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RESEARCH ARTICLE

Preserving indigenous knowledge through *angngaru:* An ecopedagogical perspective for education for sustainable development

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ABSTRACT
The *Angngaru* oral tradition, a sacred pledge of loyalty performed in Makassar communities of South Sulawesi, Indonesia, is rich in nature metaphors and has potential as a resource for Education for Sustainable Development (ESD). This study examines (1) the form, utterance structure, and ecopedagogical values of *Angngaru*; (2) how its indigenous cosmology articulates the relationship between humans, *siri' na pacce* ethics, and the environment; and (3) how these values may be translated into a framework for sustainable learning. Employing a qualitative ethnographic design with hermeneutic and ecocritical discourse analysis, the study was conducted in Gowa and Takalar Regencies. Data comprised recorded *Angngaru* performances, in-depth interviews with participants (*pangngaru*, customary leaders, and regional-language teachers), focus group discussions, and Lontarak manuscripts. The data were segmented into utterance units, coded for nature metaphors and ecopedagogical indicators, interpreted hermeneutically, and validated through triangulation and member checking. The findings show that *Angngaru* follows a three-stage structure (opening, pledge, and closing) and employs nature metaphors, such as wind and leaves (*anging na lekok kayu*) and water and drifting logs (*jekne na batang mamayu*), which participants associate with loyalty, moral order, and balance. *Siri' na pacce* provides an ethical lens through which these metaphors can be read as environmental responsibility, although part of this ecological meaning represents a contemporary reinterpretation rather than an explicit traditional teaching. Building on these findings, the study proposes a conceptual head–heart–hands framework for integrating *Angngaru* into regional-literature learning.

Keywords: *Angngaru*; Makassar Literature; Ecopedagogy; Indigenous Knowledge.

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INTRODUCTION

Indigenous and local knowledge systems are increasingly recognized as essential resources for sustainability education. Berkes (2018) describes traditional ecological knowledge as a cumulative body of knowledge, practice, and belief about the relationships of living beings with one another and with their environment, handed down through generations by cultural transmission. The global framework for Education for Sustainable Development (ESD) likewise calls for learning that connects global sustainability challenges with learners' local contexts (UNESCO, 2017), while critical ecopedagogy argues that environmental education must address the cultural and political roots of ecological crises rather than treat them as purely technical problems (Kahn, 2010; Misiaszek, 2020). From the perspective of a critical pedagogy of place, learners' own cultural landscapes are the starting point for understanding and caring for their environment (Gruenewald, 2003). Oral literature is among the richest repositories of such place-based knowledge, yet its pedagogical potential for ESD remains underexplored in many regions of Indonesia.

In South Sulawesi, Makassar culture possesses a rich repertoire of oral traditions, one of which is *Angngaru* (or *Aru'*). Historically and performatively, *Angngaru* is a sacred pledge of loyalty uttered by a member of the community before the king, accompanied by the drawing of a dagger (*badik*) as a symbol of its sacredness; today it is also performed as a pledge before a wedding couple and to welcome honored guests (Kurniawan & Bumbungan, 2020). As a result, the ecopedagogical knowledge & Bumbungan, 2020; Mahmud, 2019). Beyond its function as an expression of courage and political loyalty, the *Angngaru* utterance contains nature metaphors that invite a reading of the ecological worldview of the Makassar community.

Within the lines of its metaphorical utterances, *Angngaru* integrates the cultural pillars of the Makassar ethnic group, such as Pappaseng (ancestral messages) and Siri' na Pacce (dignity, honor, and collective empathy), as well as a local cosmology that views the earth, water, wind, and sky as inseparable parts of the existence and sustainability of human life. However, current realities indicate a fundamental shift in values: *Angngaru* has increasingly been marginalized and subjected to visual commodification merely as a ceremonial performance to welcome distinguished guests or as a tourism attraction devoid of ecological meaning (Kurniawan embedded within it is at risk of extinction because it is no longer transmitted intuitively or contextually to younger generations, potentially disrupting the continuity of this tradition of ecological pedagogy based on local wisdom.

Previous studies on *Angngaru* and Makassar oral literature have focused mainly on its linguistic and pragmatic features, such as the speech acts performed in the pledge (Mahmud, 2019), the political-historical dimension of loyalty to rulers (Salsabila, 2021), and the shift of *Angngaru* from a sacred ritual to a popular cultural performance (Kurniawan & Bumbungan, 2020). Related work by the present authors has examined Makassar oral literature as a means of language maintenance and cultural identity (Rahim et al., 2025), character education through folklore (Amin, 2022), and its integration into technology-supported learning (Rahim et al., 2026). These studies, however, have not examined whether and how the ecological meanings carried by *Angngaru* metaphors can inform sustainability education.

Research on local wisdom and ecology in South Sulawesi has shown how customary systems such as *Pasang ri Kajang* in Bulukumba regulate forest use and support conservation (Arumningtyas et al., 2023; Syarif et al., 2016), and ecocritical studies have identified representations of environmental awareness in Indonesian oral literature (Kusyani et al., 2025). Meanwhile, ecopedagogy and ESD in Indonesian schools are still largely framed by science-based approaches, while language and literature subjects remain underused as platforms for ecological education (Sutrisna et al., 2025). As a result, environmental education risks being alienated from students' local values, while regional oral traditions are increasingly regarded as irrelevant to contemporary learning.

Two gaps follow from this literature. First, no study has systematically examined the ecopedagogical dimension of *Angngaru* on the basis of performance data and the interpretations of its practitioners. Second, studies that read ecological values into oral traditions rarely ask whether these values belong to the community's inherited knowledge or result from contemporary reinterpretation. This study addresses both gaps. Theoretically, it examines how *siri' na pacce* can serve as an ethical lens for ecological responsibility and distinguishes ecological meanings that are attested by tradition bearers from those constructed through contemporary interpretation. Methodologically, it combines the ethnographic documentation of *Angngaru* performances with hermeneutic and ecocritical analysis and participant validation, offering a transparent procedure for deriving pedagogical implications from oral literature.

Accordingly, this study addresses three research questions: (1) What are the form, utterance structure, and explicit and implicit ecopedagogical values of *Angngaru*, as documented in performances and interpreted by tradition bearers? (2) How does the indigenous cosmology expressed in *Angngaru* represent the relationship between humans,

siri' na pacce ethics, and environmental sustainability? (3) How can the ecopedagogical dimension of *Angngaru* be translated into a conceptual framework for sustainable learning in formal education? RQ1 is answered through structural and thematic analysis of the recorded texts; RQ2 through the hermeneutic interpretation of metaphors validated with participants; and RQ3 through the synthesis of these findings with focus group input into a proposed learning framework.

METHOD

This study employed a qualitative ethnographic design complemented by hermeneutic and ecocritical discourse analysis. Each component served a distinct function. Ethnography (Fetterman, 2020) was used to document *Angngaru* as a living performance in its cultural setting (when, by whom, and on what occasions it is performed) and to collect the interpretations of its practitioners. Hermeneutic analysis was used to interpret the meanings of the metaphors and *pasang* (ancestral messages) in the recorded texts, moving iteratively between individual lines, the whole utterance, and its cultural context. Ecocritical discourse analysis was used to examine how the texts represent relations between humans, rulers, and nature, and to determine which ecological meanings are explicitly expressed and which emerge only through interpretation. Combining the three allowed textual interpretation to be grounded in community knowledge rather than in the researchers' readings alone.

The study was conducted in Gowa and Takalar Regencies, South Sulawesi. Gowa was the center of the Gowa Sultanate, in whose court *Angngaru* developed as a pledge of loyalty to the king, and it remains home to customary institutions and royal heritage sites where *Angngaru* is still performed during customary ceremonies (Kurniawan & Bumbungan, 2020). Takalar belongs to the same Makassar cultural area and has active customary communities and sanggar (cultural studios) that hold regular performances at weddings and customary events. The two sites were selected because *Angngaru* is still performed there in customary contexts rather than only as staged entertainment, and because active *pangngaru* were available and willing to participate.

Participants were selected through purposive sampling followed by snowball sampling, using the following criteria: (1) *pangngaru* who had performed *Angngaru* in customary ceremonies for at least years; (2) customary leaders or cultural figures recognized by the community as custodians of Makassar customary knowledge; and (3) regional-language teachers or lecturers with experience teaching Makassar literature.

Primary data consisted of transcriptions of *Angngaru* texts recorded directly from performances, field notes, and transcripts of interviews and focus group discussions (FGDs). Secondary data consisted of Lontarak manuscripts, local historical documents, reference books on Makassar literature, and studies on ecopedagogy and ESD. Figure 1 summarizes the data sources.

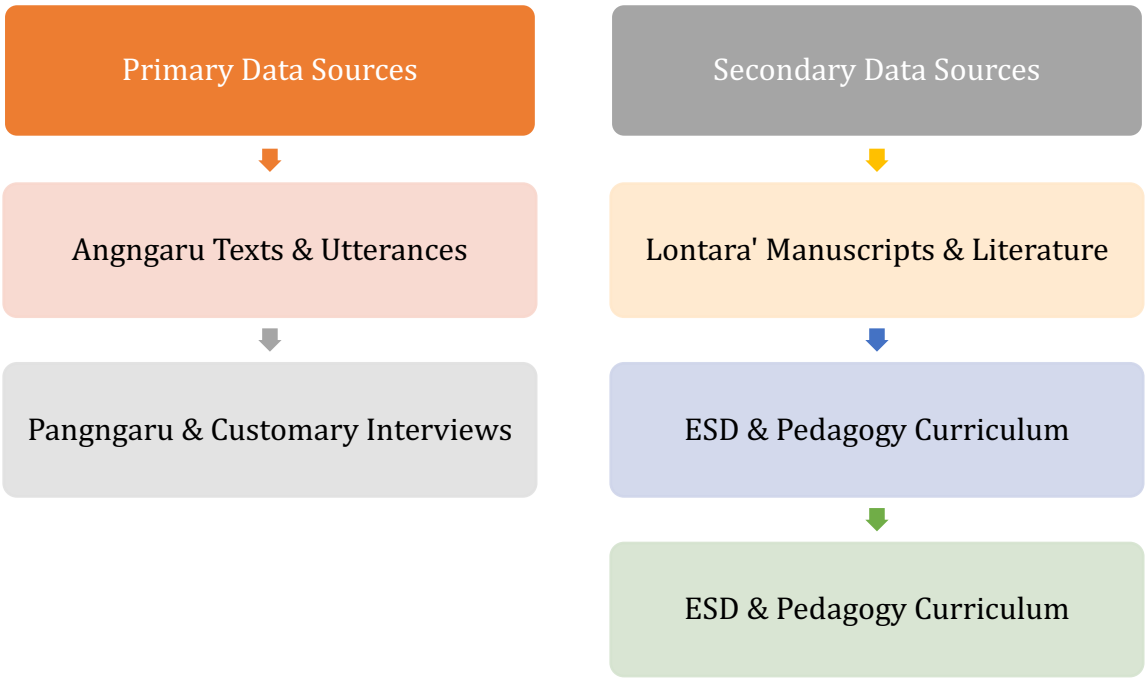


Figure 1. Data Sources

Data were collected between using four techniques. (1) Participant observation: the researchers attended *Angngaru* performances and recorded field notes on the setting, the sequence of the performance, bodily movements, the use of the *badik*, vocal tone, and audience responses. (2) In-depth interviews: semi-structured interviews were conducted with participants, each lasting approximately minutes, in Makassarese and Indonesian. The interview guide covered the history and occasions of *Angngaru*, the meaning of specific lines and metaphors, the meaning of *siri' na pacce*, and participants' views on teaching *Angngaru* to younger generations. (3) Focus group discussions: FGD sessions were held with participants (regional-literature lecturers, teachers, and members of cultural communities) to discuss the pedagogical relevance of the preliminary findings and to develop the learning framework reported for RQ3. (4) Documentation: performances were recorded in audio and video with participants' permission, transcribed using Makassarese orthography, and translated into Indonesian and English; Lontarak manuscripts and local historical documents were consulted as secondary sources. Interviews were conducted in a dialogical manner consistent with Makassar customary etiquette, such as asking permission (*tabe'*) before recording.

Data analysis followed the interactive model of Miles et al. (2020) and proceeded in five steps. Step 1, transcription and segmentation: each recorded performance was transcribed verbatim and segmented into utterance units (lines and stanzas), yielding utterance units from texts. Step 2, structural analysis (RQ1): each text was divided into structural stages (opening, content, and closing) on the basis of formulaic markers such as *tabe'* and *Karaeng*, and the stages were compared across texts. Step 3, coding of nature metaphors and values (RQ1 and RQ2): utterance units containing nature vocabulary or metaphors (e.g., *anging* 'wind', *lekok kayu* 'leaves', *jekne* 'water', *batang kayu* 'log') were coded deductively using four ecopedagogical indicators (environmental awareness, local conservation ethics, sustainability of life, and ecological justice), while inductive codes were added for meanings that emerged from the interviews. Each code was also labeled as either attested (meaning explicitly stated by participants or documents) or interpretive (meaning proposed by the researchers). Step 4, hermeneutic interpretation (RQ2): the coded metaphors were interpreted by moving between the line, the whole text, the interview data, and Makassar cosmological concepts such as *siri' na pacce* and *pasang*; the interpretations were then discussed with participants. Step 5, pedagogical synthesis (RQ3): the validated values were mapped onto the head–heart–hands dimensions of transformative sustainability learning (Sipos et al., 2008) and refined through the FGDs into the proposed framework. Coding was carried out by researchers manually and disagreements were resolved through discussion.

The study followed ethical principles for research with indigenous communities (Smith, 2021). Before data collection, permission was obtained from customary authority, village head, or sanggar. All participants were informed of the study's aims and gave oral informed consent, including separate consent for audio-video recording. Sacred performances were recorded only with the permission of the pangngaru and customary leaders.

RESULTS AND DISCUSSION

Analysis of the Form, Utterance Structure, and Ecopedagogical Values of the *Angngaru* Oral Tradition

In terms of form, *Angngaru* is a Makassar oral tradition in the form of epic poetry expressing the steadfastness of a promise (pledge/oath of loyalty), delivered expressively (recited) by a P*Angngaru*. The form of the utterance (oral) in the Makassar language can be seen in the following interview with a Makassar traditional leader:

Data 1:
Atatta Karaeng,
Tabe kipammpoporang mamak
Risakri karatuanna ri empoang matinggita
Inakke minne Karaeng

Lammbara tatassalanna turatea
Nakareppekangmi sallang Karaeng
Pangngulu ri Barugayya
Nakatepokammi sallang Karaeng
Pasorang attngnga parang

Inai-inaimo sallang Karaeng
Tammappatojengngi tojenga
Tammappiadaki adaka
Kusalagai sirikna, kuisarakki parallakkenna
Beranja kunipatebba pangkulu kunisoeang

Ikatte anging Karaeng, nai kambe lekok kayu
Ammirikko anging namarunang lekok kayua
Iya sani madidiyaji nurunang

Ikatte jekne Karaeng naikambe batang mamayu
Assolongko jekne namammayu batang kayu
Ikatte jarung Karaeng, naikambe bannang panjai
Antakleko jarung namamminawang bannag panjai
Iya sani lambusuppi nakontu tojeng

Makkana mamaki mae Karaeng, naikambe mappajari
Mannyabbu mamaki Karaeng, naikambe mapparupa
Punna sallang tkammayya Arukku ridallekanta
Pangkai jejakku, tinrak bate onjokku
Pauwang anak ri boko pasang anak tanjari
Tumakkanayya Karaeng natanupai jancinna

Sikammaminne Arukku ridallekanta
Kipada salama ngaseng

The performance of *Angngaru* combines the art of speech (oratory), firm bodily movements, the embodiment of *siri' na pacce*, and the use of a traditional weapon (*badik*) that is raised or pressed against the speaker's own chest. The use of the *badik* symbolizes the sanctity of the oath: whoever violates the message and oath contained in *Angngaru* will have their honor and the natural environment judge their life.

Respect	Mentioning the creator	ancestors	Asking for permission
	Atatta Karaeng, *Tabe kipammpoporang mamak* *Risakri karatuanna ri empoang matinggita* *Inakke minne Karaeng* Accompanied by traditional music: *ganrang* and *puik-puik* Oath in the form of poetry/oral tradition		
	Affirmation of loyalty	Enforcement of law	Protection of cultural wisdom
	Lammbara tatassalanna turatea *Nakareppekangmi sallang Karaeng* *Pangngulu ri Barugayya* *Nakatepokammi sallang Karaeng* *Pasorang attngnga parang*	*Inai-inaimo sallang Karaeng* *Tammappatojengngi tojenga* *Tammappiadaki adaka Kusalagai sirikna,* *kuisarakki parallakkenna* *Beranja kunipatebba pangkulu kunisoeang*	*Ikatte anging Karaeng, nai kambe lekok kayu* *Ammirikko anging namarunang lekok kayua* *Iya sani madidiyaji nurunang* *Ikatte jekne Karaeng naikambe batang mamayu* *Assolongko jekne namammayu batang kayu* *Ikatte jarung Karaeng, naikambe bannang panjai* *Antakleko jarung namamminawang bannag panjai* *Iya sani lambusuppi nakontu tojeng*
Closing	*Pappassapu*	Affirmation of readiness to sacrifice Prayer for safety	
	Makkana mamaki mae Karaeng, naikambe mappajari *Mannyabbu mamaki Karaeng, naikambe mapparupa* *Punna sallang tkammayya Arukku ridallekanta* *Pangkai jejakku, tinrak bate onjokku* *Pauwang anak ri boko pasang anak tanjari* *Tumakkanayya Karaeng natanupai jancinna*	*Sikammaminne Arukku ridallekanta,* *kipada salama ngaseng*	

Table 1. Structure of *Angngaru* Utterances

As shown in Table 1, the utterance follows three stages. Opening (*Mangngala Pa'bassa*): Begins with respect for the King, the wedding couple, or honored guests. The speaker asks permission (*tabe'*) so that the utterance delivered brings goodness and does not bring misfortune (*tulak*). Content (*Pasang na Ikrar*): The core of the utterance contains a pledge of loyalty to the leader, loyalty to one's life partner, protection of honored guests, and a commitment to remain loyal to one's homeland (*pa'rasangang*). The language is rich

in metaphor, alliteration, and linguistic parallelism characteristic of Makassar. Closing (*Pappasappu*): The closing of the utterance emphasizes total surrender in order to uphold truth, justice, and the balance of nature, ending with a hope for collective safety.

Ecopedagogical Values in *Angngaru*

The ecopedagogical values in *Angngaru* were identified by coding the utterance units that contain nature metaphors (Step 3 of the analysis). They reflect a worldview in which humans and nature are regarded as a single existential unity. Table 2 summarizes these values; their basis in the data, whether attested by participants or interpretive, is explained below.

Dimension	Value	Value Type	Relational Domain
Eco-Spiritual	Respect for the creator	Ethics	Human relationship with God
	Balance of nature	Ethics	Human relationship with nature
Eco-Justice	Moral responsibility	Moral	Human relationship with humans
	Maintaining social order	Moral	Human relationship with humans
Eco-Conservation	Nature metaphors	Ethics	Human relationship with nature
	Inheriting oral traditions concerning nature	Ethics	Human relationship with nature and humans

Table 2. *Ecopedagogical Values of Angngaru*

Explicit values are expressed through nature metaphors. *Angngaru* utterances employ environmental vocabulary such as water, leaves, and wind. The use of natural images to describe a harmonious life contains local wisdom about protecting the earth as the foundation of human life: water symbolizes prosperity, leaves represent the well-being of the community, and wind symbolizes life. The *Angngaru* utterance contains the following lines:

Data 2:

Ikatte anging Karaeng, nai kambe lekok kayu
Ammirikko anging namarunang lekok kayua
Iya sani madidiyaji nurunang
Ikatte jekne Karaeng naikambe batang mamayu
Assolongko jekne namammayu batang kayu

Meaning: O my Lord, wind, and we are the leaves of the tree
Blow, O wind, and the leaves of the tree will follow you
May only what is yellow be what you command
O my Lord, water, and we are the drifting tree trunks
Flow, O water, and the tree trunks will drift along

Implicit Values, namely Eco-Spiritual awareness (*Siri' na Pacce*): Implicitly, the concepts of *siri'* (self-respect/dignity) and *pacce* (empathy/solidarity) are extended to the characteristics of nature. Water and wind are natural forces used as metaphors for a 'king'. If the king is unjust, the surrounding environment will damage the life system. If water and

air function cleanly, honestly, and fairly, the surrounding environment will receive beneficial outcomes. Damaging aquatic and air ecosystems, polluting rivers, or exploiting the sea is considered to sever the value of *pacce* toward nature, which affects the sustainability of human development. Intergenerational Ethics (Sustainable Conservation): The nature metaphors in *Angngaru* imply that what is protected today is entrusted to future generations. The P*Angngaru*'s steadfastness in maintaining loyalty to the oath reflects a moral commitment to relationships with humans and nature so that the ecological heritage remains intact into the future.

Angngaru as a Culturally Situated Ecological Archive

The findings support the view that oral traditions function as repositories of traditional ecological knowledge, a body of knowledge, practice, and belief transmitted across generations (Berkes, 2018). *Angngaru* stores this knowledge not as explicit environmental instruction but in the images through which the Makassar community has understood social order: wind and leaves, water and drifting logs. In this respect, *Angngaru* resembles *Pasang ri Kajang*, in which ancestral messages regulate forest use (Arumningtyas et al., 2023; Syarif et al., 2016), but it differs in an important way. Whereas *Pasang ri Kajang* contains explicit prescriptions about the forest, *Angngaru* encodes ecological imagery within a political pledge of loyalty. Previous studies have examined the speech acts of *Angngaru* (Mahmud, 2019), its moral and character values (Surjasni & Kamal, 2026), and its shift from sacred ritual to popular performance (Kurniawan & Bumbungan, 2020). The present study adds to this literature by showing that the nature metaphors of *Angngaru* constitute a culturally situated ecological archive whose ecological meaning is embedded in, and cannot be separated from, the social and political context in which the oath is performed.

Indigenous Knowledge Cosmology in *Angngaru*: Representation of Human Harmony, Siri' Na Pacce Ethics, and Environmental Sustainability

The cosmology of Makassar indigenous knowledge views the universe (*kasiang-siang*) as a sacred ecosystem in which human existence is bound by destiny, ethics, and spirituality. The *Angngaru* oral tradition functions as a ritualistic oratory medium that conveys this cosmological philosophy. Through the oath utterances and steadfastness of the P*Angngaru*'s spirit, *Angngaru* represents the relationship between the macrocosm (the universe) and the microcosm (the human self), united by the highest ethical values: *Siri' na Pacce* (see Table 3).

Cosmological View	Ethical Foundation	Ecological Responsibility
Macro-Microcosm	Siri' na Pacce Ethics	Eco-Ethical-Moral Responsibility
Macro-Microcosm	Siri' na Pacce Ethics	Eco-Ethical-Moral Responsibility
Humans & nature are an intrinsic unity	Protecting nature = Maintaining self-dignity & empathy	Damaging the environment = An insult to sustainability
Sustainable development		

Table 3. Indigenous Knowledge Cosmology in *Angngaru*

Within Makassar cosmology, humans and nature are not positioned in a hierarchical relationship but rather in a complementary and mutually binding relationship. *Angngaru* conveys the view that the homeland (*pa'rasangang*), water, and human tears exist within the same flow of life. When a P*Angngaru* pledges an oath while raising or pressing a *badik* against the chest, this action symbolizes the union of natural elements (iron/metal) with the human body. Nature is not merely an object of utilization but an intrinsic part of the social and spiritual body of the community. Damage occurring to the universe automatically constitutes a wound to the human body and soul itself.

Internalization of Siri' na Pacce Ethics in Ecological Relations. The ethics of *Siri' na Pacce* function as the primary moral pillar in this cosmology: 1) *Siri'* (self-respect, dignity, and shame) requires humans to feel ashamed when acting greedily and damaging nature that has provided life. Destroying forests or water sources (*kalabbirang*) is regarded as an act that degrades the dignity of the family and customary community (*pappasang*). 2) *Pacce* (empathy, concern, and shared suffering) expands the scope of solidarity from fellow humans to other living beings. From the perspective of *Angngaru*, the pain experienced by nature as a result of excessive exploitation is felt as a collective sense of pain (*pacce*) that moves the community to take action to restore it.

Eco-Moral Responsibility for Sustainability

The oath of loyalty in *Angngaru* is not merely an empty promise to a ruler, but an ecological pledge to the earth and the Creator. The cosmology of indigenous knowledge represents environmental sustainability as an absolute condition for the continuity of life (*pakkuru sumange'*). If harmony between humans and their environment is disrupted due to non-compliance with customary law, nature will respond through imbalance (*tula'* or misfortune). Therefore, *Angngaru* emphasizes a moral commitment to maintaining limits on the utilization of nature in order to preserve ecological sustainability across generations.

Siri' na Pacce and the Conceptual Expansion of Ecological Ethics

In its customary sense, siri' (dignity and shame) and pacce (empathy and solidarity) regulate relations among humans. The findings suggest that these concepts can be extended to the relationship between humans and nature: damaging the land and water on which one lives can be understood as a loss of dignity (siri') and as a source of shared suffering (pacce). This extension is consistent with studies that position siri' na pacce as a moral foundation for environmental learning and community-based environmental sustainability in South Sulawesi (Fatimah et al., 2026; Sahabuddin et al., 2026) and with ecopedagogical arguments that environmental ethics must be grounded in learners' own cultural values rather than in universal technical norms (Kahn, 2010; Misiaszek, 2020). The data show, however, that this extension is not uniform: some participants explicitly linked siri' na pacce to the care of land and water, whereas others understood the concept primarily in terms of relations among humans. The contribution of this study therefore lies in documenting this extension as an ongoing conceptual development rather than assuming it to be an established feature of Makassar ethics.

Rediscovery or Reconstruction? Interpreting Ecological Meanings in *Angngaru*

A central question raised by these findings is whether the ecological interpretation of *Angngaru* represents a rediscovery of existing cultural knowledge or a contemporary reconstruction of traditional meanings. The evidence points to both. Some meanings, such as the sacredness of the oath, the obligation to uphold truth, and the hope for collective safety, are explicitly stated in the texts and confirmed by participants. Other meanings, particularly the reading of the wind and water metaphors as ecological responsibility, are not stated in the texts themselves; they arise from the encounter between the tradition and present-day environmental concerns, including the researchers' own ecopedagogical framework. Studies of invented traditions show that traditions are continually reinterpreted to serve new social needs (Hobsbawm & Ranger, 1983), and the repositioning of *Angngaru* from sacred ritual to cultural performance illustrates such reinterpretation (Kurniawan & Bumbungan, 2020). From this perspective, the ecological reading of *Angngaru* is best understood as a legitimate but contemporary reconstruction that builds on existing cultural resources. Making this distinction explicit avoids romanticizing indigenous knowledge, respects the community's own interpretations, and allows educators to present the

ecological reading transparently as an interpretation to be discussed with learners rather than as a fixed ancestral doctrine.

Reorienting and Integrating the Ecopedagogical Dimension of *Angngaru* into the Modern Sustainable Learning Framework

Angngaru oral literature has often been categorized merely as ritualistic monologue performance art or as a form of guest reception. To address the challenge of the global ecological crisis, an epistemological reorientation is necessary: shifting the view of *Angngaru* from merely an aesthetic object of cultural celebration into a source of values and critical pedagogy based on local wisdom. Integrating *Angngaru* into the sustainable learning framework in modern educational institutions is carried out through three stages of transformation: head (cognitive-critical), heart (affective-affiliative), and hands (psychomotor-action), as summarized in Table 4.

HEAD (Cognitive)	**HEART (Affective)**	**HANDS (Action)**
Critical Literacy	Eco-Siri' na Pacce	Eco-Agency & Project
Interpreting messages from nature	Developing empathy & shame regarding destruction	Concrete action
Critiquing environmental damage	A sense of shame toward environmental destruction	Maintaining the school ecosystem
Preserving local traditions	Eco-Siri' na Pacce	Eco-Agency & Project
Education Sustainable Development		

Table 4. Integrative Transformation of *Angngaru* into Sustainable Learning

Cognitive Transformation: Critical Ecological Literacy (Head)

At the cognitive level, *Angngaru* is integrated as a medium for critical ecological literacy (*critical eco-literacy*). Students are not only encouraged to read the text of *Angngaru* utterances but also to examine the metaphors of nature (earth, water, forests) and *pasang* (ancestral messages) implied within them. Students are trained to compare the norms of environmental care in *Angngaru* with contemporary environmental crises. Through deconstruction methods and critical discourse analysis, students understand that damaging nature constitutes a violation of ethical order and the fidelity of life's pledge (oath).

Affective Transformation: Internalization of Eco-Siri' na Pacce (Heart)

Modern sustainable learning will not be effective if it stops at scientific knowledge without emotional engagement. *Angngaru* transforms the affective domain by re-internalizing the ethics of Eco-Siri' na Pacce: Eco-Siri': Developing personal and collective shame when greedily exploiting the environment or allowing the surrounding environment to deteriorate. Eco-Pacce: Cultivating concern and emotional compassion when witnessing

the destruction of the earth. This affective education shapes students' character so that they view nature not as a dead mineral resource, but as a "brother" whose balance must be protected.

Psychomotor Transformation: Ecological Agency and Concrete Action (Hands)

The peak of reorientation occurs when the values of *Angngaru* are manifested in the Project for Strengthening the Student Profile or project-based learning (Project-Based Learning/PBL). The P*Angngaru*'s steadfastness in upholding the oath is articulated by students as a "Young Ecological Oath." Students are encouraged to undertake concrete actions (*eco-agency*), such as: restoration of the school ecosystem (composting, water conservation, reduction of plastic waste). Environmental conservation campaigns based on digital media incorporating modern *Angngaru* narratives. Participatory environmental research in the local communities where they live. Table 5 summarizes the proposed curricular reorientation.

***Angngaru* Dimension**	**Key Reorientation**	**Form of Sustainable Learning Integration**
Oath of Loyalty (Pledge)	Ethical Learning Commitment	Green Pledge / Students' Green Action Commitment
Customary Message (Pasang)	Literacy & Critical Pedagogy	Case Study of Local Environmental Damage
Siri' na Pacce Values	Eco-Emotional Intelligence	Energy-Saving Culture & School Conservation

Table 5. Proposed Reorientation of *Angngaru* in the School Curriculum

Possibilities and Limitations of Indigenous Ecopedagogy in ESD

The proposed head–heart–hands framework offers several possibilities for ESD. It responds to calls for place-based and culturally relevant sustainability education (Gruenewald, 2003; UNESCO, 2017) and to the argument that sustainability learning must engage learners cognitively, affectively, and through action (Sipos et al., 2008; Sterling, 2001; Tilbury, 2011). It also gives regional-literature teachers concrete entry points, namely the critical reading of metaphors, reflection on *siri' na pacce*, and community-based projects, that connect the local-content and project-based components of the Merdeka Curriculum with Makassar culture (Raihan et al., 2026). Comparable efforts to bring Makassar oral literature into learning have been reported for *Sinrilik* (Rahim et al., 2025) and for AI-supported learning (Rahim et al., 2026).

At the same time, the framework has clear limitations. First, transforming a sacred oath into classroom material raises questions of cultural appropriateness; the use of the *badik* and the sacred character of the pledge require guidance from customary authorities. Second,

the ecological meanings are partly interpretive, as discussed above, and should be presented as such. Third, the framework has not yet been implemented, so its effects on learners' ecological awareness remain unknown. Indigenous ecopedagogy should therefore be developed in partnership with tradition bearers and evaluated empirically before claims about its effectiveness are made.

CONCLUSION

This study examined the *Angngaru* oral tradition of the Makassar community from an ecopedagogical perspective. Regarding RQ1, the recorded texts show a consistent three-stage structure, namely *mangngala pa'bassa* (opening and request for permission), *pasang na ikrar* (pledge and customary messages), and *pappasappu* (closing and prayer for collective safety), and they employ nature metaphors such as wind and leaves and water and drifting logs. Regarding RQ2, *siri' na pacce* provides an ethical lens through which these metaphors can be read as expressions of human–nature interdependence; however, only part of this ecological meaning is explicitly attested by tradition bearers, while part represents a contemporary reinterpretation.

Regarding RQ3, the study proposes a conceptual head–heart–hands framework for integrating *Angngaru* into regional-literature learning: critical ecological literacy (head), the cultivation of eco-*siri' na pacce* (heart), and community-based ecological action (hands). Theoretically, the study contributes by distinguishing rediscovered from reconstructed ecological meanings in oral literature and by showing how a local ethical concept may be extended to environmental relations.

The study has several limitations. It was conducted in only two regencies, Gowa and Takalar, with a limited number of participants, and its qualitative findings cannot be generalized to all Makassar communities. Moreover, the proposed framework has not been implemented or evaluated in classrooms, so its effects on learners' ecological awareness remain hypothetical. Future research should test the framework through classroom implementation and evaluation, for example through design-based or mixed-methods research; involve tradition bearers in developing teaching materials; and extend the inquiry to other Makassar regions and other oral traditions of South Sulawesi.

DECLARATIONS

Ethical considerations

This study was approved by the Research Ethics Committee of Universitas Negeri Makassar, Indonesia. The participants were adult cultural practitioners (*budayawan*) who were informed of the study's aims, procedures, and voluntary nature, and who provided written informed consent, including consent for audio-recorded interviews. Participants could withdraw at any time without consequences. Anonymity was ensured through participant codes, and the shared cultural knowledge was represented respectfully and used solely for research purposes. The study adhered to the Declaration of Helsinki.

Use of artificial intelligence (AI)

During the preparation of this work, the author(s) used ChatGPT and Grammarly solely to improve language clarity and grammar. The tool was not used to generate content or influence the scientific contribution. The author(s) reviewed and edited the manuscript and take(s) full responsibility for the final content.

Conflict of Interest

The authors declare no competing interests

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