



## The effect of literacy cloud-assisted digital storybooks on fourth-grade students' interest in Indonesian language learning

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### ABSTRACT

This study examined the effect of Literacy Cloud-assisted digital storybooks on fourth-grade students' interest in learning Indonesian. A quantitative approach with a quasi-experimental nonequivalent control group design was employed. Two intact fourth-grade classes were assigned as the experimental and control groups. The experimental group learned Indonesian using digital storybooks accessed through Literacy Cloud, whereas the control group received conventional instruction. Students' learning interest was measured using a validated 20-item questionnaire administered before and after the intervention. The data were analyzed using normality and homogeneity tests followed by an independent-samples t-test. The pretest results showed no significant difference in learning interest between the two groups ( $p = .863$ ), indicating comparable initial conditions. However, the posttest results revealed a significant difference between the experimental and control groups,  $t(41) = 3.697$ ,  $p < .001$ . Students who learned through Literacy Cloud-assisted digital storybooks demonstrated higher learning-interest scores than those who received conventional instruction. These findings indicate that digital storybooks supported by Literacy Cloud can provide a more engaging learning experience and may serve as an effective instructional medium for increasing elementary school students' interest in learning Indonesian.



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## INTRODUCTION

Indonesian language learning plays a central role in elementary education because it supports students' ability to understand information, communicate ideas, and participate in learning across subject areas. At the fourth-grade level, students are expected not only to read written texts but also to interpret narrative and informational texts presented in print, electronic, audio, and visual formats. They are also expected to ask and respond to questions, express ideas in discussions, and retell information obtained from texts. These competencies require learning experiences that encourage students to engage actively with language rather than merely memorize linguistic concepts. Therefore, Indonesian language instruction should provide meaningful contexts in which students can read, observe, interpret, discuss, and respond to information. Digital narrative texts may support these expectations because they combine language content with visual representations that are familiar and accessible to elementary school students.

One affective factor that influences students' participation in such learning experiences is learning interest. Interest involves both affective responses, such as enjoyment and curiosity, and cognitive engagement with a particular activity or subject. Hidi and Renninger (2006) explain that interest may develop from triggered situational interest into maintained situational interest and, eventually, into a more enduring individual interest. In classroom settings, situational interest can be stimulated through relevant content, varied presentation, meaningful tasks, and opportunities for active participation. Conversely, instruction that relies primarily on verbal explanation, routine exercises, and static textbooks may provide limited stimulation for students who require concrete and visually supported learning experiences. When students perceive learning activities as repetitive or disconnected from their experiences, they may demonstrate reduced attention, participation, and willingness to

complete learning tasks. Thus, selecting appropriate instructional media is important for triggering and maintaining students' interest in learning Indonesian.

Digital storybooks offer a potential medium for creating more engaging language-learning experiences. Unlike conventional printed texts, digital storybooks can present narratives through combinations of written language, illustrations, audio narration, animation, and navigational features, depending on their design. These features may help students connect words, images, events, and meanings while following the structure of a story. A meta-analysis conducted by Takacs et al. (2015) found that multimedia features that were congruent with story content could support children's story comprehension and expressive vocabulary. However, the study also showed that interactive features unrelated to the story could distract learners. Similarly, Furenes et al. (2021) concluded that digital books do not automatically produce better learning outcomes than printed books; their effectiveness depends on how digital enhancements support rather than interrupt the reading process. Therefore, the educational value of digital storybooks is determined not simply by the use of technology but by the alignment among the story content, digital features, instructional objectives, and teacher guidance.

Evidence also suggests that appropriately designed electronic storybooks may influence students' motivation and engagement. Kao et al. (2016), for example, found that fourth-grade students who used electronic storybooks with relevant interactive guidance demonstrated stronger reading motivation and story comprehension than students who used storybooks with limited interaction. Nevertheless, these findings emphasize the importance of pedagogically meaningful features, such as guidance, prompts, and feedback, rather than entertainment features that are disconnected from the learning material. Digital storybooks can therefore be used as instructional resources through which teachers contextualize language concepts, guide students in identifying information, and encourage them to respond to a narrative. In Indonesian language learning, a story context may make abstract language elements—such as question words and their communicative functions—more concrete because students can identify who, what, where, when, why, and how within meaningful events.

One platform that provides digital reading resources for children is Literacy Cloud, a digital library developed by Room to Read. The platform offers free access to children's books in multiple languages, read-aloud videos, and instructional resources that can be used by teachers, librarians, parents, and students. Its collection includes storybooks designed for young readers and materials that can be accessed through internet-connected digital devices. In the Indonesian elementary-school context, Literacy Cloud can provide teachers with an alternative source of narrative texts when printed reading materials are limited or when teachers seek visually supported texts for classroom reading activities. However, the platform should not be treated merely as a technological substitute for printed books. Its resources need to be selected according to students' reading levels, lesson objectives, language content, and the availability of adequate teacher guidance.

Several studies in Indonesia have investigated the educational use of Literacy Cloud. Fina and Susanto (2023) reported that its use supported the reading interest of third-grade elementary students. Islami et al. (2024) employed a quasi-experimental design and found that fourth-grade students who learned using Literacy Cloud demonstrated better reading interest and reading-comprehension performance than students in the comparison group. In another study, Alifah et al. (2025) integrated Literacy Cloud into guided-reading activities for fifth-grade students and reported improvements in reading comprehension across classroom-action-research cycles. These studies indicate that Literacy Cloud has potential as a resource for supporting elementary students' reading activities. Nevertheless, most previous studies have focused primarily on reading interest, reading comprehension, or Literacy Cloud as part of a broader instructional method, such as guided reading.

Despite these developments, evidence remains limited regarding the use of Literacy Cloud-assisted digital storybooks to develop students' broader interest in learning Indonesian, particularly when storybooks are integrated into the teaching of specific language content. Reading interest and learning interest are related but conceptually distinct. Reading interest concerns students' attraction to reading activities or texts, whereas interest in learning Indonesian includes students' attention, enjoyment, participation, and willingness to engage with the subject and its classroom activities. In addition, limited comparative evidence is available on whether digital storybooks used as the main instructional medium produce different learning-interest outcomes from conventional instruction in fourth-grade Indonesian lessons. The original manuscript identifies this issue in the context of question-

word material, for which narrative texts can provide authentic situations in which students formulate and answer questions.

Accordingly, this study aimed to examine the effect of Literacy Cloud-assisted digital storybooks on fourth-grade students' interest in learning Indonesian. A quasi-experimental nonequivalent control group design was used to compare students who learned through digital storybooks accessed through Literacy Cloud with students who received conventional instruction. It was hypothesized that, after accounting for their initial conditions, students in the experimental group would demonstrate significantly higher learning-interest scores than students in the control group. The study contributes empirical evidence regarding the use of a freely accessible digital-storybook platform for teaching specific Indonesian language content and provides practical information for elementary teachers seeking to design more engaging language-learning experiences.

## RESEARCH METHODS

### Research Design

This study employed a quantitative approach with a quasi-experimental nonequivalent control group design. The design was selected because the participants were drawn from existing fourth-grade classes and could not be randomly assigned individually to the experimental and control conditions. Two intact classes participated in the main experiment. The experimental group received Indonesian language instruction using digital storybooks accessed through the Literacy Cloud platform, whereas the control group received conventional instruction without the use of Literacy Cloud-assisted digital storybooks. Both groups completed a learning-interest questionnaire before and after the intervention.

The design of the study can be represented as follows:

$$\begin{array}{ll} \text{Experimental group} & : O_1 X O_2 \\ \text{Control group} & : O_3 - O_4 \end{array}$$

In this notation,  $O_1$  and  $O_3$  represent the pretest measurements of students' learning interest,  $O_2$  and  $O_4$  represent the posttest measurements, and  $X$  represents Indonesian language instruction using Literacy Cloud-assisted digital storybooks. The dash indicates that the control group did not receive the experimental treatment. The pretest was administered to examine the initial learning-interest conditions of the two groups. The posttest was administered after the instructional intervention to determine whether the experimental and control groups differed in their interest in learning Indonesian.

### Participants

Two groups of participants were involved in the study. First, 86 fourth-grade elementary school students participated in the instrument-testing stage. Their responses were used to examine the validity and internal consistency of the 20-item learning-interest questionnaire before it was administered in the main experiment. Second, the main quasi-experimental study involved 43 fourth-grade students from two intact classes. The total number of participants was determined based on the statistical output of the independent-samples t-test, which reported 41 degrees of freedom. One class served as the experimental group, while the other served as the control group.

The control group was drawn from SDI 2 An-Nuur Bolorejo, whereas the experimental group was drawn from SDN 2 Tiudan. The classes were selected purposively based on their availability, grade level, and suitability for the implementation of the study. Individual students were not randomly assigned because the study used existing classroom groups. The experimental group learned Indonesian using Literacy Cloud-assisted digital storybooks, while the control group received conventional classroom instruction. Both groups participated in the pretest and posttest assessments. Because the groups came from different schools, contextual differences between the schools, including learning facilities, instructional practices, and student characteristics, may have influenced the results. Consequently, the findings should be interpreted within the limitations of the nonequivalent control group design.

## Collecting Data

Data were collected using a learning-interest questionnaire consisting of 20 statement items. The questionnaire was designed to measure students' interest in learning Indonesian. It was administered to both the experimental and control groups before and after the instructional intervention. Before the main data collection, the questionnaire was tested on 86 fourth-grade elementary school students. Instrument reliability was evaluated using Cronbach's alpha. The analysis produced a Cronbach's alpha coefficient of .995, indicating very high internal consistency among the questionnaire items. Construct validity was examined using exploratory factor analysis. Bartlett's test of sphericity and a scree plot were used to evaluate the factorability and dimensional structure of the questionnaire. All instrument analyses were conducted using Jamovi version 2.6.44.

During the intervention, the experimental group learned question-word material in Indonesian language lessons using digital storybooks available through Literacy Cloud. The digital stories provided narrative and visual contexts that enabled students to identify, formulate, and answer questions related to the story content. The control group studied the same subject matter through the conventional instructional approach used by the classroom teacher. The questionnaire was administered as a pretest before the instructional treatment to measure students' initial learning interest. Following the intervention, the same questionnaire was administered as a posttest to measure students' learning interest after participating in the respective instructional conditions.

## Data Analysis

The data were analyzed using Jamovi version 2.6.44. The analysis included instrument testing, assumption testing, and hypothesis testing. All inferential statistical tests used a significance level of .05. Cronbach's alpha was calculated to determine the internal consistency of the learning-interest questionnaire. Exploratory factor analysis was used to examine its construct validity. Bartlett's test of sphericity was conducted to determine whether the correlations among the questionnaire items were sufficient for factor analysis, while the scree plot was examined to identify the number of dominant factors.

Before hypothesis testing, the normality and homogeneity assumptions were examined. The Shapiro–Wilk test was used to assess the normality of the pretest and posttest scores. Data were considered normally distributed when the resulting probability value was greater than .05.

The hypotheses for the normality test were:

$$\begin{aligned}H_0 &: \text{The data are normally distributed} \\H_1 &: \text{The data are not normally distributed}\end{aligned}$$

Levene's test was used to examine the homogeneity of variance between the experimental and control groups. The variance-homogeneity assumption was considered satisfied when the probability value was greater than .05.

The hypotheses for Levene's test were:

$$\begin{aligned}H_0 &: \text{The variances of the two groups are homogeneous} \\H_1 &: \text{The variances of the two groups are not homogeneous}\end{aligned}$$

After the assumptions had been examined, independent-samples t-tests were conducted separately for the pretest and posttest scores. The pretest comparison was used to determine whether the experimental and control groups differed significantly in their initial learning-interest scores. The posttest comparison was used to determine whether the groups differed significantly after the implementation of Literacy Cloud-assisted digital storybooks.

The hypotheses tested were:

$$H_0 : \mu_{\text{experimental}} = \mu_{\text{control}}$$

There is no significant difference in learning-interest scores between students who learn using Literacy Cloud-assisted digital storybooks and those who receive conventional instruction.

$$H_a : \mu_{\text{experimental}} \neq \mu_{\text{control}}$$

There is a significant difference in learning-interest scores between students who learn using Literacy Cloud-assisted digital storybooks and those who receive conventional instruction.

The null hypothesis was rejected when the probability value was below .05. The independent-samples t-test output reported 41 degrees of freedom, indicating that 43 students were included in the main statistical analysis.

## RESULTS

### Instrument Reliability and Construct Validity

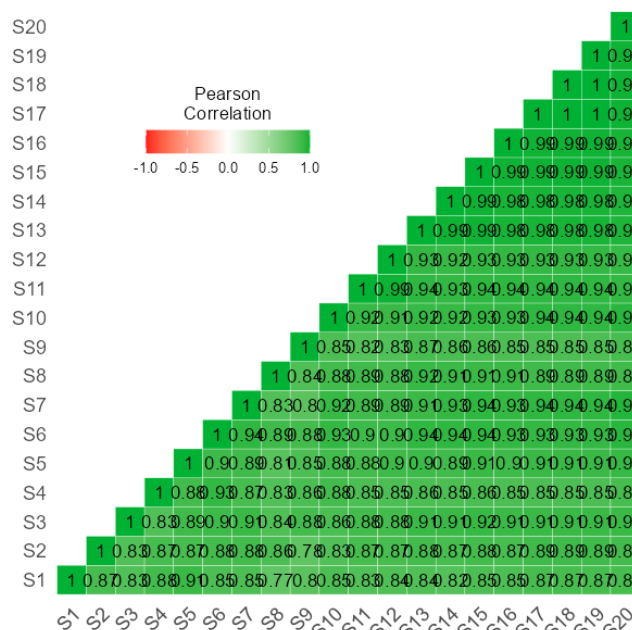
The learning-interest questionnaire consisted of 20 statement items and was initially tested on 86 fourth-grade elementary school students. The instrument-testing stage included an examination of internal consistency and construct validity using Jamovi version 2.6.44.

**Table 2. Scale Reliability Statistics**

| Scale             | Mean | Cronbach's $\alpha$ |
|-------------------|------|---------------------|
| Learning interest | 3.83 | .995                |

As presented in Table 2, the learning-interest questionnaire obtained a Cronbach's alpha coefficient of .995. This coefficient indicates very high internal consistency among the 20 questionnaire items. The result exceeded the minimum coefficient of .70 commonly used to indicate acceptable instrument reliability. Therefore, the questionnaire demonstrated adequate internal consistency for measuring students' interest in learning Indonesian.

Figure 2 presents the correlation heatmap for the questionnaire items. The heatmap shows consistently positive correlations among the 20 items, indicating that the items generally measured the same underlying construct. However, several correlations were close to 1.00, suggesting substantial similarity among some questionnaire items.



**Figure 2. Correlation Heatmap of the Learning-Interest Questionnaire**

The suitability of the item-correlation matrix for exploratory factor analysis was examined using Bartlett's test of sphericity.

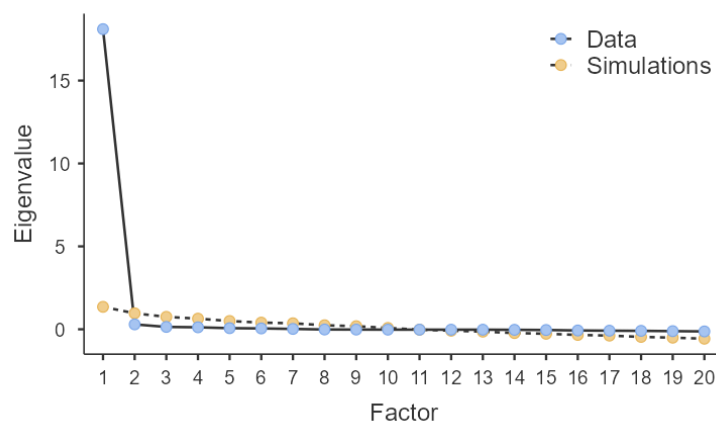
**Table 3. Bartlett's Test of Sphericity**

| $\chi^2$ | $df$ | $p$    |
|----------|------|--------|
| Inf      | 190  | < .001 |

As shown in Table 3, Bartlett's test of sphericity was statistically significant,  $\chi^2 = \text{Inf}$ ,  $df = 190$ ,  $p < .001$ . The significant result indicates that the correlations among the questionnaire items were sufficiently different from an identity matrix to warrant further examination of their factor structure.

Nevertheless, the infinite chi-square value indicates that the correlation matrix may have been singular or nearly singular. This result is consistent with the extremely high correlations observed among several items in the correlation heatmap. Consequently, the factor-analysis findings should be interpreted cautiously.

The exploratory factor analysis scree plot is presented in Figure 3.



**Figure 3. Exploratory Factor Analysis Scree Plot**

The scree plot showed a sharp decline between the first and second factors, followed by a relatively flat pattern across the remaining factors. This pattern suggests the presence of one dominant factor underlying the questionnaire responses. Thus, the scree plot provided preliminary support for a predominantly unidimensional structure representing students' learning interest. However, this interpretation remains subject to the limitation indicated by the infinite Bartlett chi-square value.

### Assumption Testing

The main quasi-experimental analysis included 43 fourth-grade students from the experimental and control classes. This total is reflected in the 41 degrees of freedom reported in the independent-samples t-test and Levene's test. Before the research hypothesis was tested, normality and homogeneity-of-variance assumptions were examined. The Shapiro–Wilk test was used to assess the normality of the pretest and posttest scores.

**Table 4. Shapiro–Wilk Normality Test**

| Measurement | $W$  | $p$  |
|-------------|------|------|
| Pretest     | .964 | .201 |
| Posttest    | .961 | .145 |

The Shapiro–Wilk test showed that the pretest scores did not significantly depart from normality,  $W = .964$ ,  $p = .201$ . Similarly, the posttest scores did not significantly depart from normality,  $W = .961$ ,  $p = .145$ . Because both probability values were greater than .05, the normality assumption was considered satisfied. Levene's test was conducted to examine whether the experimental and control groups had homogeneous variances.

**Table 5. Levene's Test for Homogeneity of Variances**

| <i>Measurement</i> | <i>F</i> | <i>df1</i> | <i>df2</i> | <i>p</i> |
|--------------------|----------|------------|------------|----------|
| Pretest            | 1.406    | 1          | 41         | .243     |
| Posttest           | .931     | 1          | 41         | .340     |

As presented in Table 5, Levene's test was nonsignificant for both the pretest,  $F(1, 41) = 1.406$ ,  $p = .243$ , and the posttest,  $F(1, 41) = .931$ ,  $p = .340$ . These results indicate that the variance-homogeneity assumption was satisfied for both measurements. Therefore, the use of Student's independent-samples t-test was considered appropriate.

### Comparison of Experimental and Control Groups

Independent-samples t-tests were conducted to compare the learning-interest scores of the experimental and control groups before and after the intervention.

**Table 6. Independent-Samples t-Test Results**

| <i>Measurement</i> | <i>Statistic</i>   | <i>t</i> | <i>df</i> | <i>p</i> |
|--------------------|--------------------|----------|-----------|----------|
| Pretest            | Student's <i>t</i> | .174     | 41        | .863     |
| Posttest           | Student's <i>t</i> | 3.697    | 41        | < .001   |

The pretest analysis showed no statistically significant difference between the experimental and control groups,  $t(41) = .174$ ,  $p = .863$ . This finding indicates that the two groups had comparable learning-interest scores before the implementation of the instructional intervention.

In contrast, the posttest analysis revealed a statistically significant difference between the experimental and control groups,  $t(41) = 3.697$ ,  $p < .001$ . Therefore, the null hypothesis stating that there was no difference in posttest learning-interest scores between the two groups was rejected. The result indicates that the experimental and control groups demonstrated different levels of interest in learning Indonesian following the intervention.

The available statistical output does not report the group means, standard deviations, mean difference, confidence interval, or effect size. Therefore, the direction and magnitude of the posttest difference cannot yet be determined from Table 6 alone. The claim that the experimental group obtained higher scores should be added only after the descriptive statistics for both groups have been verified.

## DISCUSSION

The findings showed no statistically significant difference in pretest learning-interest scores between the experimental and control groups,  $t(41) = 0.174$ ,  $p = .863$ . This result indicates that the two groups demonstrated relatively comparable levels of interest in learning Indonesian before the instructional intervention. In contrast, the posttest scores differed significantly between the two groups,  $t(41) = 3.697$ ,  $p < .001$ . When interpreted together with the reported direction of the group scores, this finding suggests that students who learned through Literacy Cloud-assisted digital storybooks demonstrated greater interest in learning Indonesian than those who received conventional instruction. Nevertheless, the descriptive statistics should be reported to confirm the direction and magnitude of this difference.

The higher learning interest associated with the use of digital storybooks can be interpreted through the four-phase model of interest development proposed by Hidi and Renninger (2006). According to this model, students' interest may initially be triggered by environmental features that attract their attention and may subsequently be maintained when learning activities remain meaningful and personally engaging. In the present study, the combination of narrative content and visual presentation may have stimulated students' situational interest. Compared with instruction dominated by verbal explanations or routine exercises, stories provided a context through which students could encounter Indonesian language content in a more concrete and engaging form. Such situational engagement may explain why the students exposed to digital storybooks responded more positively to the learning activities.

Digital storybooks may also support learning interest because they combine linguistic and visual information within a coherent narrative. When illustrations, narration, and other multimedia elements are directly related to story content, they can help students follow events, recognize characters, and connect language expressions with meaningful situations. Takacs et al. (2015) found that multimedia features congruent with story content could provide additional benefits for children's story comprehension and expressive vocabulary. Similarly, Kao et al. (2016) reported that appropriately designed electronic storybooks could strengthen elementary students' reading motivation and comprehension, particularly when interactive features provided relevant guidance, prompts, and feedback. These findings suggest that the educational value of digital storybooks comes not merely from their technological format but from the way their features direct students' attention toward the learning content.

In the context of the present study, the storybooks were integrated into Indonesian language instruction concerning question words. A narrative provides meaningful situations involving characters, actions, places, times, causes, and processes (Parlindungan & Short, 2024). These elements can be connected naturally with questions using who, what, where, when, why, and how. Consequently, students did not encounter question words solely as isolated grammatical forms but as tools for obtaining and communicating information about a story. This contextual use may have encouraged attention, participation, and willingness to respond during instruction (Dukut, 2019). It also indicates that digital storybooks can function as an instructional context rather than merely as supplementary reading material.

The findings are consistent with previous studies conducted in Indonesian elementary-school settings. Islami et al. (2024) found that fourth-grade students who learned using Literacy Cloud achieved higher reading-interest and reading-comprehension outcomes than students in a comparison group. Alifah et al. (2025) also reported that integrating Literacy Cloud into guided-reading activities supported the development of fifth-grade students' reading comprehension. Although these studies focused primarily on reading interest and comprehension, their findings support the present result by demonstrating that Literacy Cloud can facilitate more engaging literacy activities. The present study extends this evidence by focusing on students' broader interest in learning Indonesian and by integrating digital storybooks into the teaching of specific language content.

However, the findings should not be interpreted as evidence that the digital format is inherently superior to printed or conventional media. A meta-analysis by Furenes et al. (2021) showed that merely transferring a book from paper to a screen does not necessarily improve children's learning. Digital books may even produce lower comprehension when their additional features do not support the text or when adult guidance is insufficient. Similarly, Takacs et al. (2015) found that interactive elements unrelated to the story, such as distracting games or hotspots, could interfere with children's learning. Therefore, the significant difference observed in the present study may have resulted from the combination of relevant story content, visually supported presentation, teacher guidance, and structured learning activities rather than from the technology alone.

These considerations have practical implications for elementary-school teachers. Literacy Cloud-assisted digital storybooks should be selected according to students' reading levels, the linguistic content being taught, and the intended learning objectives. Teachers should guide students before, during, and after reading by activating prior knowledge, asking content-related questions, directing attention to relevant textual and visual information, and providing opportunities for students to discuss their interpretations. Interactive or multimedia elements should be used only when they strengthen the relationship between the story and the target language concept. In schools with limited devices or internet access, teachers may organize shared reading through a projector or use previously prepared materials, provided that such use is consistent with the platform's access provisions.

The findings also need to be interpreted in light of several methodological limitations. First, the main analysis involved only 43 students from two intact classes, limiting the generalizability of the findings. Second, the experimental and control classes came from different schools. Therefore, differences in school environments, teacher practices, facilities, and student characteristics may have contributed to the posttest difference. Third, students were not randomly assigned to the instructional conditions, so the study cannot completely eliminate selection bias or establish a definitive causal relationship. Although the nonsignificant pretest result suggests similar initial scores, it does not establish that the groups were equivalent in all relevant characteristics.

Fourth, the statistical output did not include group means, standard deviations, confidence intervals, or effect sizes. Statistical significance alone does not indicate whether the observed difference was educationally substantial. Reporting Cohen's *d* or Hedges' *g* would enable readers to assess the practical magnitude of the difference. An ANCOVA using posttest scores as the dependent variable and pretest scores as a covariate would also provide a stronger analysis by adjusting the posttest comparison for initial learning-interest scores. Finally, the questionnaire produced a Cronbach's alpha of .995 and an infinite Bartlett chi-square value. These results may indicate highly redundant items or a singular correlation matrix. Therefore, the questionnaire structure should be re-examined using item-level correlations, factor loadings, communalities, and an appropriate measure of sampling adequacy.

Future studies should involve larger samples drawn from multiple schools and, where feasible, assign several classes to each instructional condition. Researchers should also document the duration of the intervention, the digital stories used, teacher activities, and implementation fidelity. In addition to learning interest, subsequent research may examine reading comprehension, vocabulary acquisition, question-formulation skills, and long-term retention. Qualitative observations or student interviews may further explain which features of the digital stories attract students' attention and help maintain their engagement. Such research would clarify whether the benefits are attributable primarily to the stories, visual features, instructional guidance, or interactions among these components.

The findings provide preliminary evidence that integrating Literacy Cloud-assisted digital storybooks into Indonesian language instruction may support fourth-grade students' learning interest. The results are theoretically consistent with the development of situational interest and empirically aligned with previous research on electronic storybooks and Literacy Cloud. However, the effectiveness of this approach depends on purposeful instructional design, relevant multimedia features, teacher mediation, and adequate technological support.

## CONCLUSION

This study found a statistically significant difference in posttest learning-interest scores between fourth-grade students who learned Indonesian using Literacy Cloud-assisted digital storybooks and those who received conventional instruction. No significant difference was found between the groups at the pretest stage, indicating that their initial learning-interest scores were relatively comparable. These findings suggest that integrating digital storybooks from Literacy Cloud into Indonesian language instruction can support more engaging learning experiences and increase students' interest in participating in classroom activities.

The use of narrative contexts and visual representations may help students understand language content more meaningfully, particularly when digital stories are integrated with teacher guidance and structured learning activities. Therefore, Literacy Cloud-assisted digital storybooks can be considered an alternative instructional medium for teaching Indonesian in elementary schools.

However, the findings should be interpreted cautiously because the study involved a limited sample from two intact classes located in different schools and did not use random assignment. The statistical output also did not include descriptive statistics, confidence intervals, or effect-size estimates. Future studies should involve larger samples from multiple schools, report the magnitude of the treatment effect, and examine other outcomes such as reading comprehension, vocabulary development, and students' ability to formulate and answer questions.

## Declaration on the Use of AI Statement

During the preparation of this work, the authors used AI tools to improve the readability and language of the manuscript. After using this tool, the authors carefully reviewed and edited the content as needed and take full responsibility for the content of the published article.

## 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.

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