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Primary School Teachers' Perceptions of Digital Reading and Children's Reading Comprehension

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Abstract: This study examined primary school teachers' perceptions of digital reading in relation to children's reading comprehension and classroom learning experiences. Data from 22 primary school teachers in North Sumatra, Indonesia, were collected quantitatively using a 15-item Likert-scale questionnaire. The findings indicate that teachers generally perceived digital reading positively, particularly in relation to student engagement and multimedia-supported understanding. Specifically, 81.8% of respondents agreed that digital media makes reading instruction more engaging, while 95.5% agreed that images and audio in digital reading materials help students' comprehension. However, teachers' perceptions were less consistent regarding vocabulary, concentration, memory, and story comprehension. At the same time, 72.7% of respondents agreed that students are more easily distracted when using digital devices, and 63.6% agreed that prolonged digital device use can reduce students' concentration. From the perspective of Cognitive Load Theory, these findings suggest that digital reading may provide useful representational support while also presenting potential sources of extraneous cognitive load, particularly when digital environments contain competing or distracting elements. In addition, 81.8% of teachers agreed that digital reading should be used alongside printed books, while 90.9% agreed that teachers need the ability to use digital media in reading instruction. Because the study measured teachers' perceptions rather than students' reading comprehension directly, the findings should not be interpreted as evidence of a causal effect of digital reading on comprehension. Instead, they provide descriptive evidence of teachers' perceptions regarding the potential benefits and challenges of digital reading in elementary school contexts.

Keywords: Digital Reading; Reading Comprehension; Teacher's Perception; Primary School; Cognitive Load Theory.

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INTRODUCTION

In this age of digitization, technology has transformed many aspects of education, including reading. Digitized reading through e-books, online stories, reading apps, and similar platforms has become especially common among children (Altamura et al., 2025; Sezgin, 2022). Central to this shift is the question of reading comprehension: a skill that goes beyond word recognition to encompass inference generation, comprehension monitoring, and the mental construction of meaning from

text (Rice et al., 2024). These cognitive demands make reading comprehension critical to children's academic development.

The format through which children read shapes how they engage with and comprehend text. Digital reading relies on technology-supported tools including e-books, reading apps, augmented reality, and AI-based platforms (Nor Azmi et al., 2026) offering visual aids, audio, and interactivity. Traditional reading, by contrast, uses printed materials and has long been associated with deep comprehension and knowledge acquisition (Walsh, 2016; Salmerón et al., 2023). Though digital reading is convenient and interactive, some experts have raised concerns about whether it fosters comprehension as effectively as print (Goodwin et al., 2020; Salmerón et al., 2023).

Empirical comparisons of reading outcomes across formats have produced mixed but informative findings. A study of preschool-aged children found that those read to from a print book scored marginally higher on comprehension measures than those using an e-book with auto-narration, though behavioral and emotional engagement was equal across both conditions (Reich et al., 2019). Among older learners, no statistically significant difference in comprehension was found between print and digital texts, even when controlling for gender, decoding ability, and self-concept as a reader (Alisaari et al., 2018). Comprehension accuracy has similarly been shown to remain stable across paper, computer screen, and e-reader platforms, suggesting that electronic formats can serve as viable alternatives to print for both narrative and expository texts (Margolin et al., 2013). Contrasting evidence, however, suggests that reading modality does matter: tenth-grade students who read linear texts on paper scored significantly higher on comprehension tests than those who read identical texts as PDFs on a computer screen, with scrolling and the absence of tactile spatial cues identified as likely contributors to the performance gap (Mangen et al., 2013). For younger readers specifically, a study of 9–10-year-old children found no significant comprehension difference between printed and electronic storybooks overall, though the addition of narration in the electronic condition led to significantly higher comprehension scores, pointing to the role of specific digital features rather than the medium alone (Grimshaw et al., 2007). Beyond individual reading formats, research further suggests that children who read collaboratively using Internet-connected devices can reach comprehension levels above what is individually expected of them, with the gains being most pronounced among lower-ability readers (Mitra, 2019).

Such questions are particularly relevant when considering today's children, who are introduced to technology from an early age and are now more digitally literate than previous generations (Sezgin, 2022). Digitized reading resources are increasingly present in the literacy acquisition process. While these tools offer new ways to motivate and engage young readers, they have also introduced challenges such as distraction and reduced concentration (Altamura et al., 2025; Shen, 2025). Nonetheless, when digital reading tools are appropriately designed and implemented, they have shown meaningful benefits for young learners: an analytical review of randomized controlled trials found that interactive e-book interventions improved children’s phonological awareness and vocabulary outcomes relative to both print books and regular school programs (López-Escribano et al., 2021).

In this landscape, teachers play a key role. They work with students every day and monitor their learning in the classroom. Their perceptions form through observation of oral reading, classroom interactions, and student performance (Kikas et al., 2015). For this reason, teacher perceptions can help describe how digital reading

may relate to comprehension, motivation, and learning. Studies suggest that many teachers view digital environments as engaging and cognitively stimulating. However, the success of such tools also depends on adequate infrastructure and educator training (Adeyiga & Mpungose, 2025).

To frame these perceptions theoretically, this study uses Cognitive Load Theory (CLT), developed by John Sweller (Sweller et al., 1998). CLT states that human working memory is limited. When cognitive demands exceed this capacity, learning and comprehension become difficult (Shen, 2025; Sweller et al., 1998). CLT separates load into intrinsic load (the difficulty of the material), extraneous load (demands caused by poor design or distraction), and germane load (effort used to build understanding). This distinction is useful for digital reading. Multimedia can help when it supports the text. It can also add extraneous load when it competes for attention (Mayer, 2009). In daily practice, teachers can observe signs of these effects, such as students' attention and focus. In this study, CLT is used to interpret teachers' perceptions. It is not tested directly.

Research on digital reading has grown quickly, but it is concentrated in three areas. The first area compares print and digital formats using students' test scores (Alisaari et al., 2018; Mangen et al., 2013; Margolin et al., 2013; Reich et al., 2019). The second area reviews or tests digital interventions for young learners (López-Escribano et al., 2021; Nor Azmi et al., 2026; Sezgin, 2022). Studies in Southeast Asian primary school contexts often follow this pattern, for example by designing or testing digital materials (Noordan & Md. Yunus, 2022; Utami et al., 2025). The third area looks at teachers, but this work is limited. One example is a case study of secondary English teachers in Nigeria (Adeyiga & Mpungose, 2025). To the authors' knowledge, few studies have described how primary school teachers in Indonesia perceive digital reading in relation to children's comprehension. This is the research gap addressed here.

Teachers' perceptions deserve attention for three reasons. First, teachers decide which digital tools are used in class and how they are used. Their beliefs therefore shape classroom practice (Adeyiga & Mpungose, 2025). Second, teachers observe daily behavior, such as attention, participation, and effort, that test scores do not capture. Third, teacher perceptions are not neutral. Kikas et al. (2015) showed that teachers' views of children's skills are shaped by both children's skills and children's interest. This suggests that an interested class may be seen as a class that understands more. Studying teachers' perceptions therefore shows which digital features teachers trust and which they doubt. These points can guide later tests with students. At the same time, teacher perceptions are not direct measures of comprehension. This study treats them as descriptive evidence only.

This study is novel in three ways. First, it focuses on primary school teachers, not on students or secondary school teachers. Second, it measures perceived benefits (engagement and multimedia), perceived risks (distraction and concentration), and teacher readiness in one instrument. This shows where teachers agree strongly and where they are unsure. Third, it uses Cognitive Load Theory to interpret this pattern, while stating clearly that cognitive load was not measured. The study therefore adds descriptive evidence from North Sumatra that can guide future studies with direct measures of comprehension.

Considering this, the purpose of this research is to describe primary school teachers' perceptions of digital reading in relation to children's reading comprehension

and classroom learning experiences. The study asks whether teachers see digital reading mainly as a benefit, a challenge, or both. This is significant because teachers work with students daily and can offer observations that test scores alone cannot capture. The findings aim to help educators make informed decisions about digital reading tool selection and classroom integration. They also aim to show which perceptions should be tested in future studies with direct measures of comprehension.

How do primary school teachers perceive digital reading in relation to students' reading comprehension and classroom learning experiences?

METHOD

This study employed a descriptive quantitative research design to examine primary school teachers' perceptions of digital reading in relation to children's reading comprehension and classroom learning experiences. A descriptive quantitative approach was appropriate because the study aimed to summarize participants' views and perceptions using numerical data obtained through a questionnaire. The study did not involve manipulation of variables, experimental procedures, or a comparison between treatment and control groups. Therefore, the analysis focused on describing response frequencies and percentages rather than establishing causal relationships. The descriptive design enabled the researchers to identify patterns in teachers' perceptions regarding the potential benefits and challenges of digital reading, including student engagement, multimedia support, distraction, concentration, and the use of digital and printed reading materials. Given the convenience sampling and limited sample size, the findings are interpreted as descriptive evidence from the participating teachers and are not intended to represent the wider population of primary school teachers.

The participants were 22 active primary school teachers from North Sumatera, Indonesia. They were selected using convenience sampling. The main criterion was that the teachers were actively teaching in a primary school. They taught in public elementary schools (SD Negeri) and private Islamic schools such as SD Muhammadiyah, SD IT, and MIS. They had different levels of teaching experience and taught students from grade 1 to grade 6. Participation was voluntary. Convenience sampling was chosen for three reasons. First, the study is a small descriptive study with an exploratory aim. It does not test hypotheses about a population. Second, a full list of primary school teachers was not available to the research team, so random sampling was not possible. Third, the study was done with limited time and resources. Convenience sampling was a practical way to reach practicing teachers.

This sampling method has clear limits, and they affect how far the findings can be generalized. First, teachers were reached through an online link shared on WhatsApp, and they joined by choice. Teachers who are more comfortable with digital media may have been more likely to respond. This may make perceptions of digital reading look more positive than they are in the wider teacher population. Second, the sample is small. Each teacher equals 4.5 percentage points, so small differences between items should not be over-read. For example, the 95% confidence interval for 81.8% agreement (18 of 22 teachers) runs from about 61% to 93% (Wilson method). Third, the sample comes from one province and mixes public and private Islamic schools. Results may differ in other regions and school types. For these reasons, the findings are not statistically generalizable. They describe these 22 teachers. They can also serve as a starting point for larger studies, and readers may consider them for similar settings with caution.

The questionnaire was developed by the research team to measure teachers' perceptions of digital reading. It is a perception instrument. It is not a test of children's reading comprehension. Development followed three steps. First, the team reviewed the literature on digital reading, reading comprehension, engagement, distraction, and teacher readiness (see the Introduction). Second, the team identified indicators from this literature and grouped them into three clusters. Third, the team wrote one short statement for each indicator. The literature basis of each indicator is shown in Table 2.

Table 1. Literature Basis of the Questionnaire Indicators

Items	Indicator	Literature basis
Q1	Students' use of digital devices for reading	Sezgin (2022); Altamura et al. (2025)
Q2, Q6, Q7, Q11	Reading interest, motivation, activity, and engagement	Altamura et al. (2025); Furbani (2025); Reich et al. (2019)
Q3, Q10	Perceived text and story comprehension	Rice et al. (2024); Grimshaw et al. (2007); Alisaari et al. (2018)
Q4	Multimedia support (images and audio)	Grimshaw et al. (2007); López-Escribano et al. (2021); Mayer (2009)
Q5	Memory of content	Sweller et al. (1998); Shen (2025)
Q8	Vocabulary	López-Escribano et al. (2021); Reich et al. (2019)
Q9, Q12, Q13	Focus, distraction, and concentration	Shen (2025); Altamura et al. (2025)
Q14	Teachers' ability to use digital media	Adeyiga & Mpungose (2025)
Q15	Digital reading used alongside printed books	Salmerón et al. (2023); Walsh (2016); Goodwin et al. (2020)

Note. Cluster 1 = Items 1–11; Cluster 2 = Items 12–13; Cluster 3 = Items 14–15.

The questionnaire has three clusters. Cluster 1 (Items 1–11) covers students' use of digital reading and its perceived benefits, including reading interest, perceived comprehension, multimedia support, memory, motivation, classroom activity, vocabulary, concentration, story comprehension, and engagement. Cluster 2 (Items 12–13) covers perceived problems, namely distraction and reduced concentration. Cluster 3 (Items 14–15) covers teacher readiness and pedagogical recommendations, namely teachers' ability to use digital media and the use of digital reading alongside printed books. All items are statements rated on a five-point Likert scale from 1 (Strongly Disagree) to 5 (Strongly Agree). The questionnaire was administered in Indonesian so that participants could respond clearly and according to their classroom experience.

Validity. Evidence for validity is limited. Content validity rests on the link between each item and the literature in Table 2. Items were written as short statements in simple language. The questionnaire did not go through a separate formal validation procedure, such as expert judgment, a pilot test, or factor analysis. With 22 respondents, factor analysis was not appropriate. The questionnaire should therefore be seen as a preliminary instrument. Its results describe perceptions. They are not a validated measure of reading comprehension. The study also did not include a reading-comprehension test, so it cannot show a causal effect of digital reading on comprehension.

The questionnaire was distributed online through Google Forms, and the survey link was shared with practicing primary school teachers through WhatsApp. Responses were recorded automatically by Google Forms. For the present study, 22 completed responses were included in the analytical dataset, and all 22 responses contained complete answers to the 15 questionnaire items. The questionnaire items, rated on a scale from 1 (strongly disagree) to 5 (strongly agree), were as follows:

1. Elementary school students often use digital devices for reading.
2. Students are more interested in reading using digital media compared to printed books.
3. Digital reading materials help elementary school students understand text content more easily.
4. Images and audio in digital reading materials aid student comprehension.
5. Students find it easier to remember the content of digital reading materials.
6. Digital reading increases the reading interest of elementary school students.
7. Students appear more active when using digital reading materials.
8. Digital reading materials help students understand new vocabulary.
9. Students are more focused when reading using digital media.
10. Students can understand story content well through digital reading.
11. The use of digital media makes reading instruction more engaging.
12. Students are more easily distracted when reading using digital devices.
13. Using digital devices for too long can reduce students' concentration.
14. Teachers need to have the ability to use digital media in reading instruction.
15. Digital reading should be used alongside printed books in elementary school learning.

The questionnaire data were analyzed using descriptive statistics, specifically response frequencies and percentages. Because the purpose of the study was to describe teachers' perceptions rather than to test a causal hypothesis, no experimental comparison, inferential statistical test, or correlation analysis was conducted. For each item, responses on the five-point Likert scale were summarized according to their frequency and percentage. To facilitate interpretation, responses were subsequently grouped into three categories: disagreement (scores 1–2), neutrality (score 3), and agreement (scores 4–5). The analysis was conducted at the individual-item level. Items 1–11 were interpreted as indicators of perceived advantages and learning-related benefits; Items 12–13 were interpreted as indicators of perceived risks associated with distraction and reduced concentration; and Items 14–15 were interpreted as indicators of teacher readiness and pedagogical recommendations. Cronbach's alpha was calculated for Items 1–11 to check internal consistency (see Instrument).

RESULT AND DISCUSSION

Result

This section presents the findings of the study based on the responses of 22 primary school teachers to a 15-item Likert-scale questionnaire. The results are reported using frequency percentages for each response option (1 to 5) and grouped into three interpretive categories: agreement (scores 4 and 5), neutral (score 3), and disagreement (scores 1 and 2). The findings are organized into four thematic areas: digital reading engagement and interest, comprehension and cognitive benefits, risks of distraction and reduced concentration, and teacher readiness and pedagogical

recommendation. Each finding is discussed in relation to existing literature and the Cognitive Load Theory framework.

Table 2. Summary of Teacher Responses Across All 15 Items (N = 22)

Item	Statement	Agree (4–5)		Neutral (3)		Disagree (1–2)	
		n	%	n	%	n	%
Q1	Elementary students frequently use digital devices for reading	13	59.1%	8	36.4%	1	4.5%
Q2	Students are more interested in reading digitally than printed books	17	77.3%	3	13.6%	2	9.1%
Q3	Digital reading helps students understand text content more easily	16	72.7%	4	18.2%	2	9.1%
Q4	Images and audio in digital reading help student comprehension	21	95.5%	1	4.5%	0	0.0%
Q5	Students find it easier to remember digital reading content	15	68.2%	6	27.3%	1	4.5%
Q6	Digital reading increases students' reading motivation	17	77.3%	4	18.2%	1	4.5%
Q7	Students appear more active when using digital reading materials	18	81.8%	3	13.6%	1	4.5%
Q8	Digital reading helps students understand new vocabulary	12	54.5%	10	45.5%	0	0.0%
Q9	Students are more focused during digital reading	13	59.1%	9	40.9%	0	0.0%
Q10	Students understand story content well through digital reading	13	59.1%	8	36.4%	1	4.5%
Q11	Digital media makes reading lessons more engaging	18	81.8%	4	18.2%	0	0.0%
Q12	Students are more easily distracted when using digital devices	16	72.7%	4	18.2%	2	9.1%
Q13	Prolonged digital device use reduces student concentration	14	63.6%	4	18.2%	4	18.2%
Q14	Teachers need ability to use digital media in reading instruction	20	90.9%	2	9.1%	0	0.0%
Q15	Digital reading should be used alongside printed books	18	81.8%	4	18.2%	0	0.0%

For a more nuanced analysis, the first questionnaire cluster (perceived advantages) has been subdivided into two distinct discussion themes: digital reading engagement and cognitive gains.

Discussion

Teachers responded most positively to the engagement items (Table 1, Items 2, 6, 7, and 11). Agreement ranged from 77.3% to 81.8%, and no teacher disagreed with Item 11. Two points need careful reading. First, these items ask about what teachers see in class, not about what students learn. Kikas et al. (2015) found that teachers' views of children's skills are shaped by children's interest as well as their skills. Teachers may therefore read visible enthusiasm as a sign of learning. Prior studies support this caution. Reich et al. (2019) found equal engagement across print and e-book conditions for preschoolers, yet children in the print condition scored slightly higher on comprehension. Engagement does not guarantee better comprehension. Second, CLT supports only a partial reading of these results. Interest may lead students to invest more effort in a text, and this can support learning when the material is well designed. However, this study did not measure cognitive load. Engagement should not be equated with lower cognitive load or better comprehension. In this study, engagement is best read as a perceived motivational benefit that needs to be tested with student data.

The strongest result in the whole questionnaire was Item 4. Twenty-one of the 22 teachers (95.5%) agreed that images and audio help comprehension. This is consistent with earlier findings that specific digital features can matter more than the medium alone. Grimshaw et al. (2007) found that narration in electronic storybooks raised comprehension for 9 to 10-year-old children. López-Escribano et al. (2021) found gains in phonological awareness and vocabulary from interactive e-books. CLT gives a reason for this pattern. Images and audio can share the work between the visual and verbal channels, and this can support understanding when they match the text (Mayer, 2009; Sweller et al., 1998). Three cautions apply. First, Item 4 combines images and audio, so the study cannot tell which feature teachers had in mind. Second, the item is general and says nothing about the quality of the multimedia. Poorly designed or decorative multimedia can add extraneous load. Third, near-unanimous agreement may reflect a common belief about multimedia rather than close observation of comprehension. Reich et al. (2019) found that an e-book with narration did not outperform print for preschoolers, so multimedia support is not always helpful.

Vocabulary, memory, focus, and story comprehension showed weaker and more uncertain agreement (Items 5, 8, 9, and 10). Vocabulary is the clearest case. Only 54.5% agreed and 45.5% were neutral, with no disagreement. This is lower than the vocabulary gains reported in trials of interactive e-books (López-Escribano et al., 2021). One possible reason is that vocabulary growth is hard to see in daily lessons, because it usually needs a test rather than observation. Another possible reason is that the digital materials teachers use may not include vocabulary support, such as word definitions. These are suggestions only, and the data cannot confirm them. From a CLT view, multimedia may help most with presenting content. Deeper processes, such as remembering words and building a mental model of a story, depend on task design and on how much attention students have left for them. The high number of neutral answers shows that teachers do not see all parts of reading as equally supported by digital reading. These results describe what teachers believe. They do not show that digital reading improves comprehension.

Teachers also saw clear risks. Agreement was 72.7% for distraction (Item 12) and 63.6% for reduced concentration after long use (Item 13). These results agree with the meta-analysis of attentional interference in digital reading by Shen (2025). They also agree with Altamura et al. (2025), who reported distraction and reduced concentration as challenges of digital reading. CLT explains why this matters. Features that do not serve the text, such as notifications and animations, can add extraneous load and leave less working memory for understanding (Sweller et al., 1998). Other features of screens, such as scrolling, may also increase load (Mangen et al., 2013). Because cognitive load was not measured, this interpretation is theoretically informed only.

The results also contain a tension. Fifty-nine percent of teachers agreed that students are more focused with digital media (Item 9), while 72.7% agreed that students are more easily distracted (Item 12). These results look contradictory, but they may not be. Focus during a lively activity is not the same as protection from distraction. The study analyzed items one by one, so it cannot show whether the same teachers gave both answers. Teachers may also have been thinking of different conditions, such as well-designed apps compared with general device use. Item 13 supports this reading. It refers to using devices "for too long," and it had the highest disagreement of all items (18.2%). Together, these results suggest that teachers see design and duration as more important than the device itself. Future studies should compare tools, lesson designs, and reading time directly.

Teachers' answers on readiness and practice were consistent with their mixed views of benefits and risks. Agreement was high for Item 14 (90.9%) and Item 15 (81.8%), and no teacher disagreed with either. Support for teacher skill agrees with Adeyiga and Mpungose (2025), who found that the success of digital tools depends on infrastructure and training. In CLT terms, teacher skill matters because teachers choose the tool, the features, and the reading time. These choices decide how much extraneous load students face. Support for combining digital and printed books also fits the mixed research evidence. Some studies found no comprehension difference between formats (Alisaari et al., 2018; Margolin et al., 2013). Others found a print advantage (Mangen et al., 2013; Reich et al., 2019), and Grimshaw et al. (2007) found that specific features mattered. Given this, a combined approach looks like a cautious choice. Item 15 is also a recommendation, not a report of observed effects, so some teachers may have chosen the socially expected answer.

Overall, the teachers saw digital reading as useful mainly through multimedia and engagement, and as risky mainly through distraction and long use. Their views on vocabulary, memory, focus, and story comprehension were uncertain. These findings are teachers' perceptions. They are not evidence that digital reading improves or harms comprehension. Future studies with direct comprehension tests should examine the multimedia and distraction issues raised here.

CONCLUSION

This study examined how primary school teachers in North Sumatra perceive digital reading in relation to children's reading comprehension and classroom learning experiences. The participating teachers perceived benefits mainly in engagement and multimedia support. The strongest agreement concerned images and audio (95.5%). They also perceived risks from distraction and long device use. Their views were less certain about vocabulary, memory, focus, and story comprehension. Teachers also

agreed strongly that they need digital skills and that digital reading should be used together with printed books.

Cognitive Load Theory helped interpret this pattern. Multimedia can support understanding when it fits the text, but distracting features can add extraneous load. Cognitive load was not measured, so CLT served as an interpretive framework only. The findings describe teachers' perceptions. They do not show that digital reading improves or reduces comprehension.

Several limitations apply. First, the study involved 22 teachers selected by convenience sampling, so the results cannot be generalized. Voluntary online participation may also have attracted teachers who are more comfortable with digital media. Second, the study relied on perceptions, not on direct tests of comprehension. Third, the analysis was descriptive and did not test causal relationships. Fourth, the questionnaire had no separate formal validation, and only Items 1–11 were checked for internal consistency. Item 4 also combined images and audio. Future research should use larger and more diverse samples, validate the instrument (for example through expert review and a pilot test), and include direct comprehension tests. Studies that compare digital and printed conditions and vary multimedia design would show whether teachers' perceptions match measured results.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest related to this research or its publication.

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