing in certain areas (known as *tagal forest* or *customary land*), as well as the joint management of water sources and rivers through customary rules called "Tagal Sungai". Under this system, communities establish no-fishing zones for a period of time to restore the ecosystem. After the recovery period, the catch is shared fairly for common needs. This approach is in line with modern sustainability principles to protect nature while still meeting the needs of life. Through this practice, the Sabah community has managed to preserve natural resources while improving the local economy through ecotourism activities and processing forest products without damaging the environment, making it a clear example of the application of cultural values in sustainable development (Silva et al., 2023).

From the following description, there are Kagaluhan values and local wisdom of the Sabah community that intersect with each other about nature management and harmony. The following is the integration of the local wisdom values of the Sabah community in Integration with SEA-PLM and ESD.

**Table 5.** Integration of Sabah community values, SEA-PLM, and ESD in Contextual Learning

| Local wisdom | SEA-PLM | ESD | Description |
|---|---|---|---|
| Sumuku tradition | Interconnectedness between humans and the environment | Ecosystem integration and understanding of reciprocal relationships | Teaching spiritual values and ecological responsibility; strengthening children's awareness of environmental balance through local cultural practices |
| Tagal system "Prohibition of Fishing". | Environmental sustainability and ecological responsibility | Environmental conservation and sustainable resource management | Instilling ecological awareness and community cooperation through a temporary fishing ban as a form of responsibility to maintain the balance of nature. |
| Sabah Community Values | Equity, justice and peace as the foundation of global ethics | Social justice, equality and social harmony | Fostering a spirit of mutual respect and inter-ethnic harmony. This value strengthens inclusive learning, tolerance and sustainable peace in a multicultural society. |
| Mongogotong (Gotong-royong Sabah) tradition | Active global citizenship that encourages concrete actions for social and environmental sustainability | Active participation, collaboration and community empowerment for sustainable change | It teaches collective action, social responsibility and environmental stewardship. This tradition fosters globally aware citizens who act locally for social and ecological sustainability. |

**Table 6.** Regional Contextualization Profile of Sabah

| Aspect | Sabah (Borneo Land) |
|---|---|
| Climate | Humid tropical climate with high rainfall throughout the year. People's lifestyles and economies are adapted to the seasons, such as cropping arrangements and a ban on fishing (*Tagal*) to protect the ecosystem. |
| Geography | Located in the north of Borneo Island, it consists of mountains (Mount Kinabalu), valleys and coasts. Rich in biodiversity with customary management systems such as *Sumuku* and *Tagal*. |
| Main Crops | Rice, oil palm, tropical fruits and forest products are the main commodities. Traditional agriculture is practiced based on the principles of sustainability and respect for nature. |
| Typical Products | Seafood, forest honey, mountain rice, and crafts such as Dusun weaving, wood carving, and rattan weaving support the economy and cultural tourism. |
| Wildlife | Tropical forests with endemic species such as orangutans, proboscis monkeys and hornbills. |
| Ecology | Ecological balance is maintained through customary prohibitions, the *Tagal* system, and respect for sacred areas. |
| Social Harmony | Multiethnic communities (Kadazandusun, Bajau, Murut, and others) live in the spirit of *muhibah* and *mongogotong* (gotong royong). The values of justice, equality and peace sustain social harmony. |

The implementation of the table can be used in texts that aim to test reading literacy skills. Here are two examples of simple texts from the Sabah local wisdom matrix combined with SEA-PLM and ESD at the elementary school level.

**Table 7.** Reading Literacy Text: The Beauty of Kinabalu and the Wisdom of the Ancestors in Preserving Nature

| Component | Description |
|---|---|
| Reading Text Title | *Keindahan Kinabalu dan Kearifan Nenek Moyang dalam Menjaga Alam* |
| Brief Content of the Text | Mount Kinabalu in Sabah is famous for being beautiful and cool, surrounded by tropical forests that are home to a variety of rare flora and fauna. This beauty is maintained thanks to the ethnoconservation system, which conserves nature based on the community's traditional knowledge. One example is the Tagal System, a temporary ban on fishing to allow fish to breed and the river to remain clean. Another tradition, Sumuku, emphasizes respect for nature by replanting trees and not cutting them carelessly. Through Tagal and Sumuku, we learn that loving nature means safeguarding the future of the earth so that it remains beautiful and balanced. |
| SEA-PLM & ESD Values | 1. Literacy in reading informative text<br>2. ESD: environmental conservation, ecosystem balance, and local wisdom values. |
| Local Values | *Tagal* and *Sumuku* as a form of ethnoconservation of Sabah indigenous people in preserving nature. |
| Cognitive Level | C3 - Understanding and Application |
| Evaluation Question | 1. What is the ethnoconservation system in Sabah society?<br>2. How does *Tagal* help maintain the balance of nature?<br>3. Name simple actions at home that reflect *Tagal* and *Sumuku* values! |

**Table 8.** Reading Literacy Text: Mongogotong Tradition and Tolerance in Sabah

| Component | Description |
|---|---|
| Reading Text Title | *Tradisi Mongogotong dan Toleransi di Sabah yang Beragam* |
| Brief Content of Text | On the eve of Ramadan, the people of Sabah hold a Mongogotong tradition, where the whole community works together regardless of ethnicity or religion. Men clean ditches and repair roads, women prepare food, while children help with cleaning. The goal is to create a clean and comfortable environment to welcome the holy month. The multi-ethnic Sabah of Kadazandusun, Bajau, Murut, Rungus, Chinese is known as the most harmonious region in Malaysia. Sabah and Sarawak are the best examples of harmony because their people live peacefully without racial or religious conflict. Even within families, different beliefs are accepted with mutual respect; non-Muslims maintain a calm atmosphere during Ramadan, and all participate in celebrating Kaamatan. Through Mongogotong and the spirit of Muhibah, the people of Sabah show that gotong royong and tolerance are the keys to a peaceful and harmonious life. |
| SEA-PLM & ESD Value | 1. Literacy in reading socio-cultural texts<br>2. ESD: values of peace, inclusiveness and social solidarity. |
| Local Value | *Mongogotong* and *muhibah* as a form of mutual cooperation and interfaith tolerance in Sabah. |
| Cognitive Level | C3 - Application and Reasoning |
| Evaluation Question | 1. Why is the *Mongogotong* tradition important for the harmony of the Sabah community?<br>2. What is the attitude of tolerance of the people of Sabah during Ramadan and Kaamatan?<br>3. If the *Mongogotong* tradition is implemented in your school, what activities can be done to maintain the spirit of togetherness? |

The gap between improved teacher training and the quality of classroom learning remains a major paradox in the ASEAN region. While the majority of teachers have received formal training, it remains uniform and does not adequately accommodate the local school context. Findings in SD Model Aulady (Ciamis) and Sekolah Kebangsaan Sikuati (Sabah) show that low pedagogical preparedness, limited infrastructure and lack of community participation are regional structural barriers. In 2016, UNESCO emphasised that top-down professional development design and a lack of *teacher orientation* are the roots of weak implementation of contextual learning (McDaniel et al., 2024). Research by Hemmer et al., (2024) adds that *Education for Sustainable Development (ESD)* training does improve teachers' competencies, but its impact is limited without systemic support and adequate reflection time. Therefore, the reorientation of teacher training in ASEAN needs to move from a *one-size-fits-all* approach to a culture-based contextual model that fosters teachers' pedagogical competence and professional autonomy.

### *3.3 Integration with SEA-PLM & ESD*

The Southeast Asia Primary Learning Metrics (SEA-PLM) framework provides a strategic platform to measure literacy, numeracy and global citizenship outcomes of primary school students with an approach aligned with Piaget's *Concrete Operational* stage. Different from international assessments such as PISA, SEA-PLM emphasizes *regional contextualization* by considering cultural values and education policies in ASEAN. Chen & Chen (2022) showed that the integration of sustainability values in the SEA-PLM domains *of environmental sustainability, equity, peace,* and *active global citizenship* is positively correlated with increased student literacy and global awareness. (Teresa Fuertes-Camacho et al., 2021) also found a strong relationship between SEA-PLM and PISA performance, proving the importance of contextualized foundational learning foundations to long-term outcomes. Thus, the application of SEA-PLM in a culture-based learning model of harmony with nature ensures that the learning process is not only academic, but also builds sustainable socio-environmental competencies.

The Kagaluhan values of Sundanese society and the Tagal-Sumuku system in Sabah represent local wisdom practices that are in line with *Education for Sustainable Development (ESD)* principles. The teachings of Patanjala on the balance of nature and Tritangtu on the harmony of social roles teach ecological ethics and social justice that are relevant for sustainability education (García-Alonso et al., 2023). Meanwhile, the Tagal system in Sabah demonstrates community-based *river co-management* practices that are proven to increase ecosystem resilience nd build students' ecological awareness (Maharramli et al., 2021). Mongogotong traditions and Muhibah values strengthen inter-ethnic social harmony in line with the *Equity and Peace* domain of the SEA-PLM. Wijayanti & Esa, ( 2025) research proved that the integration of local knowledge in formal education increases students' *academic engagement* and *sense of belonging*. Thus, these local values not only enrich cultural content, but also become pedagogical foundations in character building and sustainability identity.

The similarity of pedagogical challenges in Indonesia and Malaysia emphasizes the need for teacher training reforms that place teachers at the center of change. Teachers should be positioned as knowledge *co-creators* who are able to translate local values into contextualized pedagogical strategies. Belarde et al., (2025) and Pevec-Zimmer et al., (2024) showed that reflective, collaborative and action-oriented teacher training is more effective in building *pedagogical content knowledge* than conventional training. The *regional contextualization* model in this study integrates local cultural values with global indicators through three mechanisms: mapping local values to SEA-PLM domains, developing contextual teaching materials, and pedagogical design in accordance with students' cognitive development stage (Piaget). Yadav (2024) asserted that the two-way integration of *Indigenous and Local Knowledge (ILK)* enhances students' cultural identity and learning motivation. This approach proves that the integration of local culture strengthens the relevance and quality of learning without lowering academic standards.

The integration of culture-based learning in harmony with nature contributes significantly to the achievement of Sustainable Development Goal 4 (Quality Education) by strengthening the equity and sustainability of basic education in ASEAN (Mustafa et al., 2025). The UNESCO Global Education Monitoring Report (2021) notes that although the primary school enrollment rate in ASEAN reaches 93%, the quality of learning still lags behind due to a lack of local context relevance. Mujahid & Mukminin (2025) and Tanjung et al. (2025) showed that a *culturally contextual* approach can close the *achievement gap of* up to 18% in literacy and science in *indigenous* communities. By incorporating Kagaluhan and Tagal values into learning practices, students not only master academic competencies, but also develop the critical awareness, environmental ethics and social concerns necessary to become global citizens of character and cultural empowerment.

## 4. CONCLUSION

This study successfully developed a Conceptual Model of Culture-Based Learning in Harmony with Nature by integrating local cultural values from Indonesia and Malaysia into the SEA-PLM and ESD frameworks, demonstrating that regional contextualization can bridge cultural relevance with sustainability education in primary schools. The main finding highlights that despite shared challenges—such as limited teacher pedagogical readiness, inadequate infrastructure, and weak integration of cultural and ecological values—local wisdom, including the *Kagaluhan* values in Ciamis and the *Sumuku–Tagal* traditions in Sabah, can serve as powerful pedagogical foundations to enhance literacy, numeracy, and global citizenship in a culturally meaningful way. While the model offers theoretical and practical contributions to culturally responsive and sustainability-oriented pedagogy, its primary limitation lies in its implementation being confined to two case study schools, which may limit the generalizability of findings across diverse ASEAN contexts. Future research should expand the application of the model to a broader range of schools and cultural settings, assess its long-term impact on student outcomes, and explore its integration into teacher education programs to support systemic adoption of context-based ESD approaches in the region.

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