



Exploring Madurese Ethnoscience through the Preservation of the Ondhâgghâ Bhâsa Language in Community Texts: A Source of Contextual Science Learning

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Abstract: This study explores Madurese ethnoscience as embedded in community texts written in Ondhâgghâ Bhâsa—the formal register of the Madurese language—and examines how efforts to preserve this linguistic form serve as a foundation for contextual science learning. Focusing on the Tonggalate Reading House community in Giligenting Subdistrict, Sumenep Regency, the research adopts a qualitative descriptive approach informed by sociolinguistics and ethnoscience perspectives. Data were collected through observation, in-depth interviews with community members and educators, and thematic analysis of locally produced texts that integrate traditional knowledge, ecological practices, and cultural values. The findings indicate that Ondhâgghâ Bhâsa functions not only as a vehicle for cultural identity but also as a medium through which indigenous scientific understandings—such as local environmental management, agricultural techniques, and medicinal practices—are documented and transmitted. These community texts thus provide authentic, culturally grounded resources for science education. The study concludes that preserving Ondhâgghâ Bhâsa through community literacy initiatives simultaneously safeguards Madurese ethnoscience and offers meaningful contexts for developing relevant, student-centered science learning experiences.

Keywords: Contextual science learning; Ethnoscience; Madurese Language; Ondhâgghâ Bhâsa

Introduction

Language is far more than a medium of communication; it is a dynamic repository of cultural identity, historical memory, and indigenous knowledge systems (Liebal et al., 2025). Across the world, linguistic diversity correlates strongly with epistemic diversity, that is, different ways of knowing, observing, and interpreting the natural and social world. In Indonesia, a nation characterized by extraordinary linguistic richness with over 700 regional languages, many of these languages embody unique forms of ethnoscience: locally developed, culturally embedded understandings of biology, ecology, astronomy, agriculture, health, and technology that have evolved through generations of

lived experience (Coenye et al., 2024; Pino et al., 2022; Yudhoyono et al., 2025). Ethnoscience, as a domain of study, bridges anthropology, linguistics, and science education by foregrounding how local communities conceptualize and engage with scientific phenomena through their own cultural and linguistic frameworks (Isakov et al., 2023; Masunungure & Maguvhe, 2025; Sabirova et al., 2025).

Among Indonesia's regional languages, Madurese spoken primarily in Madura Island and parts of East Java, holds particular significance not only for its estimated 14 million speakers but also for its layered linguistic registers. The formal and literary variety, known as Ondhâgghâ Bhâsa, has traditionally been used in oral poetry (dhâddhâr), religious instruction,

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customary law (bâdhâdhâ), and community documentation. This register is especially rich in metaphorical expressions, taxonomies of local flora and fauna, ecological calendars, and procedural knowledge related to fishing, farming, herbal medicine, and environmental stewardship—all of which constitute core elements of Madurese ethnosience. However, like many indigenous languages globally, Ondhâgghâ Bhâsa is experiencing rapid attrition. Factors such as urbanization, national language policies favoring Bahasa Indonesia, limited inclusion in formal education, and the pervasive influence of digital media in dominant languages have contributed to a sharp decline in intergenerational transmission, particularly among youth (Fernandes et al., 2024; Monica et al., 2025; Paolo & Shidiqi, 2025).

In response to this linguistic and epistemic erosion, community-based initiatives have emerged as critical sites of resistance and revitalization. One notable example is the Tonggalate Reading House (Rumah Baca Tonggalate) in Giligenting Subdistrict, Sumenep Regency—a grassroots literacy movement that actively produces and circulates community-authored texts in Ondhâgghâ Bhâsa. These texts include illustrated storybooks, instructional manuals on traditional crafts, compilations of folk wisdom, and documentation of local ecological practices. Significantly, they do not merely preserve language; they encode and transmit scientific knowledge grounded in Madurese cosmology and environmental interaction (Metila et al., 2025; Okuhara et al., 2025; Passeri et al., 2025).

This convergence of language preservation and indigenous scientific knowledge presents a compelling opportunity for science education. Contextual learning theories emphasize that students learn science more effectively when concepts are connected to their lived experiences, cultural backgrounds, and local environments. Yet, mainstream science curricula in Indonesia—and globally—remain largely decontextualized, often marginalizing local knowledge in favor of universalized, Western-derived paradigms. Integrating ethnosience into science teaching not only validates students' cultural identities but also fosters critical thinking, environmental awareness, and epistemic justice (Chhetri et al., 2025; Ocholla, 2025; Wilson, 2025).

Against this backdrop, the present study seeks to explore Madurese ethnosience as articulated in community texts written in Ondhâgghâ Bhâsa, with a specific focus on how language preservation efforts function as a conduit for contextual science learning. The research is guided by two central objectives: (1) to identify and analyze manifestations of ethnosience embedded in Ondhâgghâ Bhâsa texts produced by the

Tonggalate Reading House community, and (2) to examine how these texts can be leveraged as authentic, culturally responsive resources for science education in local and potentially broader educational contexts. By doing so, this study contributes to ongoing scholarly and pedagogical discussions on linguistic sustainability, decolonizing science education, and the role of community agency in knowledge co-creation.

Method

This study, entitled “Exploring Madurese Ethnosience through the Preservation of the Ondhâgghâ Bhâsa Language in Community Texts: A Source of Contextual Science Learning,” was conducted in Giligenting Subdistrict, Sumenep Regency, East Java—specifically within the activities of the Tonggalate Reading House community. The research aims to investigate how the preservation of Ondhâgghâ Bhâsa, the formal register of the Madurese language, in community-generated texts serves as a vehicle for documenting and transmitting Madurese ethnosience, and how such texts can function as authentic resources for contextual science learning.

A qualitative descriptive design was employed, integrating sociolinguistic and ethnosience perspectives. This methodological alignment enables a nuanced exploration of language use as both a cultural practice and a knowledge system, particularly in relation to indigenous scientific understandings embedded in local discourse.

Primary data consist of written and spoken discourse in Ondhâgghâ Bhâsa, including community-authored reading materials, instructional documents, storytelling scripts, and other literacy outputs produced by the Tonggalate Reading House. Data collection involved three primary techniques: (1) participant observation of community literacy activities and language use in-situ; (2) in-depth interviews with key informants—including community leaders, reading house facilitators, local educators, and elders knowledgeable in Ondhâgghâ Bhâsa and traditional practices; and (3) document analysis of locally produced texts to identify ethnosience content such as ecological knowledge, agricultural techniques, health practices, and environmental ethics.

Secondary data were drawn from academic literature, policy documents, and prior studies related to Madurese language revitalization, ethnosience, sociolinguistics, and community-based literacy initiatives. These sources were analyzed thematically to contextualize findings within broader theoretical and empirical discussions.

Data analysis followed a systematic qualitative approach: collected materials were transcribed, translated (where necessary), and coded using thematic analysis to identify recurring patterns related to (a) linguistic features of *Ondhâgghâ Bhâsa* in educational texts, (b) manifestations of ethnoscience, and (c) pedagogical implications for contextual science learning. Triangulation of data sources (observation, interviews, and documents) was used to ensure credibility and analytical rigor.

Result and Discussion

This study identifies that the Tonggalate Reading House community in Giligenting, Sumenep, actively preserves *Ondhâgghâ Bhâsa*—the formal register of the Madurese language—through community-generated texts, particularly ceremonial *MC* (Master of Ceremony) scripts used in local events. These texts consistently employ two high-register forms: *Engghi-Bhunten* (used by younger speakers to address elders or respected figures) and *Engghi-Enten* (used among peers or from elders to juniors). The linguistic analysis of these materials confirms that the community maintains grammatical accuracy, appropriate lexical choices, and culturally prescribed speech levels, even as such usage declines in everyday family and public domains.

The community's literacy programs—held weekly and involving children, youth, and adults—integrate storytelling, poetry recitation, traditional drama, and creative writing in *Ondhâgghâ Bhâsa*. Notably, the *Mohadaroh* program centers on public speaking using formal Madurese, with *MC* texts serving as both performance scripts and pedagogical tools. These texts not only reinforce linguistic structures but also embed local knowledge about seasonal cycles, ecological practices, social ethics, and customary norms. For example, announcements about community clean-up days or agricultural rituals are framed using proverbs and metaphors rooted in Madurese cosmology, thereby encoding ethnoscience within linguistic form.

Despite these efforts, several challenges persist: limited exposure to *Ondhâgghâ Bhâsa* at home, low parental proficiency or willingness to use formal registers, scarcity of age-appropriate learning materials, and sociocultural perceptions that associate Bahasa Indonesia with modernity and Madurese with backwardness. Additionally, children often experience hesitation or shame when using formal Madurese outside structured community settings, further restricting its functional domains.

The findings reveal that language preservation in the Tonggalate community transcends mere linguistic maintenance—it functions as a vehicle for sustaining

Madurese ethnoscience. The *MC* texts are not neutral linguistic artifacts; they are epistemic resources that articulate a worldview in which knowledge of the natural and social world is inseparable from cultural values, relational ethics, and linguistic decorum. This aligns with broader ethnolinguistic scholarship asserting that indigenous languages encode unique cognitive frameworks and ecological intelligence. In this context, preserving *Ondhâgghâ Bhâsa* is simultaneously an act of safeguarding a knowledge system.

Crucially, the stratified speech levels (*Engghi-Bhunten*, *Engghi-Enten*) are not merely stylistic variations but reflect a sociocultural logic in which knowledge transmission is governed by respect, hierarchy, and communal responsibility. When a child recites an *MC* script in *Engghi-Bhunten* to announce a traditional fishing ritual, they are not only practicing language—they are enacting a cultural protocol that links linguistic form to environmental stewardship and intergenerational duty. This challenges the dominant paradigm in science education that treats knowledge as universal and decontextualized. Instead, it exemplifies how science learning can emerge from culturally grounded discourse, where language is the medium through which scientific reasoning is localized and legitimized (Labadie-Tamayo et al., 2025; Ortiz-Perez et al., 2025; Saavedra et al., 2025).

However, the marginalization of *Ondhâgghâ Bhâsa* in domestic and institutional spheres reveals a deeper epistemic injustice: the devaluation of indigenous ways of knowing in favor of standardized, nationalized curricula (Foster et al., 2023; Won & Seto, 2025; Yañez Serrano & Argüelles Ramos, 2025). The reluctance of young parents to use formal Madurese at home—often due to perceived lack of utility or prestige—reflects internalized linguistic hierarchies that position local languages as obstacles to social mobility. This mirrors global patterns where minority languages are abandoned under pressure from dominant linguistic markets (González-Ruibal, 2022; Luring et al., 2025; Yoong & Lee, 2023). Yet, the Tonggalate community resists this trend by repositioning *Ondhâgghâ Bhâsa* not as a relic but as a living, functional, and intellectually rich resource.

The integration of ethnoscience into community texts offers a powerful model for contextual science learning (Cao et al., 2025; Kumar et al., 2025; Morillo et al., 2025). Unlike imported curricula that disconnect students from their ecological and cultural realities, these texts begin with what learners already know: local plant names, tidal patterns, or communal decision-making processes (Chigbu & Makapela, 2025; Ren & Zheng, 2025; Renwick et al., 2024). This approach fosters what is called “culturally sustaining pedagogy,” which

affirms students' identities while expanding their cognitive repertoires (Adler et al., 2025; Kakara Anderson & Bullock, 2025; Ziafati Bafarasat et al., 2025). For instance, a lesson on biodiversity can originate from a poem in *Engghi-Bhunten* describing mangrove species and their uses, bridging poetic expression, linguistic precision, and biological understanding.

Nonetheless, the sustainability of this model hinges on expanding the functional domains of *Ondhâgghâ Bhâsa* beyond the weekly community session. Language thrives not in isolation but in daily use across home, school, media, and public life. The current limitation to a "literacy island" risks turning language preservation into a performative exercise rather than a lived practice. To counter this, the community's strategy of involving parents through workshops is promising but insufficient without systemic support. Schools, for example, could integrate *Ondhâgghâ Bhâsa* into local content subjects, and local governments could mandate its use in official village communications.

Moreover, the emotional dimension—shame, embarrassment, or perceived irrelevance—must be addressed through positive identity reinforcement. Digital media offers untapped potential: animated stories, podcasts, or social media content in *Ondhâgghâ Bhâsa* could reframe the language as dynamic and youth-friendly. When young people see their language used in creative, modern formats, its prestige may be rehabilitated.

In sum, the Tonggalate Reading House demonstrates that language preservation, when rooted in community agency and epistemic awareness, can serve as a foundation for decolonizing science education. The MC texts are more than linguistic exercises—they are vessels of ethnoscience, cultural memory, and pedagogical innovation. The challenge ahead is not merely to document or teach *Ondhâgghâ Bhâsa*, but to restore its social functionality so that it remains a living language through which future generations continue to observe, interpret, and care for their world.

Conclusion

This study reveals that the Tonggalate Reading House community in Galis Village, Giligenting Subdistrict, Sumenep Regency, actively preserves *Ondhâgghâ Bhâsa*—the formal register of the Madurese language—primarily through community-generated MC (Master of Ceremony) texts used in local events, which consistently employ high-register forms such as *Engghi-Bhunten* and *Engghi-Enten*. These texts not only maintain linguistic structure and cultural etiquette but also encode Madurese ethnoscience, including local

ecological knowledge, social values, and traditional practices. Despite strong grassroots efforts—including literacy programs, parental workshops, and involvement of cultural and religious figures—the initiative faces significant challenges such as limited use of formal Madurese in families, negative perceptions of the language's prestige among youth, scarcity of learning materials, dominance of Bahasa Indonesia in schools, and sociopsychological barriers like shyness and lack of confidence. The study concludes that while the community serves as a vital hub for language and cultural preservation, sustainable revitalization of *Ondhâgghâ Bhâsa* requires broader collaboration among families, schools, local government, and media to expand its functional domains and reaffirm its relevance in contemporary Madurese society.

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