

# Enhancing Cultural Literacy Through the Digitalization of Dayak Deah Culture in Social Studies Learning at SMPN 2 Upau

Dewicca Fatma Nadilla<sup>1, a)</sup>, Bambang Subiyakto<sup>2, b)</sup>, Deasy Arisanty<sup>2, c)</sup>, and  
Syaharuddin<sup>2, d)</sup>

<sup>1</sup> Department of History Education, Faculty of Teacher Training and Education, Universitas Lambung Mangkurat,  
Banjarmasin, South Kalimantan, Indonesia

<sup>2</sup> Department of Social Studies Education, Faculty of Teacher Training and Education, Universitas Lambung  
Mangkurat, Banjarmasin, South Kalimantan, Indonesia

<sup>a)</sup>Corresponding author: dewicca.nadilla@ulm.ac.id

<sup>b)</sup>bambangsb@ulm.ac.id

<sup>c)</sup>deasy.arisanty@ulm.ac.id

<sup>d)</sup>syahar@ulm.ac.id

**Abstract.** This study examines the effectiveness of a digital storybook rooted in the Tawas Jaa tradition of the Dayak Deah community in enhancing students' cultural literacy and learning outcomes in Social Studies. A quasi-experimental design with a pre-test-post-test control group was employed, involving seventh-grade students at SMPN 2 Upau. The experimental group engaged with the culturally contextualized digital storybook, while the control group received conventional instruction. Data were collected through a cultural literacy test and student response questionnaires, and analyzed using descriptive statistics, normality and homogeneity testing, and paired sample t-tests. The findings indicate that students responded positively to the digital storybook, with ratings above 80% in usability, motivation, and contextual relevance. Statistical analysis further revealed significant improvements in both groups ( $p < 0.05$ ). However, the experimental group achieved a higher mean gain (-7.148) than the control group (-5.480), confirming the greater effectiveness of the intervention. These results suggest that embedding local culture into digital learning media not only strengthens cognitive outcomes but also promotes cultural awareness, identity formation, and student motivation. Overall, the study underscores the dual role of culturally embedded digital storybooks as both innovative instructional tools and vehicles for cultural preservation, providing a practical model for contextualized and inclusive education in multicultural settings.

**Keywords:** cultural literacy; Dayak Deah; digital storybook; Tawas Jaa

## INTRODUCTION

Education in the 21st century is not limited to the mastery of cognitive knowledge but also requires the strengthening of cultural literacy as an essential competence for students (Marmoah & Poerwanti, 2022). Cultural literacy enables learners to recognize, appreciate, and preserve their cultural heritage while simultaneously fostering

tolerance and intercultural understanding in diverse societies (Ummah et al., 2024). In Indonesia, cultural literacy has particular significance due to the nation's multicultural context, where local wisdom and traditional values are considered integral components of character education (Helda & Rose, 2025). Thus, the integration of culture into educational content not only reinforces identity formation but also contributes to the development of critical thinking and social cohesion (Kharismawati, 2024).

The rapid advancement of digital technology has created new opportunities to preserve and transmit cultural heritage through innovative approaches. Digital media provides flexible, interactive, and engaging platforms that accommodate different learning styles while introducing students to local cultural values (Del Vecchio et al., 2025; Pouloupoulos & Wallace, 2022). Recent studies have shown that digital learning media significantly enhance students' motivation, engagement, and achievement, particularly when contextualized with local content (Lubis, 2023). In this regard, the use of digital technology to preserve and disseminate local traditions, such as the Dayak Deah culture in South Kalimantan, is highly relevant both as an instructional resource and as a means of safeguarding intangible cultural heritage.

Despite the acknowledged importance of cultural literacy, classroom practices in many Indonesian schools remain heavily dependent on conventional teaching materials that often overlook local cultural contexts (Nadilla et al., 2024; Syaharuddin et al., 2025). As a result, students may have limited awareness of their cultural environment and fail to fully appreciate the richness of their heritage (Awe et al., 2024). Addressing this issue requires the integration of local cultural content into digital learning media, which can serve as an effective bridge between modern educational practices and the preservation of traditional culture.

Several studies have highlighted the potential of digital culture-based learning to increase student engagement and strengthen literacy outcomes. For example, Rahmawati et al. (2025) demonstrated that digital storytelling rooted in local traditions significantly enhanced students' cultural understanding and awareness. It was found that the use of digital storytelling in elementary schools represented an innovative approach that successfully integrated technology with socio-cultural values. These findings indicate that the digitization of cultural content offers an effective pedagogical strategy for advancing cultural literacy in formal education (Rahmawati et al., 2025; Wirda, 2025).

The literature reviewed above supports the argument that integrating local culture into digital media makes learning more authentic and relevant to students' everyday lives. This approach encourages learners to perceive culture not as a static tradition but as a dynamic entity that can adapt to modern contexts while retaining its core value (Loan et al., 2025).

Nevertheless, despite growing evidence of the effectiveness of cultural digitization in education, a lack of empirical studies remains, focusing on less-documented local traditions in Indonesia, particularly the Dayak Deah culture in South Kalimantan. Most existing research has concentrated on larger or more widely recognized ethnic groups, leaving smaller indigenous communities underrepresented in educational innovations. Such limited representation risks marginalizing local traditions and undermining efforts to promote inclusive cultural literacy among students.

In response to these gaps, the present study aims to empirically investigate how a digital storybook grounded in the Tawas Jaa tradition of the Dayak Deah community can enhance both students' cultural literacy and their learning outcomes in Social Studies at SMPN 2 Upau. The novelty of this study lies in its focus on a less-documented indigenous culture and in its dual function: using digital storytelling as both an instructional innovation and a tool for cultural preservation. By employing a quasi-experimental design, the study seeks to provide empirical evidence on the effectiveness of culturally embedded digital media in improving students' understanding, motivation, and identity formation within a multicultural educational context.

## METHOD

This study employed a quasi-experimental design with a pre-test–post-test control group to examine the effect of a digital storybook based on the Tawas Jaa tradition of the Dayak Deah community on students' cultural literacy. A true experimental design was not feasible due to school policies that required fixed class groupings, preventing random assignment of students. Therefore, a quasi-experimental approach was chosen as the most appropriate and ecologically valid method for comparing intact classroom groups (Osmanović & Maksimović, 2022).

The participants consisted of 52 seventh-grade students from SMPN 2 Upau, divided into an experimental group of 27 students and a control group of 25 students. They were selected through purposive sampling, considering the school's class structure and access to digital learning facilities to ensure comparable learning conditions.

Two instruments were used. The Cultural Literacy Questionnaire assessed students' literacy levels through 16 items, covering four dimensions: cultural knowledge, appreciation of diversity, interpretation of values, and application of understanding. Each item used a five-point Likert scale (1–5). Expert validation by three specialists yielded Aiken's  $V = 0.83$ – $0.92$ , indicating strong reliability (Cronbach's  $\alpha = 0.87$ ).

To assess the implementation of the digital storybook, a Student Response Questionnaire containing 10 items was used to evaluate ease of use, motivation, and perceived usefulness. This instrument also achieved good validity and reliability (Cronbach's  $\alpha = 0.85$ ), providing insight into students' engagement with the digital media.

The research comprised three stages: (1) a pre-test to assess baseline literacy, (2) instructional treatment using the digital storybook for the experimental group and conventional materials for the control group, and (3) a post-test followed by the student response questionnaire.

Data were analyzed using descriptive statistics and an independent samples t-test with a significance level of  $p < 0.05$ . This ensured the results were statistically valid and educationally meaningful, while acknowledging the inherent limitation of non-randomized class assignments.

## RESULT AND DISCUSSION

### Students' Responses to the Use of Digital Storybook Based on the Tawas Jaa Dayak Deah Tradition

Data regarding students' responses to the implementation of digital storybook-based learning on the Dayak Deah culture were collected using a questionnaire consisting of ten items measured on a Likert scale. The questionnaire was administered to the experimental class after the learning intervention. The results are summarized in Table 1.

**TABLE 1.** Students' responses to the use of a digital storybook based on the Tawas Jaa Dayak Deah tradition

Assessment Aspect	Key Indicators	Percentage	Category
Ease of Use	Easy to operate, clear storyline, more practical than textbooks	81%	Very Good
Enthusiasm and Motivation	Attractive design, increases excitement, fosters motivation, raises enthusiasm, and desire for frequent use	86%	Very High
Usefulness/Contextualization	Facilitates cultural understanding, recalls values relevant to life, and provides authentic learning	83%	Very Useful

Based on Table 1. Overall, Grade VII students of SMPN 2 Upau provided highly positive responses, with mean scores exceeding 80% across all aspects. Specifically, for the ease-of-use dimension (81%), students found the storybook intuitive, practical, and easier to follow than textbooks. The clear storyline and simple navigation were well-suited to their cognitive level, ensuring accessibility and smooth classroom use.

The motivation and enthusiasm dimension received the highest mean score (86%). This quantitative result aligns with students' qualitative statements, highlighting how the digital storybook stimulated interest and enjoyment. One student expressed, "The storybook made me more excited to learn because it used our own culture," while another added, "The pictures and story make it easier to understand than the textbook." These comments show that the increased motivation was not only due to visual appeal but also to the emotional connection and cultural familiarity embedded in the content. The interactivity of the medium and the presence of recognizable cultural symbols generated sustained attention and intrinsic motivation.

For the usefulness and contextualization dimension (83%), students acknowledged that the storybook helped them understand cultural values more deeply and relate the content to their everyday lives. As one student noted, "Through this story, I can understand the meaning of Tawas Jaa and feel proud of my tradition." This demonstrates that the

digital storybook successfully bridged academic material and real-life cultural experience, turning abstract concepts into meaningful learning.

The combination of quantitative findings (mean  $\geq 80\%$ ) and qualitative insights confirms that students' positive responses stemmed from two primary factors: (1) the novelty and interactivity of the digital format, which captured curiosity and attention, and (2) the cultural relevance of the content, which fostered emotional engagement and strengthened identification with their heritage. Together, these elements created a learning experience that was both cognitively effective and affectively engaging.

The findings assert that integrating local cultural elements into digital content aligns with the Contextual Teaching and Learning (CTL) framework, as articulated by Johnson in 2002. The CTL framework emphasizes the importance of connecting educational material to learners' real-life experiences and cultural contexts, thereby enhancing engagement and comprehension. Such a pedagogical strategy is consistent with Vygotsky's sociocultural theory, which posits that knowledge is developed through interactions that occur within meaningful cultural settings. This interaction fosters an environment where learners construct knowledge that resonates with their cultural identities (Michener et al., 2013; Silalahi, 2019).

Moreover, the results resonate with Gay's model of culturally responsive teaching (2010), which prioritizes culture as a fundamental aspect of effective pedagogy. By embedding cultural authenticity within educational resources, such as the Tawas Jaa digital storybook, students can engage with materials that reflect their lived experiences. This approach supports learners in navigating new knowledge and validates their cultural backgrounds, an essential aspect promoted in culturally sustaining pedagogy (Portes et al., 2017). The integration of Keller's ARCS model (2010), which emphasizes attention, relevance, confidence, and satisfaction as key elements in maintaining learner engagement, substantiates that digital resources rooted in students' cultural contexts lead to elevated levels of motivation and sustained engagement in learning activities (Isa et al., 2022; Wang et al., 2022).

Pedagogically, these findings affirm that integrating local cultural elements within digital media supports constructivist learning by enabling students to build new knowledge upon familiar cultural foundations. The dual strength of the digital storybook, its technological novelty and cultural authenticity, addresses both cognitive and emotional domains of learning, leading to sustained engagement and improved cultural literacy (Bennett, 2024; Purnama, 2021).

From a practical perspective, the results suggest that teachers and curriculum developers should design localized digital materials that reflect students' cultural contexts. Such resources can enhance both engagement and learning relevance. Educational policymakers should support the inclusion of indigenous narratives within digital education to promote equity and cultural preservation.

In sum, the success of the Tawas Jaa digital storybook demonstrates that meaningful learning emerges when digital innovation aligns with students' cultural identity and lived experiences. This synthesis of technology and tradition offers a progressive model for 21st-century education, one that nurtures academic achievement, intrinsic motivation, and pride in cultural heritage. However, as these findings were derived from a single school context, further research across broader and more diverse settings is recommended to validate and expand the generalizability of these results.

## **Students' Cultural Literacy Performance**

Cultural literacy was assessed through a 15-item questionnaire administered to both experimental and control groups. The results are summarized in Table 2.

**TABLE 2.** Cultural literacy scores of students in the experimental and control groups (pre-test and post-test)

<b>Group</b>	<b>Min Pre-test</b>	<b>Max Pre-test</b>	<b>Min Post-test</b>	<b>Max Post-test</b>
Experimental	38	54	46	55
Control	38	45	43	50

Based on Table 2, the results demonstrated improvements in both groups. In the experimental group, the minimum score increased from 38 to 46, showing an eight-point gain, while the maximum score increased slightly from 54 to 55. In the control group, the minimum score increased from 38 to 43, and the maximum rose from 45 to 50. Although

both groups improved, the experimental group showed a greater increase in minimum scores, suggesting that the digital storybook intervention provided more substantial benefits, especially for lower-achieving students. This reflects the inclusivity of the intervention, as it helped weaker students to achieve higher learning outcomes compared to traditional instruction.

The observed pattern suggests that the use of digital storybooks rooted in the Tawas Jaa Dayak Deah tradition promotes inclusivity and equity among diverse learners, particularly enhancing the engagement of both average students and those lacking prior cultural understanding. Previous studies support this conclusion, asserting that culturally embedded digital media significantly boost engagement and contextual comprehension. For instance, Spaliviero (2022) emphasizes the capacity of culturally anchored resources to create more meaningful educational experiences, while Rodríguez et al. (2019) correlate the integration of local cultural narratives in digital formats with increased student motivation and academic success (Rodríguez et al., 2019; Spaliviero, 2022).

The demonstrated improvement in the experimental group highlights that local cultural content incorporated into digital storytelling can cultivate deeper cultural literacy among students. This approach offers exposure to impactful and contextualized learning experiences, enabling students to draw connections between their cultural heritage and the curriculum. In comparison, the modest gains observed in the control group suggest that traditional instructional methods may be inadequate for fostering intercultural awareness and appreciation for cultural heritage (Etherington, 2014; Liton, 2016). The transformative potential of culturally relevant education, as illustrated by Deardorff (2006), posits that engaging with diverse cultural perspectives enhances cognitive and social skills, which further corroborates the positive outcomes associated with the digital storybook intervention (Aldighrir & Asiri, 2025).

These findings substantiate the importance of such interventions in advancing students' cultural literacy and reducing performance gaps among learners. By facilitating a more inclusive and culturally responsive educational environment, the use of digital storybooks contributes to the broader objectives of equity in education, ensuring that all students have the opportunity to engage meaningfully with their learning content (Awada & Gutiérrez-Colón, 2019). Therefore, the evidence suggests that digital storytelling rooted in local cultural contexts not only enriches educational outcomes but also serves as a catalyst for cultural appreciation and intercultural dialogue.

### Assumption Testing

Because each group consisted of fewer than 50 participants, the Kolmogorov-Smirnov test was used to test normality. The results are presented in Table 3.

**TABLE 3.** Normality test results Group Pre-test Sig. (2-tailed) Post-test Sig. (2-tailed) Interpretation

Group	Pre-test (Sig.)	Post-test (Sig.)	Interpretation
Experimental	0.178	0.200	Normal
Control	0.063	0.178	Normal

All significance values exceeded  $\alpha = 0.05$ , confirming that both groups met the assumption of normality. Homogeneity testing was also conducted using Levene's test. The results are presented in Table 4.

**TABLE 4.** Homogeneity test results

Group	Based on Mean (Sig.)	Based on Median (Sig.)	Based on Median adj. df (Sig.)	Based on Trimmed Mean (Sig.)	Interpretation
Experimental	0.325	0.347	0.347	0.347	Homogeneous
Control	0.289	0.316	0.316	0.317	Homogeneous

These results verified that the dataset met the core assumptions required for parametric analysis, ensuring that subsequent inferential tests (paired and independent t-tests) could be applied validly. Meeting these assumptions strengthens the internal validity of the study and enhances the reliability of statistical inference. As emphasized by Marmoah and Poerwanti (2022), establishing methodological rigor through assumption testing is a critical step in maintaining the credibility and transparency of educational research.

This process was particularly important given the quasi-experimental nature of the present study, which inherently lacks random assignment. By confirming normality and homogeneity, the researchers ensured that any observed differences between the experimental and control groups could be attributed more confidently to the instructional intervention—namely, the digital storybook based on the Tawas Jaa tradition rather than to sampling bias or data distribution irregularities. Therefore, assumption testing provided a solid foundation for applying parametric analyses to determine the statistical significance of learning gains between the two groups.

### Paired Sample t-Test Results

The results of the paired sample t-test revealed significant improvements in both groups from pre-test to post-test ( $p < 0.05$ ). As shown in Table 5, the control group exhibited a mean difference of -5.480, indicating that even without the intervention, students benefited from regular instruction. In contrast, the experimental group exhibited a higher mean difference of -7.148, reflecting the stronger effect of the digital storybook intervention on learning gains.

TABLE 5. Paired sample t-test results

Group	Mean Difference	Std. Deviation	Std. Error Mean	95% CI Lower	95% CI Upper	t	df	Sig. (2-tailed)
Control	-5.480	2.974	0.595	-6.708	-4.252	-9.214	24	0.000
Experimental	-7.148	3.697	0.712	-8.611	-5.686	-10.046	26	0.000

These stronger gains can be explained by two interrelated factors. First, the novelty of using a digital storybook created curiosity and sustained student motivation, as one student noted, “It was my first time learning with a digital storybook, so I felt more curious and motivated.” Second, the cultural relevance of the content made learning more meaningful, with another student commenting, “The story is about our own culture, so it feels more meaningful than just reading the textbook.” This suggests that the effect is likely the result of a combination of digital innovation and cultural contextualization, as illustrated by a student who stated, “The combination of pictures, narration, and cultural content made it easier for me to understand and remember the lesson.”

The results of the paired sample t-test indicate significant improvements in both the experimental and control groups from pre-test to post-test ( $p < 0.05$ ). The control group demonstrated a mean difference of -5.480, suggesting that students benefitted from regular instructional practices to some degree. However, the experimental group showed a greater mean difference of -7.148, indicative of the pronounced impact of the digital storybook intervention on learning gains, as supported by Mayer's (2017) principles of multimedia learning that emphasize how innovative educational approaches can enhance student understanding and engagement (Astuti et al., 2022; Mayer, 2017)

Two interrelated factors elucidate these stronger gains. Firstly, the novelty of using a digital storybook stimulated curiosity and sustained student motivation, aligning with evidence that highlights how novel educational tools can enhance learner engagement. Secondly, the cultural relevance of the content imbued the learning experience with deeper meaning, as articulated by students who emphasized the significance of engaging with stories from their own culture. This observation aligns with Mayer's multimedia learning theory, which posits that multimedia elements can contribute significantly to learner engagement and understanding.

Moreover, these results align with (Mayer, 2017) assertion that effectively designed digital learning materials can significantly enhance student motivation and retention by making learning both engaging and relevant. Wirda (2025) reports that culturally contextualized digital media correlate positively with increased academic engagement and achievement, confirming the importance of integrating culture in educational strategies. Such results are consistent with discussions about the importance of culturally responsive teaching, emphasizing that education integrated with cultural relevance can enhance academic skills and foster a sense of identity and belonging (Mehta et al., 2024; Wirda, 2025).

Furthermore, the reported increases in usability and motivation among students correspond with principles of culturally responsive teaching, suggesting that instructional methods resonating with students' cultural contexts can lead to heightened engagement levels (Aguayo et al., 2020). The findings reflect the notion that culturally relevant

pedagogy can effectively mitigate achievement gaps by leveraging students' cultural backgrounds as educational assets (Hsieh, 2017).

Collectively, the integration of digital innovation with local cultural relevance substantiates the aim of educational methodologies to adapt to the challenges of globalization while still nurturing students' connections to their cultural identities. The current study provides empirical support for the effectiveness of digitally mediated, culturally contextualized education, suggesting a need for future research to evaluate the long-term impacts of such educational approaches on students' critical thinking, cultural awareness, and identity development.

In conclusion, this study provides robust evidence that culturally embedded digital storybooks have a significant impact on educational outcomes. The integration of students' cultural heritage into educational content not only enhances academic performance but also fosters intrinsic motivation, reinforcing the cultural literacy that is vital for growth in a globally interconnected environment.

## LIMITATIONS

This study has certain limitations. First, the quasi-experimental design does not allow for full control of external variables, which may have influenced the outcomes. Second, the sample size was relatively small and drawn from a single school, which limits the generalizability of the findings. Future studies should consider employing a true experimental design with larger and more diverse samples, as well as longitudinal approaches to explore the long-term effects of culturally contextualized digital storybooks on students' cultural awareness, critical thinking, and identity development.

## CONCLUSION

This study provides strong empirical evidence that the use of a digital storybook based on the Tawas Jaa Dayak Deah tradition significantly enhanced students' cultural literacy, motivation, and learning outcomes in Social Studies. The students' responses indicated high levels of appreciation, with positive ratings consistently above 80% across the dimensions of usability, motivation, and contextual relevance.

Statistical testing reinforced these findings. Results of the paired sample t-test revealed significant improvements in both the experimental and control groups ( $p < 0.05$ ). However, the experimental group, which received the digital storybook intervention, demonstrated a greater mean difference (-7.148) compared to the control group (-5.480). This indicates that the digital storybook not only produced statistically significant learning gains but also generated stronger improvements than conventional instruction. The results confirm that culturally contextualized digital media are more effective in improving student performance compared to traditional teaching methods.

Importantly, the findings emphasize the dual role of digital storybooks as both instructional media and cultural preservation tools. By incorporating local traditions into modern learning formats, the intervention enhanced students' academic outcomes while promoting their cultural awareness and identity. This underscores the urgency of integrating cultural literacy into educational practices, ensuring that students remain connected to their heritage while also engaging with innovative pedagogical approaches.

## IMPLICATIONS

The outcomes of this study carry several practical implications:

1. For Teachers: Digital storybooks grounded in local culture can enhance lesson delivery by making learning more engaging, motivating, and contextually meaningful. Teachers are encouraged to adopt such media to enrich classroom practices and increase student participation.
2. For Schools: The integration of culturally embedded digital media into the curriculum supports schools in achieving dual goals: advancing academic performance and strengthening cultural literacy. This approach is particularly valuable in Social Studies education.

3. For Educational Media Developers: The findings suggest that future digital learning media should incorporate local traditions and cultural narratives. Doing so enhances relevance, promotes inclusivity, and contributes to the sustainability of cultural heritage.
4. For Policy Makers: The study highlights the importance of supporting initiatives that develop and disseminate culturally contextualized digital learning resources as part of national educational strategies, in line with the competencies emphasized in the Indonesian curriculum.

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