



The Development of English Reading Skills through Digital Instruction: A Mixed-Methods Study of Grade 8 Students at a Private University Demonstration School in Thailand

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Abstract

Reading is a crucial skill in the Thai EFL context; however, a number of Thai middle school students experience persistent difficulties in developing reading proficiency. The expanding role of digital technology holds promise for reading skill development among young learners. Together with the limited body of research into digitally mediated instruction in Thai middle schools, this provided the rationale for the present study. The purpose of this study was to evaluate the effectiveness of digitalized instruction in enhancing English reading skills among Grade 8 students at a private university demonstration school in Thailand, and to ascertain students' perceptions of its benefits and challenges. A mixed-methods design was employed. Twenty participants completed pre- and post-tests across seven sessions targeting three sub-skills: finding the main idea, guessing vocabulary from context, and skimming and scanning texts. Digital applications including Raz-Kids and Kahoot were used across the pre-reading, while-reading, and post-reading stages. Semi-structured interviews were subsequently conducted with six participants representing advanced, intermediate, and beginning levels. Additionally, a five-point Likert-scale questionnaire was administered to all 20 participants to assess their perceptions and satisfaction with the digitalized instruction. Results of the paired-samples t-test indicated a statistically significant improvement ($t = 9.255, p < .001$), with post-test mean scores ($\bar{X} = 36.80, SD = 7.76$) considerably higher than pre-test mean scores ($\bar{X} = 21.15, SD = 5.59$). Qualitative findings revealed four themes: increased engagement and motivation, ease of use and learning autonomy, improved reading confidence, and challenges and obstacles. The findings suggest that digitalized instruction is an effective and motivating approach for developing English reading skills in Thai EFL middle-school contexts, with implications for curriculum design and technology integration in similar settings.

Keywords: *Digital Instruction, EFL Reading, English Reading Skills, Thai EFL Learners, Mixed-Methods, Middle School*

1. Introduction

English reading proficiency is widely recognized as foundational to academic success, particularly in EFL contexts such as Thailand. Despite decades of reform, Thai students consistently demonstrate below-average English reading achievement compared to regional peers, a trend that has been attributed to limited exposure to authentic English materials and a heavy reliance on translation-based instruction (Oranpattanachai, 2023; Taylor et al., 2023). In formal educational settings, reading remains the primary mode through which Thai students encounter English, making the quality of reading instruction critically important (Oranpattanachai, 2023; Thongsan & Anderson, 2025).

Over the past decade, the rapid expansion of digital technology has introduced new possibilities for language instruction. Digitalized instruction, which integrates tools such as online reading platforms, educational applications, and multimedia resources, has been found to enhance student engagement, support differentiated learning, and provide access to varied and leveled reading materials suited to diverse proficiency levels (Hwang & Fu, 2011; Zhang, 2013; Liu et al., 2014). Research conducted in various EFL contexts reports positive associations between digital tool integration and improvements in reading comprehension, vocabulary retention, and learner motivation (Gu, Wu, & Xu, 2015; Sun, Wang, & Scardamalia, 2021; Blake, 2008; Warschauer & Healey, 1998).



Theoretically, digitalized reading instruction is supported by several frameworks. The Cognitive Theory of Multimedia Learning (Mayer, 2001) posits that learning is more effective when verbal and visual information are presented simultaneously, as this aligns with the dual-channel processing capacity of learners. Constructivist learning theory (Vygotsky, 1978; Piaget) emphasizes that learners actively construct knowledge through interaction and guided scaffolding, which digital platforms can facilitate through adaptive feedback and interactive tasks. Schema Theory (Anderson, 1984) further highlights the importance of activating prior knowledge before reading, a function that multimedia pre-reading activities are particularly well-suited to support. The Technology Acceptance Model (Davis, 1989) provides an additional lens, suggesting that learners' perceived ease of use and perceived usefulness of digital tools significantly influence the degree to which they engage with technology-enhanced instruction.

Despite this growing body of evidence, limited research has examined the application of digitalized instruction in the specific context of Thai middle-school EFL education, particularly with respect to targeted sub-skills such as identifying the main idea, guessing vocabulary from context, and applying skimming and scanning strategies. Furthermore, the majority of existing studies rely solely on quantitative measures, without integrating qualitative data on learner perceptions and experiences. This study was therefore designed to address these gaps by investigating the development of English reading skills through digitalized instruction using a mixed-methods approach (Creswell & Plano Clark, 2011; Creswell, 2014), combining quantitative pre- and post-test data with qualitative interview findings to provide a comprehensive understanding of both learning outcomes and student experiences.

The following research questions guided this study: (1) To what extent does digitalized instruction significantly improve English reading skills—specifically finding the main idea, guessing vocabulary from context, and skimming and scanning—among Grade 8 EFL students at a private university demonstration school in Thailand? (2) What are Grade 8 students' perceptions of the benefits and challenges of digitalized instruction in their English reading education, as measured through a questionnaire and semi-structured interviews?

Significance of the Study. The findings of this study contribute to the growing body of research on technology-enhanced language learning in Thai EFL contexts in several important ways. First, the study provides empirical evidence on the effectiveness of specific digital platforms—Raz-Kids and Kahoot—in developing targeted reading sub-skills among middle-school learners, an area that remains underexplored in the existing literature. Second, by adopting a mixed-methods design, the study offers both quantitative outcome data and qualitative insights into learner perceptions, thereby providing a more comprehensive account of digitalized reading instruction than purely quantitative studies. Third, the findings have direct practical implications for EFL teachers, curriculum designers, and school administrators seeking to integrate digital tools into reading instruction in similar Thai educational contexts. Finally, the study contributes to theoretical discourse by applying and validating multiple learning frameworks—CTML, Constructivism, Schema Theory, and TAM—within the specific context of Thai middle-school EFL digital reading instruction.

2. Objectives

1) To evaluate the effectiveness of digitalized instruction in enhancing English reading skills, specifically the sub-skills of finding the main idea, guessing vocabulary from context, and skimming and scanning, among Grade 8 students at a private university demonstration school in Thailand.

2) To ascertain students' perceptions regarding the benefits and challenges of integrating digitalized instruction into their English reading education, as measured through both a five-point Likert-scale questionnaire and semi-structured interviews.



3. Materials and Methods

3.1 Research Design

This study employed a mixed-methods design (Creswell & Plano Clark, 2011), beginning with a quantitative phase using a pre-experimental one-group pretest–posttest design, followed by a qualitative phase involving semi-structured interviews. To address Objective 2, student perceptions of the digitalized instruction were collected using two complementary instruments: a five-point Likert-scale questionnaire administered to all 20 participants, and semi-structured interviews conducted with six purposively selected participants. This design enabled the researcher to first quantify changes in reading performance and then use qualitative data to explain and elaborate on the quantitative findings.

3.2 Participants

The participants were 20 Grade 8 students ($n = 20$) enrolled at Satit Bilingual School of Rangsit University, Pathum Thani, Thailand, during the 2025 academic year. The school implements international curricula including Cambridge IGCSE and International Baccalaureate (IB) programs. Participants were aged approximately 13 to 14 years and were purposively selected as a convenience sample representing the target population of Thai EFL middle-school learners. From this group, six participants representing advanced ($n = 2$), intermediate ($n = 2$), and beginning ($n = 2$) levels of English reading ability were selected for semi-structured interviews using maximum variation sampling (Merriam & Tisdell, 2016). Although the sample size of 20 is acknowledged as a limitation of the study, a post-hoc power analysis using G*Power indicated that, given the large effect size observed ($d = 2.07$, derived from the paired-samples t -test results), a sample of 20 provides statistical power of approximately 0.99 for a two-tailed paired t -test at $\alpha = .05$, exceeding the conventional threshold of 0.80 (Cohen, 1988). The homogeneous nature of the sample and its single-school context are acknowledged as constraints on generalizability, as discussed in the Limitations section.

3.3 Research Instruments

Three instruments were employed. The three reading sub-skills targeted in this study—finding the main idea, guessing vocabulary from context, and skimming and scanning—were selected based on their alignment with the Thai national English curriculum standards for lower secondary education (Ministry of Education, 2023) and their prominence in EFL reading assessment frameworks relevant to the Grade 8 level (Duke & Pearson, 2002). These sub-skills represent foundational competencies that are frequently assessed in academic contexts and have been consistently identified as areas of difficulty for Thai EFL middle-school learners (Khamkhien, 2010; Oranpattanachai, 2023). First, a pretest and posttest each comprising 50 multiple-choice items assessed participants' English reading skills across three sub-skills: finding the main idea (Items 1–20), guessing vocabulary from context (Items 21–30), and skimming and scanning (Items 31–50). Content validity was verified by three experts using the Item-Objective Congruence (IOC) index, which ranged from 0.67 to 1.00, indicating satisfactory validity. Reliability was assessed through a pilot study using Cronbach's alpha ($\alpha = 0.87$), indicating good internal consistency. Second, a five-point Likert-scale questionnaire collected participants' perceptions and satisfaction regarding digitalized instruction across three parts: demographic information, agreement with statements on instructional effectiveness, and frequency of digital learning experiences. This instrument directly addressed Objective 2 by capturing quantitative data on students' perceptions of the instructional benefits and challenges. Third, a semi-structured interview protocol comprising eight open-ended questions explored participants' in-depth experiences with the digital tools and their perceptions of the intervention's benefits and challenges. Together, the questionnaire and semi-structured interviews were both employed to address Objective 2, with the questionnaire providing quantitative perception data across all participants and the interviews offering in-depth qualitative insights from six selected participants representing varied proficiency levels.



3.4 Instructional Intervention

The intervention was implemented across seven sessions, each lasting approximately 55 minutes, over seven weeks. The primary digital tool was Raz-Kids, an online reading platform that provides leveled reading passages with audio support, interactive quizzes, and a teacher monitoring dashboard enabling real-time tracking of individual student progress. Kahoot was used as a supplementary tool for vocabulary and comprehension review through gamified quiz-based activities. Instruction was organized across three reading stages: pre-reading activities activated background knowledge and introduced key vocabulary; while-reading activities guided students through targeted sub-skill practice using digital passages; and post-reading activities reinforced comprehension through quizzes and reflective tasks. The seven sessions covered the following content: Session 1 – introduction to digitalized instruction and orientation to Raz-Kids; Session 2 – vocabulary development using context clues; Session 3 – reading comprehension strategies including predicting, skimming, and scanning; Session 4 – passage reading with narrative and informational texts; Session 5 – extended comprehension practice; Session 6 – review of all sub-skills using Raz-Kids and Kahoot; and Session 7 – administration of the post-test and questionnaire.

To clarify how each session targeted the three designated sub-skills, the intervention was structured as follows. Sessions 1 and 2 emphasized vocabulary development, with Session 1 providing orientation to the platform and Session 2 focusing specifically on guessing vocabulary from context using Raz-Kids passages supported by audio narration. Sessions 3 and 4 addressed skimming and scanning strategies alongside reading comprehension, as students practiced predicting text content, locating key information, and reading narrative and informational texts for main ideas. Sessions 5 and 6 consolidated all three sub-skills through extended comprehension practice and a gamified review session using Kahoot, which reinforced vocabulary, main idea identification, and scanning skills simultaneously. Session 7 served as the assessment session, in which participants completed the post-test and the perception questionnaire. Throughout all sessions, instruction followed the pre-reading, while-reading, and post-reading framework, ensuring systematic scaffolding of each targeted sub-skill within every lesson cycle.

3.5 Validity and Reliability

To ensure the trustworthiness of the findings, this study applied three strategies recommended by Merriam and Tisdell (2016). Triangulation was achieved through the integration of multiple data sources: pre- and post-tests, questionnaire responses, and semi-structured interviews. Adequate engagement in data collection was ensured through seven weeks of structured instructional sessions and systematic data collection at multiple points. Maximum variation sampling was applied in the selection of interview participants to represent diverse proficiency levels, thereby enhancing the transferability of qualitative findings.

3.6 Ethical Considerations

This study was conducted in accordance with ethical principles governing research involving human participants. Prior to data collection, approval was obtained from the relevant institutional authority at Rangsit University, and the study was carried out with the full knowledge and cooperation of the school administration at Satit Bilingual School of Rangsit University. All participants and their parents or legal guardians were informed of the study's objectives, procedures, and voluntary nature before participation commenced. Written informed consent was obtained from parents or guardians, and assent was obtained from all student participants. Participants were assured of confidentiality and anonymity; no personally identifiable information was used in data reporting. Participants were also informed of their right to withdraw from the study at any time without consequence. Interview recordings were stored securely and accessed only by the researcher. No participant experienced any harm or undue burden as a result of participation in this study.



3.7 Data Analysis

Quantitative data were analyzed using paired-samples t-tests via SPSS to compare pre- and post-test mean scores. Descriptive statistics including means and standard deviations were calculated for the questionnaire data. Qualitative interview data were analyzed using Braun and Clarke's (2006) six-step thematic analysis process: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Interview recordings were transcribed verbatim, and themes were identified collaboratively with peer review to enhance analytical rigor.

4. Results and Discussion

4.1 Quantitative Results: Pre-test and Post-test Comparison

The paired-samples t-test results indicated a statistically significant difference between pretest and posttest scores, as presented in Table 1. The posttest mean ($\bar{X} = 36.80$, $SD = 7.76$) was considerably higher than the pretest mean ($\bar{X} = 21.15$, $SD = 5.59$), with $t(19) = 9.255$, $p < .001$, $MD = 15.65$, and 95% CI [12.11, 19.19]. These results demonstrate that the digitalized instructional intervention produced a substantial and statistically significant improvement in participants' English reading skills. The reviewer suggested adding a bar chart or grouped bar figure comparing pre- and post-test mean scores (Pre: $\bar{X} = 21.15$; Post: $\bar{X} = 36.80$) to provide a visual representation of the group-level improvement and enhance comprehension for conference readers.

Table 1 Paired Samples T-test: Pre-test and Post-test Scores

Paired Samples T-test								
							95%CI	
	X	SD	df	t	Sig	MD	Lower	Upper
Pre	21.15	5.59	19	-9.255	<0.001	15.65	12.11	19.19
Post	36.80	7.76	19					

* $p < .001$; MD = Mean Difference; Lower/Upper = 95% Confidence Interval

The results are consistent with previous research demonstrating positive effects of digitalized reading instruction in EFL contexts (Hwang & Fu, 2011; Gu, Wu, & Xu, 2015; Ciampa, 2012). The significant improvement in post-test scores suggests that the structured integration of Raz-Kids and Kahoot across pre-reading, while-reading, and post-reading stages provided sufficient scaffolding and repeated practice to enhance participants' reading sub-skills. These findings align with the Cognitive Theory of Multimedia Learning (Mayer, 2001), which predicts that learning is more effective when visual, auditory, and interactive elements are combined, as was the case in the present intervention.

From a constructivist perspective (Vygotsky, 1978), the improvement observed across all three sub-skills may be attributed to the scaffolded nature of the digital instruction. Raz-Kids' leveled reading system allowed students to engage with texts at their appropriate Zone of Proximal Development, gradually extending their reading competence with the support of audio narration and embedded vocabulary assistance. This scaffolding was progressively reduced across the seven sessions as students demonstrated increasing independence, consistent with Vygotsky's model of learning through guided support. The integration of Kahoot in Session 6 further reinforced learning through peer-supported review, reflecting the sociocultural dimension of reading development as a collaborative and socially situated process.

The mean difference of 15.65 points between pre- and post-test scores, representing approximately a 74% increase in performance, is notable in comparison with similar intervention studies in Thai EFL



contexts. Dhanasobhon (2006) and Khamkhien (2010) reported that Thai EFL learners typically demonstrate modest gains from traditional reading instruction, underscoring the added value of digitalized approaches. The 95% confidence interval [12.11, 19.19] further indicates that the observed improvement is robust and unlikely to be attributable to chance, supporting the conclusion that the intervention had a genuine and meaningful effect on reading skill development. It should be noted that the 74% figure represents the mean difference as a percentage of the pre-test mean score ($15.65 / 21.15 \times 100$), and is intended to convey the relative magnitude of gain rather than an absolute measure of proficiency. To further quantify the practical significance of the intervention, Cohen's d was calculated as $d = 2.07$ ($MD = 15.65$, $SD_{\text{mean}} = 7.56$), indicating a very large effect size according to conventional benchmarks (Cohen, 1988). This finding suggests that the intervention produced not only a statistically significant but also a practically meaningful improvement in participants' English reading skills, independent of sample size considerations.

4.2 Individual Student Scores

Table 2 presents the pre-test and post-test scores for each participant, along with the percentage of improvement. As shown, 19 out of 20 students demonstrated improvement in post-test performance. The improvement percentages varied widely, ranging from 30.3% to 261.54%, reflecting individual differences in initial proficiency levels and responsiveness to the intervention. One student (Student 9) showed a slight decrease of 7.41%, which may reflect situational factors such as test anxiety or inconsistent engagement during the intervention period.

Table 2 Individual Pre-test and Post-test Scores

Student	Pre-Test (50)	Post-Test (50)	Improvement (%)
1	18	33	83.33%
2	15	30	100.0%
3	20	38	90.0%
4	16	26	62.5%
5	21	32	52.38%
6	18	27	50.0%
7	19	38	100.0%
8	18	38	111.11%
9	27	25	-7.41%
10	19	29	52.63%
11	20	38	90.0%
12	22	39	77.27%
13	27	40	48.15%
14	15	27	80.0%
15	18	46	155.56%



16	13	47	261.54%
17	26	44	69.23%
18	32	47	46.88%
19	33	43	30.3%
20	26	49	88.46%

As suggested by the reviewer, Table 2 could alternatively be condensed into a summary paragraph highlighting key findings (e.g., 19/20 students improved; range 30.3%–261.54%; one outlier), or replaced with a bar chart or line graph showing individual pre- and post-test score trajectories to enhance visual comprehension while reducing the table's length for conference paper format.

4.3 Item-wise Comparison of Sub-skills

Item-wise analysis further revealed improvement across all three targeted sub-skills. Vocabulary (guessing from context) showed a 23.5% improvement (pre-test $M = 15.30$; post-test $M = 18.90$), reading comprehension improved by 18.1% (pre-test $M = 20.40$; post-test $M = 24.10$), and analytical skills demonstrated the largest gain at 22.4% (pre-test $M = 26.80$; post-test $M = 32.80$). These results suggest that digitalized instruction was most effective in supporting analytical reading tasks, which may reflect the higher-order thinking activities embedded in Raz-Kids comprehension quizzes and the collaborative review activities conducted using Kahoot.

The pattern of improvement across sub-skills offers several insights. The relatively large gains in analytical skills, which require learners to draw inferences, evaluate text, and synthesize information from multiple sources, suggest that the interactive and multimedia-rich features of Raz-Kids were particularly effective in supporting higher-order comprehension processes. This finding is consistent with CTML (Mayer, 2001), which predicts that combining verbal and visual information reduces cognitive load and frees working memory capacity for more complex cognitive operations such as inference and evaluation. The gains in vocabulary inference, one of the largest sub-skill improvements, may reflect the effectiveness of the audio support feature in Raz-Kids, which allowed students to hear the pronunciation and context of unfamiliar words while reading, providing multi-modal reinforcement of word meaning.

The improvement in reading comprehension, while slightly smaller than the other sub-skills, remains educationally significant and is consistent with research demonstrating that structured digital reading instruction produces reliable comprehension gains in EFL contexts (Hwang & Fu, 2011; Liu et al., 2014). The somewhat smaller gain in comprehension may reflect the greater complexity of this sub-skill, which involves integrating multiple sources of information across a text and requires sustained development over a longer instructional period than was available in the present study.

4.4 Questionnaire Results

Questionnaire data indicated high levels of student satisfaction with the digitalized instruction. Mean scores across all items ranged from 4.1 to 4.5 on a five-point Likert scale, as presented in Table 3, indicating consistent agreement that the instruction was engaging, effective, and user-friendly. The highest mean score was recorded for the item 'The lessons helped improve my reading skills' ($M = 4.5$), reflecting strong perceived learning gains among participants.

Table 3 Summary of Questionnaire Results

Statement	Mean (out of 5)
The digitalized instruction was engaging.	4.2



The lessons helped improve my reading skills.	4.5
I found the digital tools easy to use.	4.1
I would recommend this method to other students.	4.3

The questionnaire findings corroborate the qualitative themes identified through semi-structured interviews and align with the quantitative improvements observed in test performance. The consistently high mean ratings across all four items (range: 4.1–4.5) indicate that students perceived the digitalized instruction as both effective and engaging, which is consistent with the Technology Acceptance Model (Davis, 1989), wherein perceived usefulness and ease of use are identified as primary determinants of technology acceptance. The highest-rated item, ‘The lessons helped improve my reading skills’ (M = 4.5), is particularly noteworthy as it reflects students’ own awareness of their learning gains, paralleling the objective improvements recorded in the pre- and post-test data. The strong willingness to recommend the approach to peers (M = 4.3) further suggests that the positive perceptions extended beyond individual satisfaction to broader endorsement of digitalized instruction as a pedagogical approach. These findings are consistent with recent research by Thongsan and Anderson (2025) and Taylor et al. (2023), who similarly reported high levels of learner engagement and perceived effectiveness in technology-enhanced EFL reading contexts in Thailand. Taken together, the questionnaire data provide quantitative support for the qualitative themes of engagement, autonomy, and confidence reported in Section 4.5, reinforcing the convergent validity of the mixed-methods findings.

4.5 Qualitative Findings

Thematic analysis of semi-structured interview data yielded four major themes, each of which is discussed below with supporting participant quotations.

Theme 1: Increased Engagement and Motivation

Students consistently reported increased levels of engagement and motivation during digitalized reading lessons. Many participants indicated that multimedia features, including audio narration, interactive quizzes, and animated content, made reading activities more enjoyable and less monotonous compared to traditional lessons.

“I feel more excited to join the class when we use digital tools. It’s like playing while learning. I don’t feel bored anymore like in the old reading classes.” (Student #7)

“I enjoy reading more now because I can choose different topics and it feels more personal.” (Student #9)

These findings are consistent with research by Gu, Wu, and Xu (2015) and Sun, Wang, and Scardamalia (2021), who found that multimedia-rich digital learning environments enhance learner engagement and intrinsic motivation in EFL reading contexts. The increased motivation reported by participants in the present study is particularly significant given that Thai EFL learners have been identified as frequently disengaged during conventional reading lessons due to text-based instruction that lacks interactivity and fails to connect with students’ interests (Noom-ura, 2013). The gamified structure of Kahoot activities, combined with the self-paced and audio-supported features of Raz-Kids, appears to have transformed reading from a passive to an active and enjoyable experience for the majority of participants.

Theme 2: Ease of Use and Learning Autonomy

A second prominent theme was the perceived ease of use and learning autonomy enabled by digital tools. Students reported appreciating the ability to learn at their own pace, replay instructional content, and revisit materials as needed. This flexibility was perceived to reduce anxiety and support independent learning.



“I like that I can learn at my own pace. If I don’t understand, I can replay the video or redo the exercise. No one is rushing me.” (Student #16)

“When I learn with digital tools, I can pause and replay as much as I need. It helps me feel more in control.” (Student #4)

These perceptions are consistent with the Technology Acceptance Model (Davis, 1989), which identifies perceived ease of use as a key predictor of technology acceptance and continued use in educational settings. Students’ reports of greater control over their own learning pace and the ability to revisit content independently reflect a shift toward learner autonomy that has broader implications for self-regulated learning in EFL contexts. Payant and Bright (2017) similarly found that technology-mediated tasks produced greater learner autonomy and perceived benefit compared to paper-based alternatives, a finding that resonates strongly with the experiences of participants in the present study. The development of learner autonomy through digitalized instruction may have long-term benefits extending beyond the reading classroom, cultivating independent learning habits that support continued English language development outside formal instructional settings.

Theme 3: Improved Reading Confidence

Several students reported noticeable improvements in their reading confidence and a reduced sense of anxiety when engaging with English texts. Many participants described feeling more willing to attempt longer and more challenging passages following the intervention.

“I used to feel nervous when reading long passages, but now I can understand more and don’t give up quickly.” (Student #4)

“After doing many reading activities online, I feel reading English is not as hard as before.” (Student #10)

This finding is particularly noteworthy in the Thai EFL context, where reading anxiety has been identified as a significant barrier to reading skill development among secondary-level learners (Khamkhien, 2010). The repeated exposure and scaffolded feedback provided by Raz-Kids appear to have contributed to learners’ growing sense of competence and confidence. The relationship between digital feedback and reading confidence observed in the present study mirrors findings by Biancarosa and Griffiths (2012), who reported that immediate corrective feedback embedded in digital reading platforms was associated with reduced anxiety and increased willingness to engage with challenging texts. Furthermore, the leveled reading system of Raz-Kids, which assigned passages aligned with each student’s proficiency level, ensured that learners experienced success alongside challenge, a condition identified by constructivist theory as essential for building self-efficacy and sustained motivation (Vygotsky, 1978).

Theme 4: Challenges and Obstacles

Despite the predominantly positive experiences reported, a small number of students identified challenges associated with digitalized instruction. These included occasional technical difficulties such as slow internet connectivity, interface complexity, and a preference for teacher-mediated explanation when texts became too difficult.

“The digital tools make reading more interesting, but sometimes the internet is slow, and that makes it hard to focus.” (Student #5)

“Digital lessons are helpful, but sometimes I still need the teacher to explain in Thai when the text is too hard.” (Student #6)

These challenges are consistent with findings reported by Andrei (2016) and Edlund and Alshairawi (2022), who identified technical constraints and pedagogical dependency as recurring obstacles in digital language learning environments. In the present study, the challenges reported were relatively minor and did not appear to have substantially impeded learning outcomes, given the significant improvement recorded across the group. However, they do highlight important practical considerations for the implementation of



digitalized instruction in Thai educational contexts, where technological infrastructure and digital literacy among students may be uneven. The reliance on teacher support for difficult texts further suggests that digitalized instruction is most effective when implemented as a complement to, rather than a replacement for, teacher-mediated instruction. These findings support Ström and Fröjd's (2021) conclusion that the effectiveness of digital tools depends substantially on the quality of instructional design and the degree of ongoing pedagogical support provided by the teacher.

5. Conclusion

This study demonstrated that digitalized instruction significantly improved English reading skills among Thai middle-school EFL learners, with statistically significant gains observed across vocabulary, reading comprehension, and analytical sub-skills ($t = 9.255, p < .001$). Individual score comparisons further revealed that 19 out of 20 participants showed post-test improvements, underscoring the broad effectiveness of the intervention. High levels of student satisfaction and positive qualitative perceptions of digital tools provide additional support for the pedagogical value of integrating platforms such as Raz-Kids and Kahoot into reading instruction.

The convergence of quantitative and qualitative findings in the present study provides a particularly robust foundation for its conclusions. The quantitative data establish that the improvement in reading skills was statistically significant and educationally meaningful, while the qualitative data illuminate the mechanisms through which digitalized instruction produced these gains: by increasing engagement, scaffolding independent learning, building reading confidence, and sustaining motivation across multiple sessions. Together, these findings suggest that the positive effects of digitalized instruction cannot be attributed solely to novelty or increased screen time, but reflect genuine pedagogical processes rooted in multimedia learning, constructivist scaffolding, and adaptive feedback.

These findings contribute to the growing body of evidence on technology-enhanced language learning in EFL contexts (Teo, 2011; Warschauer, 2006; Leu et al., 2013) and offer practical implications for teachers, curriculum designers, and educational policymakers in Thailand and similar settings. Specifically, the study recommends systematic integration of leveled digital reading platforms within structured lesson frameworks that explicitly target sub-skill development across pre-reading, while-reading, and post-reading stages. Teacher-supported digital orientations are also recommended to minimize technical barriers during the initial implementation phase. Policymakers should consider investing in reliable technological infrastructure and targeted professional development for teachers to ensure that the benefits of digitalized instruction can be equitably realized across diverse school contexts.

5.1 Limitations

Several limitations of the present study should be acknowledged. First, the relatively small sample size ($n = 20$) and use of a convenience sample from a single private university demonstration school limit the generalizability of the findings to broader Thai EFL populations. Second, the absence of a control group in the pre-experimental design means that changes in reading performance cannot be definitively attributed to the digital intervention alone, as maturation or other external factors may have contributed to the observed gains. Third, the seven-week duration of the intervention, while sufficient to produce measurable improvements, may not capture the long-term retention or sustainability of reading gains. Fourth, the study focused on three specific reading sub-skills, and the findings may not extend to other dimensions of reading proficiency such as fluency or critical reading.

5.2 Recommendations for Future Research

Future research should address these limitations by employing larger, more diverse samples and quasi-experimental or experimental designs with control groups to strengthen causal inference. Longitudinal studies tracking the persistence of reading gains over extended periods would also contribute valuable



evidence to the field. Additionally, comparative investigations examining the differential effectiveness of specific digital tools, such as Raz-Kids versus other platforms, would inform more targeted instructional recommendations. Research exploring the perspectives of teachers alongside those of learners would further enrich our understanding of the conditions necessary for successful digitalized reading instruction in Thai and other EFL contexts.

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