



Cultural and digital literacy in rural Indonesian elementary schools: a case study from Melawi

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Article info	Abstract
Keywords: cultural literacy; digital literacy; elementary school folklore; Indonesia.	The present study examines the implementation of cultural and digital literacy in elementary schools in Melawi Regency, Indonesia, a rural area rich in cultural traditions, yet constrained by limited digital infrastructure. This study addresses a gap in previous research, which has not explored the relationship between these two forms of literacy within rural school contexts. This research aims to analyze the implementation of cultural and digital literacy by examining teacher training, classroom practices, the availability of learning resources, and the integration of folklore into instruction. Using a qualitative case study design, data were collected from 22 schools through classroom observations and semi-structured interviews with 22 principals and 22 teachers. The data were analyzed using descriptive qualitative analysis supported by a coding process applied to interview transcripts and observation notes. The findings indicate that: (1) teacher training remains limited, with only 15 schools participating in short district-level workshops; (2) cultural literacy was present in a majority of schools, with folklore integrated into learning activities in 13 out of 22 schools, although the frequency of use varied; and (3) digital literacy has not yet developed due to unstable electricity, weak internet connectivity, and limited opportunities for student engagement. This study contributes to the literature by demonstrating how cultural literacy continues to develop despite digital constraints and filling a research gap concerning the integration of cultural and digital literacy in rural elementary schools.

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1. Introduction

Literacy is widely recognized as a multidimensional concept that extends beyond reading and writing. UNESCO (2013) identifies six domains: reading and writing, numeracy, scientific, financial, digital, and cultural or civic literacy that are essential for learners in the twenty-first century. This framing highlights the view that literacy is not limited to technical skills but encompasses broader social practices that enable participation in civic and digital life (Hanemann, 2015). Similarly, the OECD (2019) emphasizes that literacy requires integrating knowledge, skills, and values to prepare students for meaningful engagement in society. UNESCO (2021) further emphasizes that education systems must foster both cultural and digital competencies as part of a broader agenda for lifelong learning (De la Calle et al., 2021). Recent scholarship reinforces this imperative, demonstrating the potential of digital technologies to enhance student engagement and creativity, while also underscoring the persistent barriers that hinder their effective integration in schools (Haleem et al., 2022; Mădamürka et al., 2021; Zou et al., 2025).

Aligned with global developments in literacy, Indonesia has expanded its educational vision through the *Gerakan Literasi Nasional* (National Literacy Movement), which positions cultural literacy as a foundation for identity formation, character development, and civic responsibility, as also emphasized in culture-based literacy education research that highlights the strong relationship between literacy, character building, and national identity (Hamidah et al., 2025). Folklore, in particular, holds strategic value because it embodies local knowledge and moral wisdom that reinforce students' sense of belonging. In parallel, digital literacy has become a compulsory competency within the *Merdeka Belajar* curriculum, reflecting the growing expectation that learners engage effectively in technology-rich environments. Digital literacy, however, is understood not merely as the ability to operate digital devices but as a multidimensional competency encompassing critical, cognitive, social, emotional, operative, and projective skills required for effective, ethical, and responsible participation in digital environments. (Martínez-Bravo et al., 2022; Shofiyati et al., 2023). Scholars further argue that digital literacy extends beyond technical proficiency to include the ability to evaluate, interpret, and critically engage with information (Buckingham, 2007).

In the Indonesian context, despite its prominence in policy discourse and teacher education, research indicates that digital literacy training is often superficial, with pre-service teachers reducing it to operational skills and in-service programs focusing narrowly on device use (Nabhan, 2021; Nurhayati et al., 2024). Consequently, disparities in competence, limited device availability, and infrastructural constraints, particularly unstable electricity and weak internet connectivity, continue to impede meaningful implementation in many rural elementary schools. Only a small number of works examine their integration through digital folklore-based learning, leaving a clear empirical gap regarding how schools, especially in rural areas, can bridge cultural heritage with digital competencies.

Within this broader national landscape, Melawi Regency in West Kalimantan offers a particularly relevant context. The region is culturally rich, with diverse folklore traditions passed down across generations. Yet its elementary schools face persistent challenges, including limited teacher training, insufficient learning resources, and infrastructural weaknesses that hinder the development of both cultural and digital literacy. As a result, folklore remains predominantly delivered through oral and print media, while digital literacy practices are inconsistent and underdeveloped. These conditions illustrate both opportunity and constraint: the potential to strengthen cultural identity through locally grounded materials, and the difficulty of translating that potential into digital learning practices.

Accordingly, this study investigates the simultaneous implementation of cultural and digital literacy in elementary schools in Melawi by examining teacher training, classroom practices, resource availability, and the challenges of integrating folklore into both print- and digital-based learning. To direct the inquiry, the study is guided by the following research questions:

1. How do elementary school teachers in Melawi integrate cultural literacy and digital literacy into their classroom practices?
2. What training, resources, and facilities support the implementation of these two literacy domains?
3. What challenges hinder the integration of folklore into print-based and digital learning environments?

This study addresses the theoretical and empirical gap by offering a contextualized understanding of how cultural heritage and digital learning intersect in rural Indonesian education. Digital folklore-based learning thus represents a potential bridge between cultural and digital literacies, yet its implementation in rural Indonesian schools remains underexplored.

2. Literature review

Literacy, as framed by UNESCO, goes beyond basic reading and writing to encompass the ability to interpret, create, and navigate information in digital contexts. It is a socially and culturally embedded process essential for autonomy and lifelong learning, and scholars view it as a continuous, multidimensional practice that supports individual empowerment and societal development (Oswaldo & Rond, 2020). This understanding is relevant to rural Indonesian schools, including Melawi, where literacy practices are strongly shaped by local culture while digital exposure remains uneven. Therefore, examining cultural literacy, digital literacy, and their potential integration is essential to positioning this study within existing scholarly discourse.

2.1 Cultural literacy in education

Cultural literacy is a skill that influences habits, learning processes, attitudes, communication, and core values (Simamora et al., 2019). In the context of Indonesia, Johan et al. (2019) define cultural literacy as the ability to act and understand in accordance with Indonesian culture, reflecting the nation's identity. In education, cultural literacy is commonly implemented through folklore and other forms of local knowledge to support character development. Folklore plays a central role in transmitting moral values, ethics, and cultural identity, and its integration into classroom learning has been shown to strengthen students' cultural identity, literacy skills, and character formation (Ismaili & Neziri, 2024; Antika et al., 2024). School literacy practices that incorporate classroom-based reading resources foster students' reading habits and cultural exposure by embedding literacy activities into daily classroom routines (Zukhraeni et al., 2023).

However, most existing studies are descriptive and conducted in well-resourced schools. In contrast, rural schools in Melawi often rely solely on oral storytelling because written folklore materials are scarce. Consequently, while previous research has clarified why folklore is crucial, it offers limited insight into how cultural literacy is implemented in resource-constrained rural contexts. This gap underpins the present study.

2.2 Digital literacy in education

Digital literacy has become an essential competency in the era of the Fourth Industrial Revolution. Digital literacy refers to the capacity to understand, evaluate, and use information effectively in digital environments (Kaeophanuek et al., 2018). Expanding this perspective,

Murtadho et al. (2023) emphasize that digital literacy is not limited to technical skills, but also encompasses critical understanding, digital safety, and ethical engagement in online interactions. Furthermore, recent 21st-century competency frameworks highlight digital literacy as a multidimensional construct involving critical judgment, ethical engagement, online collaboration, and the capacity to navigate complex information ecosystems (Martínez-Bravo et al., 2022). Collectively, these views demonstrate the shift from a tool-based interpretation of digital literacy toward a broader, competence-oriented conceptualization that integrates cognitive, ethical, and socio-technical dimensions.

Despite its growing conceptual significance, empirical studies continue to reveal persistent inequalities in digital access and implementation. Hadiansah et al. (2021) report that limited device availability and unstable internet connectivity hinder the effective integration of digital learning in several Indonesian schools. Similarly, Liu et al. (2023) find that teachers in remote regions often possess only basic operational digital skills and lack adequate digital pedagogical strategies. These conditions closely mirror the situation in Melawi, where unreliable electricity, limited devices, and minimal training significantly limit digital adoption in elementary schools. Nevertheless, prior studies largely emphasize structural barriers while offering limited insight into adaptive strategies suitable for low-connectivity rural environments. This gap highlights a critical research opportunity to examine how digital literacy practices are enacted under infrastructure constraints, which constitutes the core focus of the present study.

2.3 Integrating cultural and digital literacies

The integration of cultural and digital literacies offers opportunities to preserve heritage while developing essential 21st-century skills. One promising method is digital storytelling, which combines cultural narratives with technology to support learning. Grant & Bolin (2016) stated that digital storytelling promoted cultural competency and student engagement, while Korosidou & Griva (2024) reported that it enhanced writing skills and intercultural awareness among elementary students.

Systematic reviews have reinforced these findings Wu & Chen (2020) that concluded that digital storytelling supports creativity, learning outcomes, and motivation across diverse educational contexts. Other applied studies highlight how digital preservation efforts sustain cultural continuity. Perera (2023) described heritage archiving projects in Sri Lanka, while Saad et al., (2024) argued that Malaysian indigenous folktales could be revitalized through online platforms and animation.

Collectively, these studies reveal that integrating digital tools into cultural education has significant potential to make learning both relevant and engaging. However, in Indonesia, research remains limited, with folklore in schools still mostly taught through oral or print methods. This indicates the need for locally adapted digital folklore initiatives that can bridge the gap between cultural preservation and digital literacy.

2.4 Synthesis and research gap

The literature indicates that both cultural literacy and digital literacy constitute essential dimensions of modern education. Folklore contributes to the development of cultural identity and moral understanding, whereas digital technologies enhance learner engagement and equip students for participation in increasingly digitized learning environments. Despite their importance, previous studies have commonly examined these literacies in isolation, yielding limited insight into how they intersect in classroom practice, particularly in rural Indonesian elementary schools. Although research has addressed folklore and digital technology separately,

only a small body of work investigates their integration in contexts where cultural resources are abundant but technological infrastructure remains weak.

To date, very few studies have explored the simultaneous implementation of cultural and digital literacy in rural Indonesian primary education, including efforts to digitize local folklore in Melawi. This study addresses this empirical gap by examining teacher practices, resource availability, and infrastructural barriers, thereby offering a nuanced understanding of how cultural and digital literacies emerge concurrently in low-resource settings.

3. Method

3.1 Research design

This study employed a qualitative case study design to explore how cultural and digital literacies were implemented in elementary schools in Melawi. The unit of analysis was the entire regency, while each of the 22 schools served as a sub-case unit, allowing cross-case comparison. The case study approach was selected because it enables in-depth exploration of real literacy practices in natural settings, including infrastructure limitations, teacher capacity, and resource availability.

3.2 Research site and participants

The research involved 22 elementary schools across 11 districts, selected purposively. Selection was based on two criteria: (1) schools with active literacy programs or provincial literacy exposure; (2) accessibility and feasibility of field visits.

Participants included 22 principals and 22 teachers, with balanced representation of gender, teaching experience, and educational background. Teacher experience ranged from 3 to 28 years, with most holding a bachelor's degree in education. Including diverse profiles allowed the study to capture varied literacy practices across rural school contexts.

3.3 Data collection

Data were obtained through classroom observations and semi-structured interviews conducted between July and September 2024. The observations examined five key dimensions: (1) the use of folklore within instructional activities; (2) the availability of cultural reading materials; (3) access to digital resources, including devices, electricity, and internet connectivity; (4) student engagement with cultural and digital content; and (5) teacher strategies and classroom routines. Observational evidence was documented through field notes, facility checklists, and photographs when permitted. Illustrative indicators included whether teachers integrated local folklore into reading activities, whether students used devices independently, and whether digital materials were present during lessons.

The semi-structured interviews explored teachers' experiences, professional training histories, perceptions of literacy implementation, challenges encountered, and school-level literacy policies. Sample guiding questions included 'How often do you use folklore in classroom instruction, and in what form?', 'What digital media or devices are available in your school?', and 'What challenges do you face when implementing digital forms of literacy?'. Each interview lasted approximately 30–45 minutes and was audio-recorded with informed consent. All recordings were transcribed verbatim in Bahasa Indonesia prior to coding.

3.4 Data analysis

The data were analyzed using a descriptive qualitative approach, with systematic coding applied to interview transcripts and observation notes. The analysis followed three stages. First, initial coding was conducted by repeatedly reading the data and manually highlighting keywords and meaningful segments related to teacher training, the use of folklore, resource availability, and infrastructural constraints. Second, the codes were organized into broader categories, including teacher capacity, access to resources, classroom use of folklore, and technology limitations. Finally, these categories were refined into overarching themes—including limited professional training, folklore-based literacy practices, digital scarcity, and infrastructure barriers.

In addition to qualitative coding, descriptive frequency counts were used to summarize observation sheets and checklist data. These frequency counts were employed solely to support qualitative interpretations and to provide a clearer overview of patterns across schools, without constituting a mixed-method research design.

Throughout this process, an audit-tracked matrix table was used to compare patterns across schools. Themes were revised iteratively until analytical saturation was reached, allowing the findings to be presented descriptively and supported by tables and illustrative quotations.

3.5 Trustworthiness

Credibility was strengthened through multiple strategies. Triangulation was carried out by cross-checking observations, interviews, school documents, and infrastructure records. Member checking was conducted by inviting teachers to review and validate interview summaries and preliminary interpretations. An audit trail was maintained by systematically archiving field memos, raw transcripts, and coding logs, enabling analytic decisions to be traced. Peer debriefing was used to enhance analytic rigor, with coding patterns discussed and verified among members of the research team.

Transferability was supported by providing detailed descriptions of school settings and contextual conditions, enabling readers to assess the applicability of the findings to other rural educational environments.

4. Results

Data from observations and interviews across 22 elementary schools in 11 districts revealed four key themes: (1) training on cultural and digital literacies, (2) use of folklore in learning, (3) materials, facilities, and infrastructure, and (4) digital literacy practice, each showing clear variation in implementation and conditions between schools.

4.1 Training on cultural and digital literacies

Participation in training programs related to cultural literacy and digital literacy is presented in Table 1.

Table 1. Participation in cultural and digital literacies training (n=22)

Training Types	Participation Status	Number of Schools (n)	Percentage (%)
Cultural Literacy Training	Yes	15	68%
	No	7	32%
Digital Literacy Training	Yes	18	82%
	No	4	18%

As shown in Table 1, a higher proportion of schools reports participation in digital literacy training (82%) compared to cultural literacy training (68%). Despite this relatively high participation rate, training activities are generally infrequent. Most schools report attending only one or two training sessions, with only a small number of schools participating in more than two activities.

Interview findings further reveal disparities in access to and continuity of training across schools. Most training activities took the form of short workshops conducted approximately once a year and were rarely followed by sustained support or mentoring. Teachers who participated in these programs reported gaining initial exposure to relevant skills, such as creating simple learning materials, integrating cultural content into lessons, and introducing local heritage within the *Merdeka Belajar* framework. However, they also emphasized that the limited frequency and depth of training constrained its impact on classroom practice.

One teacher noted:

“We had training on cultural literacy once last year, but there was no follow-up and mentoring after the activity.” (Teacher, School 21).

Similarly, cultural literacy training was reported to be less frequently offered and often displaced by programs focusing on technical digital skills:

“Cultural literacy training is rarely offered; most programs focus more on digital skills.” (Principal, School 14).

A comparable pattern was observed in digital literacy training. While some schools organized one or two sessions, primarily focused on basic device operation, others reported having no training at all. Teachers indicated that the lack of regular, practice-oriented training limited their capacity to meaningfully integrate cultural and digital literacies into daily classroom instruction.

4.2 Use of folklore in learning

The frequency of folklore use in classroom learning is summarized in Table 2.

Table 2. Frequency of folklore use in classroom learning (n = 22)

Frequency Categories	Number of Schools (n)	Percentage (%)
Never	9	41%
Rarely	6	27%
Occasionally	5	23%
Frequently	2	9%
Total	22	100%

As shown in Table 2, 13 schools (59%) indicate using folklore in learning activities, while 41% imply they never used folklore in classroom instruction. Among the schools that incorporated folklore, its use is generally infrequent, with most schools reporting rare or occasional implementation. Only 2 schools (9%) are reported as having frequent integration of folklore into learning activities.

Interview data indicate that folklore was most commonly integrated into Indonesian language lessons, although in some schools it was also linked to civic education and art subjects. Teachers explained that local folktales—such as *Batu Menangis*, *Putri Bunga Melor*, and *Bepalu Badak*—were perceived as effective for developing students’ literacy skills while simultaneously conveying moral values. However, folklore use was typically limited to specific themes or subjects rather than being systematically embedded in daily learning.

“I like to tell students about local folktales. This activity can improve students' understanding of various local cultures in their area. Stories that are often told include *Dara Muning*, *Apay Alay*, *Kumang Keeling*, and *Temawang Baring Batang*.” (Teacher, School 15).

The level of implementation varied across schools, ranging from short daily storytelling activities to sessions conducted once a week or once a month. On average, most schools implemented cultural literacy activities approximately twice a week. Access to instructional materials also varied considerably. Only five schools reported having printed folklore collections, while others relied on oral storytelling or teacher-prepared worksheets. Several teachers improvised by using available materials, such as recycled calendars, to help students sketch local Dayak motifs.

Overall, these findings highlight variations among schools in both access to folklore resources and instructional practices, which influence the frequency and depth of folklore integration in classroom learning.

4.3 Materials, facilities, and infrastructure

The availability of materials, facilities, and infrastructure was examined across 22 elementary schools to describe schools' readiness to support digital and cultural literacy practices. Table 3 summarizes the availability of laptops/computers, projectors, stable internet connectivity, and adequate electricity.

Table 3. Availability of materials, facilities, and infrastructure (n = 22)

Indicators	Available (n)	Available (%)	Not Available (n)	Not Available (%)
Laptop/Computer	21	95.5%	1	4.5%
Projector	14	63.6%	8	36.4%
Stable Internet connectivity	3	13.6%	19	86.4%
Adequate Electricity Supply	15	68.2%	7	31.8%

As shown in Table 3, almost all schools (21; 95.5%) have access to laptops or computers, indicating that basic digital devices are generally available. However, access to supporting facilities is less consistent. Only 14 schools (63.6%) have projectors, while 8 schools (36.4%) do not.

More pronounced disparities are observed in supporting infrastructure, particularly internet connectivity and electricity. Only 3 schools (13.6%) have stable internet connectivity, whereas the majority (19 schools; 86.4%) have weak or unavailable internet connectivity. Regarding electricity, 15 schools (68.2%) have an adequate supply, while 7 (31.8%) experience insufficient or unstable electricity.

School-level data further reveal variation in the combination of available facilities. Only three schools have complete access to all four indicators—laptops/computers, projectors, stable internet connectivity, and adequate electricity. In contrast, one school has none of the listed facilities, while several others have partial availability, such as having laptops without stable electricity or internet connectivity.

In addition to digital infrastructure, the availability of culturally themed reading materials and facilities to support literacy activities was uneven across the schools studied. Only five schools have culturally themed reading resources, including local folktales and texts on local wisdom such as *The Origin of Batu Raong* and *Dayang Agih*. In most schools, such materials were either

unavailable or limited to teacher-prepared notes. Facilities to support literacy activities also varied, with only seven schools reporting resources such as reading corners, limited digital devices, projectors, or internet connectivity. In several classrooms, teachers displayed cultural images, traditional clothing, or local food as part of efforts to support cultural literacy.

Interview data corroborate these quantitative findings and illustrate how infrastructural conditions differed across schools:

“Electricity is available, but sometimes it goes out during lessons.” (Teacher, School 10)

“The internet connection exists, but the signal is weak and inconsistent.” (Principal, School 21)

“The resources to support cultural literacy are inadequate; we only use makeshift books.” (Teacher, School 21)

Overall, the results indicate that while basic digital devices were largely available, access to reliable supporting infrastructure and culturally relevant learning materials remained limited and uneven across schools, affecting the sustainability of literacy activities and the integration of cultural elements into learning.

4.4 Digital literacy practice

The level of digital literacy practice and the use of digital folklore were examined across 22 elementary schools. Table 4 summarizes the distribution of digital literacy practice levels and the use of digital folklore in learning activities.

Table 4. Levels of digital literacy practice and use of digital folklore (n = 22)

Indicator	Category	n	%
Level of Digital Literacy Practice	No Practice (Level 1)	9	40.9%
	Low (Level 2)	4	18.2%
	Moderate (Level 3)	2	9.1%
	High (Level 4)	7	31.8%
Use of Digital Folklore in Learning	Yes	2	9.1%
	No	20	90.9%

As shown in Table 4, the largest proportion of schools (9; 40.9%) reveal no digital literacy practices (Level 1). These schools indicate minimal or no use of digital tools in instructional activities. A further 4 schools (18.2%) have low levels of digital literacy practice (Level 2), characterized by limited and occasional use of digital media.

Only 2 schools (9.1%) practice moderate digital literacy (Level 3), while 7 schools (31.8%) practice high digital literacy (Level 4). Schools in the high category generally used digital tools more frequently for instruction.

Despite moderate to high levels of digital literacy in several schools, the integration of cultural content into digital formats remains limited. Only 2 schools (9.1%) use digital folklore in learning activities, while the vast majority (20 schools; 90.9%) do not.

School-level data further indicate that high levels of digital literacy practice did not necessarily coincide with the use of digital folklore. Several schools classified as having high digital literacy practices did not report integrating local folklore into digital learning materials. Conversely, digital folklore use was reported by only two schools, indicating limited adoption of culturally based digital content across the sample.

Overall, the results imply considerable variation in digital literacy practice across schools, with most schools concentrated at the lower levels and very limited use of digital folklore in instructional activities.

5. Discussion

This study examined the implementation of cultural and digital literacies in rural elementary schools in Melawi Regency through four interrelated themes: teacher training, the use of folklore, infrastructural conditions, and digital literacy practices. The findings highlight a central paradox in rural education: the presence of rich local cultural resources alongside limited digital capacity and uneven technological use. This section discusses the findings thematically, emphasizing their contribution to existing literature and their implications for literacy development in rural Indonesian contexts.

5.1 Limited teacher training

The findings indicate that teacher training related to cultural and digital literacies remains limited in scope, frequency, and continuity. Training activities were generally short-term and rarely followed by sustained mentoring, resulting in uneven classroom implementation. This finding aligns with previous studies reporting that professional development in rural areas often prioritizes technical skills over pedagogical integration (Nabhan, 2021; Simamora et al., 2019). It also aligns with Liu et al. (2023), who found that rural teachers in China equated digital literacy with basic device use, reflecting a lack of sustained training. However, this study extends prior research by demonstrating that limited training constrains not only digital literacy practices but also the integration of cultural content into digital and instructional formats. These findings underscore the need for continuous, context-sensitive professional development tailored to rural school conditions.

5.2 Folklore as cultural capital

Despite limited teacher training and uneven infrastructure, folklore remains an accessible cultural resource for literacy development in rural schools in Melawi. The findings indicate that folklore was utilized in a majority of schools, 13 schools in total, particularly in Indonesian language lessons, where teachers perceived local stories as effective for developing literacy skills and conveying moral values. This finding aligns with previous studies emphasizing folklore's role in strengthening cultural identity and character education (Antika et al., 2024; Johan et al., 2019). Teachers in Melawi used stories such as *Batu Menangis* and *Putri Bunga Melor* to teach both language and moral lessons, which is consistent with international findings that folklore can strengthen identity and comprehension (Ismaili & Neziri, 2024).

However, consistent with the structural limitations discussed earlier, folklore integration remained largely episodic and theme-based, rather than systematically embedded across subjects. Limited access to printed folklore collections and culturally relevant teaching materials compelled many teachers to rely on oral storytelling or improvised resources. This pattern supports the observations of Muda et al. (2024), who noted that folklore-based instruction is highly dependent on the availability of materials. Importantly, this study contributes to the literature by demonstrating that cultural literacy can persist in rural classrooms despite material and infrastructural constraints, yet its sustainability and potential integration with digital literacy depend on stronger institutional support and systematic resource provision.

5.3 Digital infrastructure gaps

The implementation of digital literacy was found to be particularly constrained in the schools. Although most schools possessed basic digital devices such as laptops and projectors, their instructional use was severely limited by unstable electricity and poor internet connectivity. This finding corroborates previous studies documenting persistent digital divides between urban and

rural schools in Indonesia (Hadiansah et al., 2021; Nurhayati et al., 2024) and reflects global patterns in which rural schools continue to lag behind in technological infrastructure (Mustafa et al. (2024). Importantly, this study demonstrates that device availability alone does not ensure meaningful implementation of digital literacy. Instead, digital literacy practices are shaped by structural factors, including infrastructure reliability, teacher readiness, and institutional support. Addressing these systemic constraints is therefore essential for equitable digital literacy development in rural settings.

5.4 The paradox of cultural richness and digital scarcity

A key conceptual contribution of this study is the identification of a paradox in rural education: cultural richness coexists with digital scarcity. Despite the abundance of local folklore, the integration of cultural content into digital learning remained minimal. This finding challenges assumptions that increased digital literacy automatically leads to culturally responsive digital practices (Grant & Bolin, 2016; Perera, 2023; Wu & Chen, 2020). Instead, the findings indicate that cultural and digital literacy may develop in parallel without intentional strategies to bridge them. The study thus highlights the need for deliberate approaches that integrate local culture into digital learning, particularly in low-resource rural contexts. Conceptually, this study contributes by framing the coexistence of strong cultural literacy and weak digital capacity as a structural paradox in rural education.

6. Conclusion and implications

6.1 Conclusion

This study examined the implementation of cultural and digital literacies in rural elementary schools in Melawi Regency by addressing three central issues: literacy practices in schools, the adequacy of training and resources, and the challenges of integrating cultural content into digital learning.

The findings reveal that cultural literacy is practiced primarily through the use of local folklore in classroom activities, while digital literacy practices remain limited and uneven across schools. Literacy implementation is generally episodic and largely depends on individual teacher initiative rather than being embedded in systematic instructional programs.

The study further demonstrates that teacher training related to cultural and digital literacies is limited in frequency, continuity, and pedagogical depth. In addition, the scarcity of culturally relevant teaching materials and uneven access to supporting infrastructure constrain teachers' capacity to implement both forms of literacy in a sustained and meaningful way.

Finally, the findings indicate that integrating cultural and digital literacies faces significant structural challenges. Although most schools possess basic digital devices, unstable electricity and limited internet connectivity substantially restrict digital literacy activities and hinder the digital transformation of local folklore in learning.

All in all, these findings reveal a central paradox in rural education: rich cultural resources coexist with limited digital capacity and structural support. This paradox underscores that effective integration of cultural and digital literacies in rural elementary schools requires coordinated support for teacher development, culturally relevant resources, and reliable digital infrastructure, rather than relying solely on teacher initiative or device availability.

6.2 Limitations

This study is limited by its reliance on teacher and principal perspectives, the absence of student and parental viewpoints, its focus on a single rural regency, and the lack of systematic analysis of curriculum documents. These limitations suggest caution in generalizing the findings and highlight the need for future research that incorporates broader perspectives and contexts.

6.3 Implications

Based on the findings, this study offers several implications organized into practical, policy, and research dimensions.

Practical Implications for Schools and Teachers

Schools need structured and sustained professional development programs that integrate cultural and digital literacies. Training models should move beyond one-off workshops toward continuous, practice-oriented programs, such as mentoring-based training, lesson study, or school-based professional learning communities. For example, teachers could be trained to develop simple digital storytelling projects using local folklore, adapted to low-bandwidth or offline conditions. Schools are also encouraged to collaborate with local cultural figures and communities to document and contextualize folklore as learning resources.

Policy Implications for Local and National Governments

At the policy level, local governments should prioritize equitable infrastructure development, particularly stable electricity and internet connectivity for rural schools, as a prerequisite for digital literacy initiatives. Education authorities may also support the development of regional digital folklore repositories that contain curated local stories in printable, offline-accessible formats. Additionally, policies on teacher professional development should explicitly include integrating local culture into digital and literacy curricula, supported by targeted funding and cross-sector collaboration among education, culture, and communication agencies.

Implications for Theory and Future Research

Theoretically, this study contributes to the growing literature on literacy integration by highlighting the paradox of cultural richness and digital scarcity in rural contexts. Future research should explore how this paradox can be addressed through culturally responsive digital pedagogy. Further studies are encouraged to include student perspectives, analyze curriculum and instructional documents, and examine longitudinal impacts of integrated literacy interventions. Comparative studies across rural regions may also deepen understanding of how structural, cultural, and policy factors shape literacy practices in diverse contexts.

Credit authorship contribution statement

Mastiah: Conceptualization, Methodology, Data curation, Formal analysis, Investigation, Writing – original draft, Writing – review & editing. **Mardiana:** Validation, Investigation, Writing – review & editing. **Rokiah Pae:** Formal analysis, Writing – review & editing. **Tri Marhaeni Pudji Astuti:** Writing – review & editing. **Muhammad Akip:** Resources, Project administration, Data curation.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. Due to the inclusion of information related to human participants, the data are not publicly available in order to protect participant privacy.

Ethical Declaration

Participation in the study was voluntary, and all participants were informed of the purpose of the research. Anonymity and confidentiality were maintained throughout data collection and reporting. The study involved educational product development and classroom observation without the collection of sensitive personal data, in accordance with standard ethical practices in educational research (Creswell & Poth, 2018).

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Declaration of AI statement

Portions of this manuscript were edited and enhanced using ChatGPT (OpenAI) and DeepL Translator to improve language clarity, academic style, and translation accuracy. All content generated or assisted by these AI tools was carefully reviewed, revised, and validated by the authors. The authors take full responsibility for the integrity, accuracy, and originality of the final manuscript.

References

- Antika, R., Asfina, R., Sukma, D., & Nurmayasari, D. (2024). Foklore: Enhancing Character Education in EFL Classroom. *Issues in Applied Linguistics & Language Teaching*, 6(1), 179–186. <https://doi.org/10.37253/iallteach.v6i1.9314>
- Buckingham, D. (2007). Digital Media Literacies: rethinking. *Research in Comparative and International Education*, 2(1), 43–55. <https://doi.org/https://doi.org/10.2304/rcie.2007.2.1.43>
- De la Calle, A. M., Pacheco-Costa, A., Gómez-Ruiz, M. Á., & Guzmán-Simón, F. (2021). Understanding Teacher Digital Competence in the Framework of Social Sustainability: A Systematic Review. *Sustainability*, 13(13283), 1–17. <https://doi.org/https://doi.org/10.3390/su132313283>
- Grant, N. S., & Bolin, B. L. (2016). Digital Storytelling: A method for engaging students and increasing cultural competency. *The Journal of Effective Teaching*, 16(3), 44–61.
- Hadiansah, D., Setiawardani, W., & Shoteh, M. (2021). Digital Literation Proficiency of Elementary School Students in the Era of the Industrial Revolution 4.0. *PrimaryEdu - Journal of Primary Education*, 5(1), 80. <https://doi.org/10.22460/pej.v5i1.2034>
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Understanding the role of digital technologies in education: A review. *Sustainable Operations and Computers*, 3(February), 275–285. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Hamidah, J., Jumadi, J., Rafiek, M., Mu'in, F., Noortyani, R., Amelia, R., & Rahmawati, L. E. (2025). Innovations to Strengthen National Identity in Indonesia: Promoting Literacy Acquisition through Culture-Based Education. *Journal of the International Society for the Study of Vernacular Settlements*, 12(4), 158–172. <https://doi.org/https://doi.org/10.61275/ISVSej-2025-12-04-08>
- Hanemann, U. (2015). Lifelong literacy: Some trends and issues in conceptualising and operationalising literacy from a lifelong learning perspective. *International Review of Education*, 61(3), 295–326. <https://doi.org/10.1007/s11159-015-9490-0>

- Ismaili, N., & Neziri, M. (2024). Folklore In Elementary School Textbooks. *International Journal of Religion*, 3538(10), 4405–4414. <https://doi.org/https://doi.org/10.61707/g2zqt557>
- Johan, R. C., Rullyana, G., Ardiansah, Hanoum, N., Fathoni, T., & Wulandari, Y. (2019). Cultural Literacy: Getting to Know Digital-Based Folklore. *2019 5th International Conference on Education and Technology, ICET 2019*, 66–71. <https://doi.org/10.1109/ICET48172.2019.8987204>
- Kaeophanuek, S., Na-songkhla, J., & Nilsook, P. (2018). How to Enhance Digital Literacy Skills among Information Sciences Students. *International Journal of Information and Education Technology*, 8(4), 292–297. <https://doi.org/10.18178/ijiet.2018.8.4.1050>
- Korosidou, E., & Griva, E. (2024). Fostering Students' L2 Writing Skills and Intercultural Awareness Through Digital Storytelling In Elementary Education. *International Electronic Journal of Elementary Education*, 16(5), 585–597. <https://doi.org/10.26822/iejee.2024.355>
- Liu, D., Yu, X., & Li, D. (2023). Digital Literacy of Rural Preschool Teachers: Research on Connotation, Value and Path. *The Educational Review, USA*, 7(10), 1471–1475. <https://doi.org/10.26855/er.2023.10.001>
- Mädämürka, K., Tuominenc, H., Hietajärvia, L., & Aroa, K. S. (2021). Adolescent students' digital engagement and achievement goal orientation profiles. *Computers & Education*, 161. <https://doi.org/https://doi.org/10.1016/j.compedu.2020.104058>
- Martínez-Bravo, M. C., Chalezquer, C. S., & Serrano-Puche, J. (2022). Dimensions of Digital Literacy in the 21st Century Competency Frameworks. *Sustainability*, 14(1867), 1–13. <https://doi.org/10.3390/su14031867>
- Muda, T. Z. T., Hamzah, H. I., & Saad, M. N. (2024). Exploring the Evolution of Malaysian Folklore in Education and Technology: A Perspective through Digital Audiobooks. *International Journal of Advanced Research in Education and Society*, 6(1), 718–729. <https://doi.org/10.55057/ijares.2024.6.1.65>
- Murtadho, M. I., Rohmah, R. Y., Jamilah, Z., & Furqon, M. (2023). The Role Of Digital Literacy In Improving Students' Competence In Digital Era. *AL-WIJDÂN Journal of Islamic Education Studies*, 8(2), 253–260. <https://doi.org/10.58788/alwijdn.v8i2.2328>
- Mustafa, F., Nguyen, H. T. M., & Gao, X. (Andy). (2024). The challenges and solutions of technology integration in rural schools: A systematic literature review. *International Journal of Educational Research*, 126((2024) 102380), 1–14. <https://doi.org/10.1016/j.ijer.2024.102380>
- Nabhan, S. (2021). Pre- service teachers ' conceptions and competences on digital literacy in an EFL academic writing setting. *Indonesian Journal of Applied Linguistics*, 11(1), 187–199. <https://doi.org/https://doi.org/10.17509/ijal.v11i1.34628>
- Nurhayati, S., Fitri, A., Amir, R., & Zalisman, Z. (2024). Analysis of the Implementation of Training on Digital-based Learning Media to Enhance Teachers' Digital Literacy. *AL-ISHLAH: Jurnal Pendidikan*, 16(1), 545–557. <https://doi.org/10.35445/alishlah.v16i1.4029>
- Oswaldo, J., & Rond, V. (2020). La Alfabetización . Una competencia educativa para el mundo globalizado. *Cuestiones Pedagógicas*, 2(29), 145–155. <https://doi.org/https://doi.org/10.12795/CP.2020.i29.v2.11>
- Perera, K. (2023). Heritage at risk: Digital preservation of traditional cultural heritage (tch) in sri lanka. *International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences - ISPRS Archives*, 48(M-2-2023), 1197–1207. <https://doi.org/10.5194/isprs-Archives-XLVIII-M-2-2023-1197-2023>
- Saad, S., Wediyantoro, P. L., & Zolkifli, A. N. F. (2024). Cultural Preservation in the Digital Age: The Future of Indigenous Folktales and Legends. *International Journal of Research and Innovation in Social Science (IJRISS)*, VIII(IX), 2835–2847. <https://doi.org/10.47772/IJRISS>

-
- Shofiyati, H., Vebrianto, R., & Amini, M. (2023). The Influence of PJBL-based Student Worksheets on Improving Their Critical Thinking Ability and Digital Literacy Pengaruh Lembar Kerja Siswa Berbasis PJBL Tentang Peningkatan Kemampuan Berpikir Kritis Dan Lit. *PRIMARY: JURNAL PENDIDIKAN GURU SEKOLAH DASAR*, 12(6), 1478–1492. <https://doi.org/10.33578/jpfkip.v12i6.10267>
- Simamora, J. G., Iskandar, I., & Sulistyningrum, S. D. (2019). Cultural Literacy in Lesson Plan of Primary School. *Ijlecr - International Journal of Language Education and Culture Review*, 4(2), 122–131. <https://doi.org/10.21009/ijlecr.042.14>
- UNESCO. (2013). Adult and Youth Literacy: National, regional and global trends, 1985-2015. UIS Information paper. In *UNESCO Institute for Statistics* (Issue June 2013). <https://doi.org/10.15220/978-92-9189-133-7-en>
- Wu, J., & Chen, D. T. V. (2020). A systematic review of educational digital storytelling. *Computers and Education*, 147(103786), 1–31. <https://doi.org/10.1016/j.compedu.2019.103786>
- Zou, Y., Kuek, F., Feng, W., & Cheng, X. (2025). Digital learning in the 21st century: trends, challenges, and innovations in technology integration. *Frontiers in Education*, 10(1562391), 1–11. <https://doi.org/10.3389/educ.2025.1562391>
- Zukhraeni, Z., Akib, E., & Munirah, M. (2023). School Literacy Program Through The Classroom Reading Corner at Inpres Tombolo Elementary School in Tombolopao Gowa. *Jurnal PAJAR (Pendidikan Dan Pengajaran)*, 7(1), 20–28. <https://doi.org/http://dx.doi.org/10.33578/pjr.v7i1.8677>