

Chromebook digital media innovation on Tana Tidung folklore material to improve reading literacy of fifth grade students

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Abstract: This study investigates the effectiveness of Chromebook-based digital media in improving elementary students' reading literacy and learning motivation in learning Tana Tidung folklore. A mixed-methods approach was employed, combining a quantitative pretest-posttest design with qualitative data from observations, interviews, and questionnaires. Results from the paired sample t-test showed a significant increase in reading literacy ($p < 0.001$; Cohen's $d_z = 4.70$), indicating a very large effect. Thematic analysis further revealed that multimedia features helped students comprehend narrative structures and identify moral and cultural values more clearly. Students demonstrated higher intrinsic motivation, active participation in digital discussions, and increased independence in accessing learning materials. Teachers also reported enhanced classroom engagement, although challenges such as limited device availability and unstable internet occasionally hindered learning activities. Overall, the findings show that Chromebook-based digital media effectively supports literacy development, motivation, and cultural understanding, highlighting its potential as a meaningful digital learning innovation for elementary education.

Keywords: Digital learning, folklore, learning motivation, reading literacy

Abstrak: Penelitian ini bertujuan untuk menganalisis efektivitas media digital berbasis Chromebook dalam meningkatkan literasi membaca dan motivasi belajar siswa sekolah dasar pada pembelajaran cerita rakyat Tana Tidung. Metode mixed methods digunakan dengan menggabungkan desain kuantitatif *pretest-posttest* dan analisis kualitatif melalui observasi, wawancara, serta kuesioner. Hasil uji paired sample t-test menunjukkan peningkatan signifikan pada literasi membaca ($p < 0.001$; Cohen's $d_z = 4.70$) dengan kategori efek sangat besar. Analisis tematik mengungkap bahwa fitur multimedia membantu siswa memahami alur cerita serta nilai moral dan budaya secara lebih jelas. Siswa juga menunjukkan motivasi intrinsik yang lebih tinggi, partisipasi aktif dalam diskusi digital, dan kemandirian belajar dalam mengakses materi. Guru melaporkan peningkatan keterlibatan kelas, meskipun tantangan seperti keterbatasan perangkat dan koneksi internet yang tidak stabil masih ditemukan. Secara keseluruhan, temuan penelitian ini menunjukkan bahwa media digital berbasis *Chromebook* efektif dalam mendukung perkembangan literasi, motivasi belajar, dan pemahaman budaya, serta memiliki potensi sebagai inovasi pembelajaran digital yang bermakna di pendidikan dasar.

Kata kunci: Pembelajaran digital, cerita rakyat, motivasi belajar, literasi membaca,

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INTRODUCTION

Literacy education in Indonesia faces significant challenges affecting the quality of learning, particularly at the elementary school level. A major issue is students' low literacy skills, as reflected in international surveys like the Program for International Student Assessment (PISA). Based on PISA 2018 data, Indonesia's reading literacy score was only 371, significantly below the global average of 487 (OECD, 2019). This indicates that the reading abilities of Indonesian students, especially in elementary schools, need serious attention. Fundamental problems, such as a limited ability to comprehend texts, connect information, and apply it in real-life contexts, require immediate solutions. Mulyasa (2021)

also emphasizes that the quality of elementary school literacy is a crucial determinant of students' future academic success, making reading literacy a top priority in national education policy.

In addition, challenges in improving reading literacy in elementary schools are related to the limitations of existing learning tools. Textbooks are often considered boring and irrelevant to students' daily lives, while conventional, unengaging teaching methods reduce their reading motivation (Dewi & Sulistyowati, 2019; Dita et al., 2023; Nasir et al., 2023). Therefore, a more innovative approach is needed to accommodate the needs of the current digital generation. A potential solution is the use of technology-based learning media, specifically devices like Chromebooks. This technology allows students to access a variety of educational resources enriched with interactive content such as videos, images, quizzes, and more (Khoirunnisa & Aminah, 2020).

Chromebooks, as cloud-based devices, offer many advantages in digital learning. Their use allows students to not only read texts but also interact with material through multimedia features like videos, animations, and interactive quizzes. With cloud-based applications, students can easily access learning materials outside of school hours, extending their learning opportunities (Gunawan & Handayani, 2023). This technology also enables more personalized learning, allowing students to learn at their own pace and improving their overall learning experience. Dziuban and Moskal (2020), note that using technology like Chromebooks also facilitates better collaboration among students and increases learning accessibility for all learners. The importance of reading literacy in elementary Indonesian language education goes beyond technical reading skills; it also includes the ability to understand and interpret texts in a broader context. Indonesian language education at this level should equip students with the skills to think critically about the information they read and connect it to their daily lives (Kamba & Haq, 2024).

One learning material that can support this goal is the use of folktales. Folktales are an integral part of Indonesia's cultural heritage, containing important moral, social, and cultural values that students can learn from (Kurniawan, 2021). By integrating folktales into lessons, students not only learn language structure but also gain insight into Indonesian culture and traditions. Folktales from Tana Tidung, North Kalimantan, are a prime example of material that can enrich students' cultural and language literacy. They are effective media for instilling character and cultural values in students from an early age (Santoso, 2021).

By utilizing Chromebook-based digital media, Tana Tidung folktales can be presented in a more interactive and engaging format. Through digital applications and devices, students can listen to or watch folktales in multimedia formats rich with visual and audio elements (Wijayanti & Martono, 2022). Interactive features like quizzes and discussion forums encourage students to be more actively involved in understanding the stories and expressing their opinions. This approach allows students to not only read the text but also engage in a deeper and more enjoyable learning process. This is consistent with findings by Agustina et al. (2021), who found that technology-based learning significantly improves students' comprehension of subjects.

METHOD

This study used a mixed-methods approach with a sequential explanatory design, which combines quantitative and qualitative methods in a specific order. This design was

chosen to not only measure the effectiveness of Chromebook-based digital media on students' reading literacy statistically but also to understand the experiences, perceptions, and interactions of both students and teachers during the learning process. According to Creswell and Clark (2018), a sequential explanatory design allows researchers to support quantitative results with qualitative explanations, leading to a more comprehensive interpretation.

The research was conducted at SDN 008 Tana Tidung with 30 fifth-grade students (20 girls and 10 boys). Fifth grade was selected because students at this level have foundational reading skills and are in the process of developing critical literacy, a crucial focus in Indonesian language learning (Snow, 2002). The study was carried out over six meetings during a three-week period, with each meeting lasting approximately 70 minutes, consistent with the Indonesian language subject schedule. Each meeting followed these learning stages: (1) Reading a Tana Tidung folktale text in a digital format on Chromebooks; (2) Completing interactive quizzes to test reading comprehension; (3) Engaging in discussions through a digital forum on the learning platform. This design was chosen to provide a consistent learning experience, support reading literacy skills, and facilitate technology-based learning in line with the principles of Technology Enhanced Learning (Mishra & Koehler, 2006).

Participant selection criteria

Students who actively participated in Indonesian language lessons, especially on topics related to folktales. Students who were involved in learning activities using Chromebook-based digital media throughout the research period. Students who were able to provide feedback through questionnaires or interviews about their experience using Chromebooks for learning. The fifth-grade level was selected for this study because students at this stage possess sufficient cognitive maturity to interact with digital learning tools while still requiring structured guidance to strengthen their reading literacy skills. Data were collected through observations, interviews, and a reading literacy test to obtain a comprehensive understanding of students' experiences and learning outcomes when using Chromebook-based digital media to study Tana Tidung folktales.

Observation

Observational data were gathered to examine the implementation of learning using Chromebook-based digital media and to capture students' behavioral engagement during the lessons. A structured observation sheet was employed in the form of a 1–4 checklist scale (1 = not implemented, 4 = very well implemented). The indicators assessed included: (1) student activity in following learning instructions; (2) student engagement in digital activities such as quizzes, online discussions, and text exploration; (3) students' responses and attitudes toward Chromebook use; and (4) student interaction with teachers and peers during the learning process. Example observation items include: (1) Students actively use the Chromebook to answer interactive quiz questions; (2) Students are able to participate in online forum discussions using the Chromebook. The instrument underwent expert validation by two lecturers specializing in language education and educational technology. All indicators met the content validity criteria with Aiken's $V \geq 0.80$, and the reliability test using Cronbach's Alpha yielded $\alpha = 0.87$, indicating high internal consistency.

Interviews

Semi-structured interviews were conducted with both teachers and students to obtain deeper insights into the perceived effectiveness of Chromebook-based digital media, challenges encountered, and motivational changes during the learning process. Student interview questions focused on learning experiences and difficulties, for example: (1) How do you feel about learning with a Chromebook compared to a regular textbook?; (2) What difficulties did you experience while using the Chromebook?. Teacher interview prompts examined changes in classroom dynamics and instructional challenges, such as: (1) Did you observe any changes in student motivation and engagement after using Chromebooks?; (2) What were the main challenges in integrating Chromebooks into daily lessons?. The interview protocol was reviewed by experts and deemed contextually appropriate. Although no quantitative reliability test was applied, the inter-rater reliability of the coded responses reached 85%, demonstrating a high degree of coding consistency for qualitative analysis.

Reading literacy test

The reading literacy test was designed to measure students' comprehension and critical interpretation of Tana Tidung folktales and was administered in both pre-test and post-test formats. The instrument consisted of 20 multiple-choice items and 5 short-answer questions, assessing three major components: (1) text comprehension; (2) identification of cultural and moral values; and (3) critical analysis of character behavior and plot structure. Sample items include: (1) What moral value is highlighted by the main character in the Tana Tidung folktale?; (2) How do the attitudes of character A and character B differ in responding to a conflict?. Validity testing using the Pearson Product Moment correlation showed that 22 of 25 items were valid ($r_{\text{calculated}} > r_{\text{table}} 0.361$ at $N = 30$, $\alpha = 0.05$). The reliability coefficient obtained through Cronbach's Alpha was $\alpha = 0.91$, indicating excellent reliability and making the test suitable for assessing changes in reading literacy levels.

Data analysis methods

This study employed a mixed-methods approach consisting of quantitative and qualitative data analysis techniques to provide a comprehensive understanding of students' reading literacy development and their experiences using Chromebook-based digital media.

Quantitative analysis

Quantitative data from the reading literacy pre-test and post-test were analyzed using several statistical procedures. First, normality was examined using the Shapiro-Wilk test, and homogeneity of variances was assessed using Levene's test. Since the assumptions for parametric analysis were met, an Independent Samples t-test was conducted to determine whether there were significant differences in reading literacy outcomes between students who used the Chromebook-based digital media and those who learned through conventional methods. In addition, effect size (Cohen's d) was calculated to measure the magnitude of the intervention's impact. These analyses enabled the researcher to quantify improvements in comprehension, cultural-value identification, and critical reading skills.

Qualitative analysis

Qualitative data derived from interviews, observations, and open-ended questionnaire responses were analyzed using thematic analysis following Braun and Clarke's (2006) framework. The process consisted of six stages: (1) data familiarization; (2) initial coding; (3) development of candidate themes; (4) review and refinement of themes; (5) theme naming and definition; and (6) reporting. Codes generated during this process included indicators of student engagement, motivation, technological challenges, and perceived benefits of using Chromebooks. Through coding and theme development, key themes such as "increased motivation," "active digital engagement," and "technological constraints" emerged.

Integration of quantitative and qualitative findings

Consistent with the mixed-methods design, qualitative findings were used to support and explain the quantitative results. For example, themes related to enhanced motivation and engagement helped interpret the observed improvements in reading literacy scores, while themes concerning technical challenges provided context for cases where learning outcomes did not improve as expected. This integrative approach allowed the study to capture not only measurable gains in literacy but also the lived experiences of students and teachers using Chromebook-based folktale materials in the Indonesian language classroom.

RESULT AND DISCUSSION

Quantitative results: Improvement in reading literacy

Quantitative data analysis was conducted to determine the effectiveness of Chromebook-based digital media on students' reading literacy. Descriptive statistics showed an increase in students' scores from the pre-test ($M = 67.34$, $SD = 3.14$) to the post-test ($M = 81.22$, $SD = 4.20$), indicating substantial improvement in comprehension, cultural-value identification, and critical analysis. A paired sample t-test confirmed that this increase was statistically significant, $t(29) = 25.66$, $p < 0.001$, with a mean difference of 13.88 ($SD = 2.95$) and a 95% confidence interval of [12.78, 14.98]. Effect size analysis yielded Cohen's $d_z = 4.70$, categorized as a very large effect, demonstrating that the Chromebook intervention had a strong impact on students' reading literacy. These results indicate that Chromebook-based digital media significantly improved students' reading literacy (Table 1).

Table 1. Reading literacy pretest and posttest results

Variable	N	Mean	SD	Min	Max	t(29)	p	95% CI	Cohen's dz	Category
Pre-test	30	67.34	3.14	61.3	73.5	-	-	-	-	-
Post-test	30	81.22	4.20	75.0	88.3	-	-	-	-	-
Difference	30	13.88	2.95	-	-	25.66	<0.001	[12.78; 14.98]	4.70	Very large

Qualitative results: Thematic analysis

Qualitative data from interviews, observations, and reflective responses were analyzed using Braun & Clarke's thematic analysis. Four major themes emerged.

Theme 1: Increased intrinsic motivation

Codes: Enjoyment, enthusiasm, interest, willingness to participate.

"I get more excited to learn because I can immediately see pictures and videos, not just read a book." (S-04).

"I'm happy when the score appears right after the quiz. I know if I'm correct." (S-17).

Students expressed heightened enjoyment and interest, supported by observations of increased attentiveness and active participation.

Theme 2: Enhanced cognitive engagement with texts

Codes: Deeper comprehension, faster understanding, active interpretation.

"When there's an animated video, I understand the story faster and can catch the message clearly." (S-07).

Observation notes indicated that animations, audio narration, and digital visualization helped students grasp plot structure and moral values more effectively.

Theme 3: Strengthened cultural understanding

Codes: Recognition of moral values, connection to local wisdom, cultural relevance.

"The cooperation in the story is just like in our village when we do community service." (S-10).

Students linked the folktales' cultural messages to their lived experiences, reinforcing cultural and character literacy.

Theme 4: Challenges in technology-based learning

Codes: Device limitations, unstable internet, technical orientation.

"Sometimes the internet is slow, so the quiz takes longer to load." (S-12).

Teacher comment: "A few students struggled at first because classrooms had limited devices." (G-01).

These constraints provide important insight into factors moderating the effectiveness of digital learning.

Integration of quantitative and qualitative findings

The integration of quantitative and qualitative findings demonstrates strong convergence among data sources, indicating that the Chromebook-based digital media intervention improved reading literacy through interconnected cognitive, motivational, and contextual mechanisms. The mixed-methods interpretation is presented through three major dimensions: The substantial increase in reading literacy scores ($d_z = 4.70$) corresponded with clear qualitative indicators of heightened motivation and engagement. Observation data showed that approximately 85% of students consistently participated in quizzes and digital forums, suggesting increased willingness to engage in literacy tasks.

Interview responses highlighted intrinsic motivation gains, reflected in students' expressions of enjoyment ("more excited to learn," S-04), persistence, and curiosity.

Three patterns illustrate this alignment: (1) Effort and persistence increased, students voluntarily re-opened texts and repeated quizzes, matching the increase seen in comprehension scores; (2) Active engagement expanded significantly, discussion participation rose from 45% (baseline) to 85% (during intervention), mirroring the score improvement trend; (3) Greater self-regulation emerged, students reported engaging with materials outside school hours, contributing to improved post-test performance. Taken together, these findings indicate that motivational and behavioral engagement acted as mediators of the quantitative gains. Qualitative evidence supports the conclusion that multimedia features within the Chromebook platform played a critical role in improving comprehension scores. Supporting patterns include: (1) Enhanced cognitive processing Students consistently reported that animations and visuals "made the story easier to understand" (S-07). This corresponds with the high post-test performance in plot comprehension items; (2) Reinforcement of cultural-value recognition Videos illustrating local contexts helped students identify moral and cultural themes (cooperation, courage), reflected in both interview responses and improved test scores on cultural-value items; (3) Immediate feedback strengthened learning accuracy Students emphasized that instant feedback increased confidence and corrected misunderstandings quickly, likely contributing to the very large effect size. These qualitative insights strengthen the interpretation that multimedia scaffolding enhanced information processing, consistent with Mayer's Cognitive Theory of Multimedia Learning.

While the overall effect was highly significant, qualitative findings revealed challenges that help explain variability among students, particularly those with lower post-test gains. Key moderating factors included: (1) Device limitations, because chromebooks were insufficient for all students simultaneously, some students shared devices or waited their turn, reducing their exposure time and possibly affecting learning continuity; (2) Internet instability Several students (S-12, S-15) reported slow loading during quizzes, causing frustration and disrupting cognitive flow. These disruptions correlate with slightly lower performance among a subset of students; (3) Initial digital unfamiliarity observation notes documented that around 20–25% of students needed additional guidance during early sessions, meaning early instruction time was spent on orientation instead of content learning. These moderating factors provide context for understanding why, despite a large overall effect, individual learning gains varied, illustrating the importance of infrastructure and readiness in digital learning success.

The findings of this study provide substantial theoretical contributions to contemporary discussions on technology-enhanced learning, particularly in relation to students' motivation, social interaction, and cognitive development. The significant improvement in reading literacy scores, supported by strong qualitative indicators of engagement and cultural understanding, can be interpreted through several complementary theoretical lenses. According to Self-Determination Theory (SDT), intrinsic motivation emerges when learners' basic psychological needs autonomy, competence, and relatedness are fulfilled (Alonso & León, 2016; Wang et al., 2019). The Chromebook-based learning environment in this study fostered autonomy by allowing students to navigate digital folktale materials, select resources, and participate freely in discussion forums. The

interactive quizzes, which offered instant feedback, supported the need for competence by enabling students to monitor their progress and experience mastery over reading tasks. The digital forum further strengthened relatedness, as students collaborated, exchanged interpretations, and affirmed one another's perspectives. The alignment between these classroom dynamics and SDT explains why intrinsic motivation increased significantly, as reflected in students' enthusiastic participation and willingness to engage in extended learning beyond class hours.

The results also resonate strongly with Social Learning Theory (SLT), which underscores the role of observation, imitation, and interaction in the learning process. Bandura's principles are evident in the way students adopted strategies observed in peer responses within the digital forum (Jin, 2022). Students learned not only from teacher instruction but from watching how others constructed interpretations of the folktales' moral and cultural values. As Chuang (2021) highlights, digital platforms cultivate a sense of community that enriches peer-to-peer learning, a phenomenon clearly mirrored in this study where students actively responded to and built upon each other's ideas. SLT thus helps explain the rise in collaborative engagement and the deeper comprehension of folktale content observed during the intervention.

Moreover, the results align with Multimedia Cognitive Theory, which posits that learning is strengthened when visual and auditory channels are activated simultaneously. Mayer's principles are reflected in students' comments that animations and videos helped them "understand the story faster" and "capture the message clearly." These multimodal presentations reduce cognitive load and support more efficient processing of complex narrative structures. This interpretation is reinforced by Rachmadian et al. (2021), who found that multimedia-based learning enhances conceptual understanding, as well as by Sunawan et al. (2017), who emphasize that interactive digital feedback not only supports comprehension but also encourages the refinement of learning strategies. Additionally, collaborative interactions within digital forums align with Nisa et al. (2018), who argue that cooperative learning improves analytical skills through discussion and shared interpretation.

The integration of these theoretical perspectives indicates that the effectiveness of Chromebook-based learning does not stem solely from the technology itself, but from the synergy between technological affordances and sound pedagogical design. As highlighted by Hidayat and Afriza (2023), teachers play a crucial role in curating digital environments that align with students' developmental needs and learning objectives. Teachers' capacity to guide, scaffold, and facilitate meaningful interactions ensured that the Chromebook features supported not replaced core literacy learning. This finding aligns with Agam and Marlia (2024) and Yurida et al. (2021), who emphasize the teacher's role as motivator, and with broader evidence that teachers often struggle to adapt to technological and curricular changes (Suyamti, 2024). Thus, mastering Technological Pedagogical Content Knowledge (TPACK) becomes essential for effectively integrating Chromebook-based strategies (Daga, 2022; Ulya, 2023).

In the context of this study, the teacher's ability to orchestrate digital exploration, interactive quizzes, and cultural-value reflections proved instrumental in maximizing the potential of Chromebook technology. As noted by Agustina et al. (2021), Layton and Smith (2019) and Mustofa et al. (2024), technology yields optimal outcomes when paired with

appropriate pedagogy. The large effect size observed in this study, along with the strong qualitative evidence of increased engagement, supports the idea that well-designed digital learning environments can meaningfully enrich both cognitive understanding and cultural-literacy outcomes.

Overall, the theoretical implications of this research demonstrate that Chromebook-based digital media creates a learning ecosystem that satisfies psychological needs, stimulates social learning, supports multimodal cognitive processing, and enables teachers to apply pedagogical strategies aligned with 21st-century competencies. These findings contribute to existing educational literature by reinforcing the conceptual integration of SDT, SLT, and Multimedia Learning Theory as a foundation for digital literacy instruction in elementary schools, while also emphasizing the indispensable role of the teacher as facilitator, mediator, and learning architect.

CONCLUSION

This study demonstrates that Chromebook-based digital media is highly effective in enhancing fifth-grade students' reading literacy, as evidenced by a substantial increase in post-test scores supported by a very large effect size. Qualitative findings further revealed that students experienced higher intrinsic motivation, stronger engagement, and deeper cultural understanding when interacting with multimedia folktale materials. The integration of quantitative and qualitative results indicates that improvements in literacy were driven not only by technological access but also by increased autonomy, competence, and social collaboration fostered through the digital learning environment.

The success of this intervention can be theoretically explained through the combined perspectives of Self-Determination Theory, Social Learning Theory, and Multimedia Learning Theory. The Chromebook platform supported autonomy and competence through independent navigation and instant feedback, facilitated social learning through collaborative forums, and strengthened cognitive processing through multimodal resources. However, the findings also highlight moderating factors such as device availability and internet stability, suggesting that digital learning effectiveness is closely tied to implementation conditions and technological readiness.

Overall, this study reinforces that Chromebook-based digital media, when supported by appropriate pedagogical strategies, can significantly enrich students' motivation, engagement, and cognitive comprehension of culturally relevant texts. The results contribute to the growing body of literature on digital literacy instruction and offer practical insight into designing technology-integrated learning environments in elementary schools. Future research may explore long-term implementation, broader cultural content, and teacher professional development to further optimize the impact of digital learning innovations.

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