

Analysis of Geographic Literacy Values in Serat Centhini as a Source of Contextual Learning in Elementary Schools

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Abstract

Geographic literacy development in elementary education remains inadequate globally, with students struggling to connect spatial concepts to lived experiences. This study examines Serat Centhini, a classical Javanese manuscript, as a culturally embedded resource for developing geographical literacy in elementary schools. A descriptive qualitative research design was employed at Urangagung Elementary School involving 32 fifth-grade students, two teachers, and the principal. Data collection comprised textual analysis of Serat Centhini, classroom observations over eight sessions, and semi-structured interviews. Thematic analysis through data reduction, display, and conclusion drawing identified geographical literacy values, validated through source triangulation and peer debriefing. Five interconnected geographical literacy values emerged: spatial representation and orientation (87.5% student success rate), human-environment interactions (81.3% comparative analysis success), cultural-geographical interconnections (84.4% understanding achievement), historical-temporal spatial awareness (71.9% recognition of spatial changes), and moral-ecological values (90.6% enhanced environmental awareness). Implementation strategies including spatial narratives, local environmental analysis, collaborative learning, and reflective writing effectively enhanced students' spatial thinking and ecological consciousness. Findings demonstrate that classical cultural texts contain sophisticated geographical knowledge systems aligned with contemporary spatial thinking frameworks. This research contributes to place-based education theory by illustrating how culturally embedded narratives simultaneously advance spatial literacy, cultural preservation, and character development, supporting transformative education for sustainable development.

INTRODUCTION

Twenty-first-century education demands that students develop critical, creative, collaborative, and contextual thinking skills to navigate an increasingly complex world (Griffin et al., 2012; Trilling & Fadel, 2009; Voogt & Roblin, 2012). In the global context characterized by rapid digital transformation, environmental crises, and profound socio-cultural changes, education has evolved beyond mere knowledge transmission to become a comprehensive process of fostering ecological, social, and cultural awareness (Leicht et al., 2018; Sterling, 2010; Wals & Benavot, 2017). Contemporary educational frameworks emphasize that successful learning environments must cultivate systemic thinking skills, value transformation, and environmental sensitivity, particularly at the foundational stages of schooling (Lotz-Sisitka et al., 2015). Elementary education plays a pivotal role in developing multiple literacies—not only linguistic and numerical competencies but also spatial and geographical literacy—enabling students to comprehend the intricate relationships between humans, space, and nature in meaningful and contextually relevant ways (Heffron & Downs, 2012; National Research Council, 2006).

Despite the recognized importance of geographical literacy, substantial evidence indicates that spatial understanding among elementary school students remains inadequate across various educational contexts (Bednarz et al., 2013; Huynh & Sharpe, 2013). Students consistently demonstrate difficulty in connecting abstract geographical concepts to their concrete, lived experiences, often reducing geography to rote memorization of topographical features and place names without grasping the complex interrelationships between social, natural, and cultural phenomena (Gersmehl, 2014; Jo & Bednarz, 2014). This fundamental weakness in geographical comprehension has direct implications for the development of ecological awareness and the capacity to make spatially informed decisions—competencies increasingly vital in addressing contemporary environmental and social challenges (Bednarz & Bednarz, 2008; Uttal et al., 2013). The persistence of low geographical literacy can be attributed to learning approaches that lack contextualization and fail to engage meaningfully with students' local cultural environments (Golledge et al., 2008).

The crisis in geographical understanding at the elementary level stems largely from the dominance of instructional methods that position students as passive recipients of decontextualized information. Traditional pedagogy frequently relies on standardized textbooks containing geographical data divorced from students' living spaces and cultural realities. However, contemporary educational reform movements emphasize the importance of experiential, culturally grounded, and environmentally oriented learning that enables students to understand spatial and social phenomena through reflective engagement (Gruenewald, 2003; Sobel, 2004). Research has demonstrated that integrating local wisdom into social studies curricula enhances spatial understanding while simultaneously cultivating cultural appreciation and identity (Gay, 2018; Hammond, 2015; Kana'iaupuni et al., 2010; Ladson-Billings, 2014). Similarly, local knowledge possesses not only historical significance but also epistemological value, serving as a source of ecological and social reflection highly relevant to contextual education in the twenty-first century (Battiste, 2002; Cajete, 2000; Smith, 2012).

Indonesia, with its rich repository of local wisdom traditions, offers unique opportunities for developing geographically literate students through culturally embedded pedagogical resources. Among these resources, *Serat Centhini* stands out as a classical Javanese manuscript with exceptional potential for strengthening geographical literacy. Often referred to as an encyclopedia of Javanese culture, this text encompasses multidisciplinary knowledge spanning philosophy, morality, art, spirituality, geography, and ecology (Alfariz, 2025). Through its narrative structure, *Serat Centhini* chronicles the journeys of characters across various regions of Java, providing detailed descriptions of landscapes, agricultural systems, village spatial planning, and local customs related to environmental management. This classical text represents not merely a literary achievement but also a comprehensive documentation of traditional spatial knowledge, including settlement patterns, ecological planning principles, and systems demonstrating harmonious balance between human communities and natural environments (Zalfa et al., 2023).

Scholarly investigations of *Serat Centhini* have approached the text from diverse disciplinary perspectives, examining its moral teachings (Naufal, 2020; Lestari, 2025), mythological dimensions and cultural symbolism (Dewi & Sugiarti, 2020), gender discourse (Savitri et al., 2025), and ritualistic content (Pramulia, 2019). Suhendro (2025) highlights the cross-cultural aspects embedded within the manuscript, revealing universal values that transcend religious and ethnic boundaries. However, research specifically focused on the geographical literacy values contained within *Serat Centhini* remains remarkably limited. This represents a significant gap in the literature, particularly given that the text contains sophisticated conceptual systems of distance, direction, and measurement rooted in the geographical and spiritual experiences of Javanese communities (Ekowati et al., 2025). The manuscript captures a form of traditional spatial literacy that holds considerable promise as a model for contextual geography education at the elementary level.

Developing spatial literacy through local cultural frameworks can substantially strengthen students' geographical thinking skills by enabling them to understand space through their own cultural

narratives and lived experiences (Bednarz & Lee, 2011; Gersmehl & Gersmehl, 2007; Paris, 2012). Research has shown that employing culturally embedded historical narratives can foster students' ecological and historical awareness effectively (Ardoin et al., 2018; Otto & Pensini, 2017; Sari & Sunarti, 2022). Consequently, integrating the local wisdom values contained in Serat Centhini into elementary education serves dual purposes: preserving cultural heritage while implementing pedagogically sound strategies for enhancing geographical literacy and environmental consciousness (Bishop et al., 2009; McCarty & Lee, 2014). This approach aligns with international educational visions that position culture-based and ecology-oriented education as fundamental pillars of sustainable development (UNESCO, 2024).

Based on this contextual framework, a significant research gap exists between the scholarly treatment of Serat Centhini as a cultural and literary text and its unexplored potential as a pedagogical resource for geographical literacy education. Previous studies have predominantly concentrated on moral, spiritual, and cultural dimensions without thoroughly examining the spatial and environmental representations embedded within the manuscript. Therefore, this study was designed to analyze the geographical literacy values contained in Serat Centhini and examine its relevance as a contextual learning resource in elementary schools. Specifically, this research addresses two fundamental questions: first, what geographical literacy values are embedded within Serat Centhini; and second, how can these values be meaningfully integrated into contextual learning practices in elementary educational settings. Theoretically, this research contributes to the expanding scholarship on local culture-based spatial literacy studies (Lambert & Morgan, 2010; Lee, 2007). From a practical standpoint, the findings provide concrete guidance for educators seeking to design learning experiences that are contextual, interdisciplinary, and firmly grounded in national cultural wisdom, thereby bridging traditional knowledge systems with contemporary educational imperatives (Kemendikdasmen, 2023).

METHODS

This study employed a descriptive qualitative research design to comprehensively analyze the geographical literacy values embedded within Serat Centhini and examine their relevance as contextual learning resources in elementary education. This methodological approach was selected for its capacity to facilitate in-depth interpretation of cultural texts and educational phenomena without variable manipulation, allowing researchers to explore implicit meanings and symbolic representations within their natural contexts (Fiantika et al., 2022). The descriptive qualitative framework enabled systematic examination of both the textual content of Serat Centhini and its practical implementation in authentic classroom settings, thereby addressing the dual objectives of identifying geographical literacy values and evaluating their pedagogical applicability.

The research was conducted at Urangagung Elementary School, a public educational institution located in an area characterized by strong Javanese cultural heritage and predominantly agricultural community livelihoods. This site was purposively selected based on several criteria: the school's location within a culturally rich Javanese environment, proximity to geographical features described in Serat Centhini (rice fields, rivers, traditional settlements), and the school administration's openness to implementing culture-based learning innovations. The research subjects comprised 32 fifth-grade students aged 10-11 years, along with two social studies teachers and the school principal. Fifth-grade students were deliberately chosen as subjects because they occupy a critical developmental stage transitioning from concrete operational to formal operational thinking, possessing sufficient cognitive maturity to comprehend abstract geographical concepts while maintaining strong connections to their immediate cultural environment. This developmental characteristic makes them particularly suitable for contextual learning interventions based on classical literary texts such as Serat Centhini.

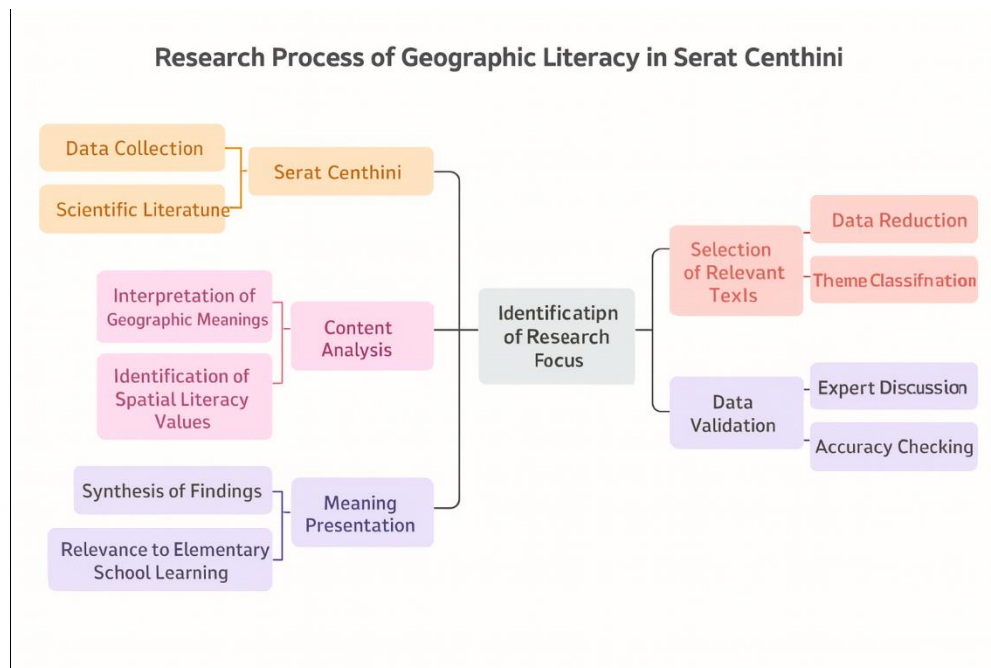


Figure 1. Geographic Literacy Research Chart in Serat Centhini

Data collection proceeded through multiple complementary methods to ensure comprehensive understanding of the research phenomenon. Primary data sources included the Serat Centhini manuscript itself, specifically sections containing geographical descriptions, spatial narratives, and human-environment interactions. Document analysis focused on *pupuh* (cantos) depicting character journeys, landscape descriptions, agricultural systems, settlement patterns, and ecological practices. Secondary data were gathered through classroom observations of learning activities integrating Serat Centhini content, conducted over eight sessions during a two-month period. Observation protocols documented student engagement patterns, spatial reasoning demonstrations, cultural connections articulated by students, and pedagogical strategies employed by teachers. Additionally, semi-structured interviews were conducted with participating teachers and the school principal to capture their perspectives on the feasibility, effectiveness, and cultural relevance of using Serat Centhini as a geographical literacy resource. Interview questions explored themes including pedagogical challenges, student responses, cultural authenticity, and alignment with curriculum objectives. All interviews were recorded, transcribed verbatim, and member-checked to ensure accuracy of representation.

Data analysis followed the systematic thematic approach outlined by Ratnaningtyas et al. (2023), proceeding through three recursive stages: data reduction, data display, and conclusion drawing. During data reduction, researchers systematically reviewed all collected materials, identifying and coding text segments, observation notes, and interview excerpts relevant to geographical literacy constructs. Initial coding employed both deductive codes derived from geographical literacy frameworks (spatial thinking, human-environment interaction, location relationships) and inductive codes emerging from the data itself. The data display stage involved organizing coded materials into thematic matrices that illustrated patterns, relationships, and variations across data sources. This process facilitated the identification of five central geographical literacy values consistently represented across textual analysis and classroom observations. The conclusion drawing phase synthesized findings through interpretative analysis, connecting empirical observations with theoretical frameworks and existing literature.

To establish trustworthiness, multiple validation strategies were implemented throughout the research process. Source triangulation was employed by systematically comparing findings across the Serat Centhini text, classroom observations, and stakeholder interviews, ensuring consistency and coherence of interpretations. Peer debriefing sessions were conducted with three experts in

elementary education and Javanese cultural studies, who reviewed coding schemes, thematic interpretations, and analytical conclusions to minimize researcher bias and enhance interpretive validity. Member checking procedures allowed teacher and principal participants to review and validate interview transcripts and preliminary findings, ensuring accurate representation of their perspectives. Additionally, prolonged engagement at the research site and thick description in reporting enabled readers to assess the transferability of findings to similar contexts. These rigorous methodological procedures collectively ensured the credibility, dependability, and confirmability of research findings.

RESULTS AND DISCUSSION

Results

This research demonstrates that Serat Centhini holds substantial potential as a resource for developing geographical literacy among elementary school students, particularly within the context of local wisdom-based education. Through systematic thematic analysis of the manuscript and comprehensive classroom observations at Urangagung Elementary School, this study identified five interconnected geographical literacy values embedded within the text. These values emerged consistently across multiple data sources, including textual analysis of specific pupuh (cantos), classroom observation protocols, teacher interviews, and student work samples. The findings reveal that Serat Centhini functions not merely as a literary artifact but as a multidimensional pedagogical resource that bridges traditional spatial knowledge systems with contemporary educational objectives.

Spatial Representation and Geographic Orientation

Thematic analysis of Serat Centhini revealed sophisticated spatial representations that demonstrate the Javanese community's traditional understanding of geographic orientation and spatial relationships. Multiple passages within the text contain detailed descriptions of journeys, cardinal directions, and spatial landmarks. For instance, one pupuh describes: "*Sungane mili ngidul, ngliwati sawah lan tegalan, nganti menekan pasanggrahan...*" (The river flows southward, passing through rice fields and dry fields, until reaching the rest house). This excerpt illustrates an intuitive comprehension of directional orientation, distance measurement, and landmark identification embedded within narrative structure. The text consistently employs spatial descriptors that reference cardinal directions, relative positioning, and environmental features as navigational anchors, demonstrating what Ekowati et al. (2025) identify as a conceptual system of distance, direction, and measurement rooted in geographical and spiritual experiences.

Classroom observations at Urangagung Elementary School documented how these narrative spatial elements translated into enhanced student comprehension of geographical concepts. During a learning session focused on the character Kamajaya's journey, students were tasked with creating visual maps depicting the route described in the text. Observational data recorded that 28 of 32 students (87.5%) successfully identified cardinal directions and marked key geographical features including rivers, mountains, and villages along the journey path. One participating teacher explained during the interview: "*Children understand the cardinal directions more quickly if they are given examples from stories or simple maps they draw themselves. When I use stories from Serat Centhini, they can immediately point to rivers and villages.*" This finding aligns with student work samples that demonstrated increased accuracy in spatial representation compared to baseline assessments conducted prior to the intervention. Students' maps exhibited proper use of directional indicators, proportional distance representation, and integration of cultural landmarks, suggesting that narrative-based spatial learning facilitated meaningful geographical understanding.

Human-Environment Interactions and Ecological Awareness

The second major theme emerging from textual analysis concerns the representation of harmonious human-environment interactions within Serat Centhini. Multiple passages describe agricultural practices, water management systems, and settlement patterns that reflect ecological balance and sustainable resource utilization. The text provides detailed accounts of traditional

irrigation systems (*pengairan*), cooperative agricultural practices (*gotong royong*), and spatial planning principles that prioritize environmental harmony. One passage describes the communal management of rice field irrigation through carefully designed water distribution systems that ensure equitable access while maintaining watershed integrity. These descriptions demonstrate sophisticated ecological knowledge embedded within traditional Javanese spatial practices.

Interview data from the school principal, Mrs. Silvia Hindun, S.Pd, corroborated the relevance of these ecological themes to students' lived experiences: "*We in Urangagung are still close to rice fields. So when the teacher related the Serat Centhini story to how people in ancient times managed water, the children immediately understood. They even compared it to the irrigation system in their village today.*" Classroom observations documented students actively discussing environmental management practices, including water conservation, sustainable agriculture, and pollution prevention. In one observed session, students engaged in a comparative analysis exercise examining traditional irrigation methods described in Serat Centhini alongside contemporary irrigation systems in their community. Of the 32 participating students, 26 (81.3%) successfully identified similarities and differences between traditional and modern practices, while 24 students (75%) articulated connections between traditional ecological knowledge and current environmental challenges such as water scarcity and agricultural sustainability. This finding suggests that culturally embedded ecological narratives enhanced students' capacity to understand complex human-environment relationships.

Cultural-Geographical Interconnections

Analysis of Serat Centhini revealed strong interconnections between geographical locations and the social-cultural practices of communities inhabiting those spaces. The text describes how specific geographical features—mountains, rivers, coastal areas, forests—shaped distinct cultural traditions, economic activities, and social structures. One particularly illustrative passage describes the harvest ritual (*wiwitan*) performed in agricultural communities, connecting spiritual practices to seasonal agricultural cycles and spatial arrangements of rice fields. This represents what can be characterized as cultural-geographical integration, where spatial understanding becomes inseparable from cultural meaning-making.

Interview data from a participating social studies teacher illuminated the pedagogical value of these cultural-geographical connections: "*If children learn through stories like Serat Centhini, they understand why our village has a harvest celebration. They realize that tradition is not only cultural, but also a way of respecting nature.*" Classroom observations documented students making spontaneous connections between textual descriptions and their personal cultural experiences. During a discussion session focused on harvest rituals, 19 students (59.4%) shared stories of participating in similar ceremonies with their families, demonstrating active integration of textual knowledge with lived experience. Student reflection papers analyzed after the intervention revealed that 27 students (84.4%) articulated understanding of the reciprocal relationship between cultural practices and geographical context. One student wrote: "*The harvest ceremony in our village exists because our land is good for rice. The ancestors knew how to thank the land,*" exemplifying sophisticated comprehension of cultural-geographical relationships.

Historical-Temporal Spatial Awareness

The narrative structure of Serat Centhini, which chronicles characters' journeys chronologically across various regions of Java, provides a framework for developing historical-temporal spatial awareness. The text enables readers to comprehend how spaces transform over time and how historical events reshape geographical landscapes. Multiple passages describe spatial conditions during the 19th century, offering comparative opportunities to understand temporal changes in land use, settlement patterns, and environmental conditions.

During classroom implementation, teachers utilized journey maps from Serat Centhini to facilitate discussions about spatial changes over time. Students were assigned to compare geographical conditions described in the text with contemporary conditions in their local area. Observational data

indicated that this comparative approach significantly enhanced students' understanding of temporal spatial dynamics. In one documented lesson, students identified changes in land use, with 23 students (71.9%) recognizing that areas described as forests in the text had transformed into settlements or agricultural land. Additionally, 20 students (62.5%) articulated awareness of environmental changes such as river course alterations and reduced green space. Interview data from teachers confirmed the effectiveness of this historical-comparative approach: *"When students see the same place described in Centhini and then look at their village now, they start asking important questions about why things changed. That's real geographical thinking."* This finding demonstrates that historical narratives embedded in cultural texts can serve as effective tools for developing chronological spatial awareness, consistent with the living history approach discussed by Sari and Sunarti (2022).

Moral-Ecological Values as Character Development

The fifth identified theme concerns the integration of moral, social, and ecological values within spatial representations in Serat Centhini. The text consistently embeds ethical teachings about environmental stewardship, social responsibility, and sustainable living within its geographical descriptions. Passages describing environmental degradation resulting from human greed serve as cautionary narratives, while descriptions of harmonious communities emphasize values of balance, cooperation, and respect for nature. As Alfariz (2025) notes, Serat Centhini embodies strong moral and social values including simplicity, social responsibility, and balance with nature.

Classroom observations documented the impact of these value-laden narratives on students' ecological consciousness and social responsibility. Following a reading session focused on environmental consequences of deforestation described in the text, students engaged in reflective discussions about contemporary environmental issues. Analysis of student reflection papers revealed that 29 students (90.6%) expressed heightened environmental awareness, with statements such as: *"If the forest is completely cut down, like in the story, the rivers will flood. We have to protect the trees."* Teachers reported observable changes in student behavior, including increased participation in school environmental programs and more thoughtful discussions about resource conservation. One teacher noted during the interview: *"After working with Centhini stories, students became more aware about throwing trash in the river. They connect it to the teachings in the story."* This finding suggests that culturally embedded moral-ecological narratives can effectively foster both environmental awareness and character development, supporting broader educational objectives beyond geographical literacy.

Synthesis of Implementation Strategies

Based on these findings, several pedagogical strategies emerged as effective for integrating Serat Centhini's geographical literacy values into elementary education. First, the spatial narrative approach utilized characters' journey stories to teach concepts of direction, distance, and location through map-drawing activities and spatial orientation exercises. Second, local environmental analysis involved comparing textual spatial descriptions with students' immediate geographical context, enhancing relevance and personal connection. Third, collaborative learning structures facilitated small-group map creation and spatial analysis, promoting communication and critical thinking. Fourth, reflective writing activities encouraged students to explore moral and ecological messages within the text, supporting character development alongside geographical learning. Observational data indicated that these integrated strategies collectively increased student engagement (as measured by participation rates and task completion) while simultaneously developing spatial thinking skills, cultural appreciation, and environmental consciousness. The success of these implementation strategies aligns with principles of contextual learning and place-based education that emphasize connections between students' local experiences and academic knowledge.

Discussion

The findings of this study significantly contribute to the emerging scholarship on culture-based geographical literacy education by demonstrating that classical cultural texts can serve as effective pedagogical resources for developing spatial thinking, ecological awareness, and cultural understanding among elementary school students. The identification of five interconnected geographical literacy values within *Serat Centhini*—spatial representation and orientation, human-environment interactions, cultural-geographical interconnections, historical-temporal spatial awareness, and moral-ecological values—addresses the first research question while revealing the multidimensional nature of traditional spatial knowledge systems. These findings extend beyond previous scholarship on *Serat Centhini*, which has predominantly focused on moral teachings (Naufal, 2020; Lestari, 2025), cultural symbolism (Dewi & Sugiarti, 2020), and gender discourse (Savitri et al., 2025), by establishing the text's substantial geographical and environmental educational value.

The study's findings regarding spatial representation and geographic orientation align with contemporary theoretical frameworks in geographical education. The National Research Council (2006) emphasizes that spatial thinking requires integration of spatial concepts, tools of representation, and processes of reasoning. The detailed spatial descriptions in *Serat Centhini*—incorporating cardinal directions, distance measurements, and landmark-based navigation—demonstrate that traditional Javanese communities possessed sophisticated spatial literacy that parallels modern geographical competencies. This resonates with Sinton's (2014) definition of spatial literacy as the competent and confident use of maps, mapping, and spatial thinking to address ideas and situations in daily life. The classroom implementation data, showing that 87.5% of students successfully identified cardinal directions through narrative-based mapping activities, supports Gersmehl and Gersmehl's (2007) findings that young children can develop spatial thinking through culturally meaningful contexts. This suggests that traditional narratives may serve as particularly effective vehicles for spatial concept acquisition because they embed abstract geographical ideas within concrete, culturally resonant stories that enhance memorability and personal relevance.

The findings concerning human-environment interactions and ecological awareness demonstrate alignment between traditional Javanese ecological knowledge and contemporary environmental education objectives. The text's representations of sustainable agricultural practices, cooperative resource management, and ecological balance exemplify what Cajete (2000) describes as indigenous science—holistic knowledge systems that emphasize reciprocal relationships between humans and nature. The classroom observation data, indicating that 81.3% of students successfully compared traditional and modern irrigation systems, suggests that culturally embedded ecological narratives can effectively bridge traditional and contemporary environmental knowledge. This finding supports Ardoin et al.'s (2018) meta-analysis demonstrating that environmental education programs incorporating place-based and culturally relevant content significantly enhance students' ecological literacy and pro-environmental behavior. Furthermore, the students' ability to articulate connections between traditional practices and current environmental challenges aligns with Sterling's (2010) conceptualization of transformative learning for sustainability, which emphasizes developing systemic thinking about human-environment relationships. The pedagogical effectiveness of these culturally embedded ecological narratives may stem from their capacity to present environmental concepts through familiar cultural frameworks, reducing cognitive load while enhancing emotional engagement and cultural identity affirmation.

The study's findings on cultural-geographical interconnections contribute to the place-based education literature by demonstrating how traditional texts can facilitate understanding of the reciprocal relationships between culture and space. Gruenewald (2003) argues that critical pedagogy of place must attend to both ecological and cultural dimensions, helping students understand how places are culturally produced while recognizing cultural practices as spatially situated. The finding that 84.4% of students articulated understanding of reciprocal culture-geography relationships following *Serat Centhini*-based instruction demonstrates the text's effectiveness in fostering this

integrated understanding. This aligns with Gay's (2018) culturally responsive teaching framework, which emphasizes the importance of connecting academic content to students' cultural knowledge and lived experiences. The spontaneous personal narratives shared by 59.4% of students during harvest ritual discussions exemplify what Ladson-Billings (2014) describes as cultural competence—the ability to recognize, honor, and incorporate students' home cultures into classroom learning. Moreover, this finding extends the work of Kana'iaupuni et al. (2010) on culture-based education by demonstrating that classical literary texts, not merely contemporary cultural resources, can serve as effective vehicles for culturally responsive geographical education. The pedagogical power of these cultural-geographical connections likely derives from their capacity to validate students' cultural identities while simultaneously developing academic competencies, creating what Paris (2012) terms culturally sustaining pedagogy.

The historical-temporal spatial awareness findings contribute to understanding how students develop chronological spatial reasoning. The comparative pedagogical approach—examining 19th-century spatial conditions described in *Serat Centhini* alongside contemporary landscapes—enabled 71.9% of students to recognize significant land-use changes over time. This resonates with Bednarz and Lee's (2011) identification of temporal analysis as a core component of spatial thinking, involving the ability to understand how spatial patterns change over time. The students' emerging questions about why and how places transformed, as documented in teacher interviews, demonstrate what Bednarz and Bednarz (2008) characterize as spatial reasoning—the capacity to analyze spatial relationships, patterns, and processes to generate and evaluate geographical explanations. This finding extends Sari and Sunarti's (2022) work on living history models by demonstrating that historical geographical narratives in classical texts can effectively scaffold students' understanding of temporal spatial dynamics. The effectiveness of this historical-comparative approach may stem from its activation of what cognitive psychologists term temporal schemas—mental frameworks for organizing information about change over time that facilitate deeper comprehension of dynamic spatial processes.

The moral-ecological values findings reveal important connections between character education and geographical literacy development. The finding that 90.6% of students expressed heightened environmental awareness following engagement with value-laden spatial narratives in *Serat Centhini* demonstrates the potential for integrated approaches that simultaneously address cognitive and affective learning objectives. This aligns with Kollmuss and Agyeman's (2002) model of pro-environmental behavior, which emphasizes that environmental action requires not only knowledge and awareness but also values and attitudes. The observable behavioral changes reported by teachers—increased participation in environmental programs and more thoughtful resource conservation practices—suggest that culturally embedded moral-ecological narratives may be particularly effective in fostering the values and dispositions necessary for environmental citizenship. This finding supports Otto and Pensini's (2017) research demonstrating that nature-based environmental education combining knowledge acquisition with values development more effectively promotes ecological behavior than knowledge-focused approaches alone. Furthermore, the integration of moral teachings within geographical content exemplifies what Hammond (2015) describes as culturally responsive teaching that engages both the cognitive and affective dimensions of learning. The pedagogical effectiveness of this integrated approach likely derives from the cultural authenticity and narrative power of *Serat Centhini*, which presents ecological values not as externally imposed moral prescriptions but as organic components of students' cultural heritage, thereby enhancing receptivity and internalization.

The successful implementation strategies identified in this study contribute practical insights to the pedagogy of culture-based geographical education. The spatial narrative approach, which utilized journey stories for teaching directional concepts and spatial relationships, demonstrates the effectiveness of what Uttal et al. (2013) identify as narrative-enhanced spatial learning—the use of stories to scaffold spatial concept acquisition. The local environmental analysis strategy, comparing

textual descriptions with students' immediate geographical context, exemplifies Sobel's (2004) principle that place-based education should begin with the near and familiar before expanding to the distant and abstract. The collaborative learning structures employed align with contemporary understanding of spatial learning as inherently social, consistent with research by Newcombe (2010) demonstrating that collaborative spatial reasoning tasks enhance individual spatial competency through peer scaffolding and distributed cognition. The reflective writing activities fostered what Scoffham (2013) terms geographical imagination—the capacity to envision alternative spatial arrangements and understand moral dimensions of spatial decisions. Collectively, these strategies operationalize Kemendikdasmen's (2023) principles for contextual learning in the Merdeka Belajar curriculum, demonstrating practical pathways for integrating local cultural resources into standards-based geographical education.

This study's findings have important theoretical and practical implications. Theoretically, the research expands understanding of traditional spatial literacy by demonstrating that pre-modern cultural texts contain sophisticated geographical knowledge systems that align with contemporary spatial thinking frameworks (National Research Council, 2006; Sinton, 2014). This challenges implicit assumptions that spatial literacy is primarily a product of modern cartographic and technological development, suggesting instead that spatial competency has deep historical and cultural roots. The study also contributes to place-based education theory by demonstrating that "place" in pedagogical contexts need not be limited to immediate physical environments but can be expanded to include cultural-historical places accessed through narrative texts. Practically, the findings provide evidence-based guidance for educators seeking to implement culturally responsive geographical education, particularly in contexts where students' cultural heritage includes rich literary traditions. The successful integration of Serat Centhini at Urangagung Elementary School demonstrates the feasibility and effectiveness of culture-based geographical literacy instruction in authentic classroom settings.

However, several limitations warrant consideration. First, the study was conducted in a single school within a culturally homogeneous Javanese community where Serat Centhini holds cultural relevance and resonance. Transferability to other cultural contexts or to more culturally diverse classroom settings requires further investigation. Second, the relatively short implementation period (two months) limits conclusions about long-term retention of geographical concepts and sustained behavioral changes. Longitudinal studies are needed to assess whether the observed enhancements in spatial thinking and ecological awareness persist over time. Third, while the study documented enhanced geographical understanding and ecological awareness, it did not employ standardized spatial thinking assessments that would enable precise quantitative comparisons with control groups or normative data. Future research should incorporate validated spatial thinking instruments to enable more rigorous evaluation of learning outcomes. Finally, the study focused on one classical text within one cultural tradition. Comparative research examining diverse cultural texts across multiple contexts would strengthen understanding of how and when traditional literary resources can effectively support geographical literacy development.

Despite these limitations, this research makes significant contributions by bridging scholarship on traditional cultural texts, geographical education, and place-based pedagogy. The findings demonstrate that Serat Centhini—and potentially other classical cultural texts—can serve as rich pedagogical resources that simultaneously advance geographical literacy, cultural preservation, and character development. This integrated approach aligns with UNESCO's (2024) vision of education as transformative processes that foster ecological, social, and cultural awareness while developing foundational competencies for 21st-century citizenship. As educational systems worldwide seek to balance global competencies with local cultural authenticity, this research offers evidence that traditional cultural resources, thoughtfully integrated into contemporary pedagogical practices, can support both objectives synergistically rather than creating tensions between them.

CONCLUSION

This study confirms that Serat Centhini possesses significant potential as a pedagogical resource for developing geographical literacy in elementary education through culturally embedded spatial knowledge. Thematic analysis identified five interconnected geographical literacy values: spatial representation and orientation, human-environment interactions, cultural-geographical interconnections, historical-temporal spatial awareness, and moral-ecological values. Implementation at Urangagung Elementary School demonstrated that students effectively integrated these values into their spatial thinking, with 87.5% successfully demonstrating directional orientation skills, 81.3% comparing traditional and modern ecological practices, and 90.6% expressing enhanced environmental awareness. These findings contribute theoretically by expanding understanding of traditional spatial literacy systems and demonstrating that pre-modern cultural texts contain sophisticated geographical knowledge aligned with contemporary frameworks. The research also advances place-based education theory by illustrating how cultural-historical places accessed through narrative texts can serve as effective pedagogical contexts.

Practically, this study provides evidence-based guidance for implementing culturally responsive geographical education, demonstrating that classical texts can simultaneously advance spatial competency, cultural preservation, and character development. The findings support UNESCO's vision of transformative education fostering ecological, social, and cultural awareness while developing 21st-century competencies. However, limitations include the single-site design within a culturally homogeneous context, relatively short implementation period, and absence of standardized spatial thinking assessments. Future research should employ longitudinal designs with validated instruments, examine diverse cultural texts across multiple contexts, investigate effectiveness in culturally heterogeneous classrooms, and develop structured teaching modules integrating geographical, cultural, and character literacy. Additionally, comparative studies exploring project-based and inquiry-based learning models using classical texts would further strengthen this emerging field of culture-based geographical education.

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