

The Effectiveness of Google Read Along in Enhancing Reading Skills Among Primary ESL Learners

Aishwarriya Sasi*, Azlina Abdul Aziz

Universiti Kebangsaan Malaysia, Malaysia

*Corresponding author: Aishwarriya Sasi (aishwarriyasasi99@gmail.com)

Received: 4 May 2026

Received in revised form: 2 July 2026

Accepted: 6 July 2026

Published: 10 July 2026

ABSTRACT

Artificial intelligence (AI)-powered reading applications are increasingly being used to support English as a Second Language (ESL) literacy development. This mixed-methods, one-group pre-test–post-test study examined the effectiveness of Google Read Along in improving reading fluency and comprehension among Year 5 ESL learners in a mixed-ability classroom in Pasir Gudang, Malaysia. Many learners experience reading difficulties due to varying proficiency levels and limited opportunities for individualised support. To address this issue, Google Read Along was implemented as an AI-powered reading application incorporating automatic speech recognition (ASR), immediate feedback, and guided reading support. Thirty purposively selected pupils participated in a six-week intervention comprising 18 sessions, each lasting 30 minutes and conducted three times per week. The quantitative findings showed significant improvements in both reading fluency and comprehension. These results were further supported by teacher observations and learner questionnaires, which indicated increased motivation, engagement, and confidence. Pupils also reported more positive perceptions of reading than with traditional Big Book shared reading. However, because the study employed a one-group design without a control group, the findings should be interpreted with caution. Future studies using experimental designs are recommended to provide stronger evidence of the intervention's effectiveness.

Keywords:

AI-Powered applications; ESL learners; Reading fluency; Reading comprehension; Technology in education

Introduction

English plays a central role in global communication, science, and professional development, making it essential for academic success (Hossain et al., 2024). However, English is one of the fundamental subjects taught in schools, as stated in the Ministry's MBMMBI policy, which focuses on strengthening English language proficiency without compromising mastery of the national language. Despite its importance, many primary ESL learners continue to face difficulties in reading fluency and comprehension. In such settings, traditional teacher-centred instruction often struggles to meet individual learning needs (Brookhart, 2017). Consequently, teachers have limited time to provide adequate practice and feedback for each learner.

Despite the growing use of educational technology in classrooms, limited research has examined its effectiveness among Malaysian primary ESL learners, particularly in developing reading fluency and comprehension (Haleem et al., 2022). Classroom observations by the researcher show that many Year 5 pupils are still reluctant to read aloud and often depend heavily on teacher support, even after repeated shared reading activities. These observations led to the present study, which examines whether Google Read Along can offer more individualised support for learners with different reading abilities.

Problem Statement

Although English is widely seen as important for academic and future success, reading achievement among Malaysian primary school learners remains below expected levels. In Year 5 ESL classrooms, many pupils still struggle with both understanding what they read and reading smoothly, which are basic parts of literacy development (Xu, 2023).

These issues become even clearer in mixed-ability classrooms, where pupils are at very different language levels and do not all get the same exposure to English outside school. Before the intervention, classroom observations showed a consistent pattern in which many pupils read word by word, stopped often, and hesitated when they encountered unfamiliar vocabulary. Most lessons still rely on whole-class teaching, while Big Book Shared Reading provides limited opportunities for individual feedback and independent reading practice.

While AI-assisted language learning tools are increasingly adopted, research on their effectiveness in Malaysian primary ESL classrooms remains limited. Existing studies tend to focus on engagement or pronunciation rather than on reading fluency and comprehension as integrated skills (Khasawneh & Belton, 2025). Evidence on AI-powered reading applications in primary education contexts is also still emerging (Nassir & Yacob, 2026). This highlights the need for further investigation into the effectiveness of AI-powered reading applications in supporting reading development among Malaysian primary ESL learners.

Research Objectives

The objective of this paper is to examine the literacy development among Year 5 ESL learners in a Malaysian public primary school using the Google Read Along app. The specific aims are as follows:

1. To assess improvements in literal reading comprehension based on pre- and post-intervention comprehension test scores.
2. To measure the change in reading rate (Words Correct Per Minute) among Year 5 ESL learners before and after using Google Read Along.
3. To explore Year 5 ESL learners' perceptions of the usefulness of Google Read Along in supporting their reading development.

Research Questions

1. How does Google Read Along affect the literal reading comprehension of Year 5 ESL learners?
2. To what extent does the use of Google Read Along improve the reading rate (WCPM) of Year 5 ESL learners?
3. What are Year 5 ESL learners' perceptions of the usefulness of Google Read Along as a reading support tool?

Theoretical Framework

This chapter includes a literature review which details the theoretical framework and research that has been done related to the study. Three concepts were drawn together to support the rationale of technology used for language learning including social mediation, comprehensible input and learner acceptance. These three concepts help to support Google Read Along as an effective reading intervention tool for reading fluency, reading comprehension and learner acceptance. Studies were also reviewed regarding digital learning resources used for ESL classrooms and their impact on reading fluency, reading comprehension and reading motivation.

Vygotsky's Sociocultural Theory

Sociocultural Theory emphasises social interaction and mediated learning in cognitive development (Vygotsky, 1978). Learning occurs through interaction with more knowledgeable others or tools that enable learners to perform beyond their independent capability. This is explained through the Zone of Proximal Development (ZPD), defined as the gap between what learners can do independently and what they can achieve with guidance (Altamimi, 2022).

In language learning, scaffolding supports learners in gradually achieving independence through structured assistance. Such mediation can also be provided by digital tools. Features such as immediate feedback, pronunciation modelling, and guided reading in Google Read Along allow learners to practise independently while receiving instructional support (Nasir & Yacob, 2026).

In this study, Google Read Along functions as a mediating tool within pupils' ZPD. Through AI-powered automatic speech recognition (ASR), it detects pronunciation errors, provides real-time corrective feedback, and supports self-correction. This scaffolding promotes independent reading, improved fluency, and enhanced comprehension. Thus, Sociocultural Theory provides the basis for its use as a reading intervention

Krashen's Input Hypothesis

Krashen's theory on Input Hypothesis states that learners acquire knowledge of a second language when they understand language input that is slightly above their current level (Krashen, 1982). In other words, this input should be comprehensible with a little bit of something that is new to them ($i + 1$).

This theory is applied using the mechanism of digital reading systems by providing leveled readers as well as support to comprehend these readers. Google Read Along provides AI-driven feedback as well as guided reading and speech recognition that enables learners to read along with scaffolding support. Additionally, the system automatically levels readers so that learners are able to access materials that are comprehensible at their appropriate level with new language (Ramasamy et al., 2025).

By allowing learners to engage with texts at their appropriate levels with scaffolding through instant feedback, Google Read Along implements Krashen's Input Hypothesis through guided reading practice.

Technology Acceptance Model

The Technology Acceptance Model (Davis, 1989) explains users' acceptance of technology through two key constructs: perceived usefulness and perceived ease of use. Perceived usefulness refers to the belief that a system enhances performance, while perceived ease of use refers to how effortless the system is to use.

TAM is widely used to examine learner adoption of educational technologies. In this study, it explains how Year 5 pupils perceive Google Read Along as a reading support tool (Schorr, 2023). Learners who perceive it as useful and easy to use are more likely to engage with and continue using it. Prior research shows that these perceptions positively influence engagement and motivation in digital learning contexts (Anthonysamy, 2022). The learner perception questionnaire in this study was developed based on TAM constructs to measure pupils' acceptance of Google Read Along after the intervention.

Together, Sociocultural Theory, Krashen's Input Hypothesis, and TAM form the conceptual foundation of this study. Sociocultural Theory explains how Google Read Along provides scaffolding through AI-mediated feedback, Krashen's theory explains how it delivers comprehensible input for language development, and TAM explains learner acceptance and engagement.

Collectively, these frameworks justify the use of Google Read Along as an AI-powered reading intervention and support the study's focus on reading fluency, reading comprehension, and learner perceptions.

Literature Review

AI-Powered Reading Applications in ESL Education

Recent developments in educational technology have provided interactive input, immediate feedback, and repeated practice opportunities that support English as a Second Language (ESL) reading development (Grabe & Stoller, 2021; Ying et al., 2025). More recently, artificial intelligence (AI)-powered reading applications have expanded these opportunities by incorporating features such as automatic speech recognition (ASR), text-to-speech, adaptive feedback, and guided reading support. These technologies enable learners to receive immediate corrective feedback while engaging in repeated and independent reading practice. Despite these advancements, the use of Google Read Along in Malaysian primary ESL classrooms remains underexplored.

Reading Development Among Primary ESL Learners

Reading development encompasses both reading comprehension and reading fluency, which are essential and interrelated components of literacy. Digital tools have been shown to support learners in developing reading comprehension skills by promoting greater engagement with texts. Yang (2026) found that learners engaged more deeply with texts when prompted by real-time notifications and text-to-speech functions. Similarly, Ekaputra et al. (2023) reported that interactive applications enabled pupils to focus more on understanding textual meaning rather than merely decoding words. The integration of audio and visual support further benefited learners with varying levels of reading proficiency.

In addition to comprehension, digital reading applications have demonstrated positive effects on reading fluency, which comprises reading accuracy, rate, and expression. Baharuddin and Hashim (2020) reported that applications such as Raz-Kids and Epic improved the reading pace of Malaysian primary ESL pupils. Likewise, Xu (2023) found that repeated reading combined with audio modelling helped learners develop greater reading rhythm and pacing. Collectively, these findings suggest that technology-enhanced reading interventions have the potential to improve multiple dimensions of reading development.

Learner Motivation and Engagement

Motivation plays a crucial role in successful ESL reading development. According to the Technology Acceptance Model, learners are more likely to engage with educational technologies when they perceive them as useful and easy to use (Jong et al., 2025). Studies have shown that AI-supported reading applications enhance learners' confidence, increase their interest in reading, and promote greater engagement in learning activities. For example, Alshakh (2025) reported that AI-supported reading tools increased learner confidence and classroom participation. Furthermore, the interactive features of AI-powered reading applications encourage independent practice and sustained motivation, both of which contribute to continuous reading development.

Research Gap

Although digital reading tools have received increasing attention in ESL research, existing studies have largely focused on technology-enhanced reading instruction rather than AI-powered applications specifically designed for young learners. While Jong et al. (2025) highlighted the growing integration of digital reading technologies in ESL education, limited research has examined AI-powered reading applications that provide adaptive feedback through automatic speech recognition and personalised scaffolding.

Furthermore, previous studies have frequently investigated reading comprehension and reading fluency as separate constructs despite their complementary roles in literacy development. Ramasamy et al. (2025) emphasised that integrated investigations of both skills remain limited, particularly among primary school learners whose foundational literacy skills are still developing.

Although digital reading applications such as Raz-Kids and Epic have been widely explored in ESL classrooms (Azmi & Zahari, 2024), these applications differ from emerging AI-powered reading systems such as Google Read Along, which integrates automatic speech recognition, immediate corrective feedback, and guided reading support. Consequently, empirical evidence regarding the effectiveness of AI-powered reading applications in improving reading outcomes among Malaysian primary ESL learners remains limited.

In addition, existing AI-related studies have tended to emphasise learner engagement and motivation rather than measurable improvements in literacy performance. Studies by Nasir and Yaccob (2026) and Tai et al. (2025), for example, focused primarily on affective and behavioural outcomes, with comparatively less attention given to objective improvements in reading fluency and comprehension, particularly in mixed-ability classrooms where differentiated support is essential.

Therefore, a clear gap exists in understanding the effectiveness of AI-powered reading applications in simultaneously improving reading fluency and comprehension among primary ESL learners. This study addresses this gap by examining Google Read Along as an AI-assisted reading intervention and integrating quantitative and qualitative evidence to provide a more comprehensive understanding of its effectiveness within a Malaysian primary school context.

Methods

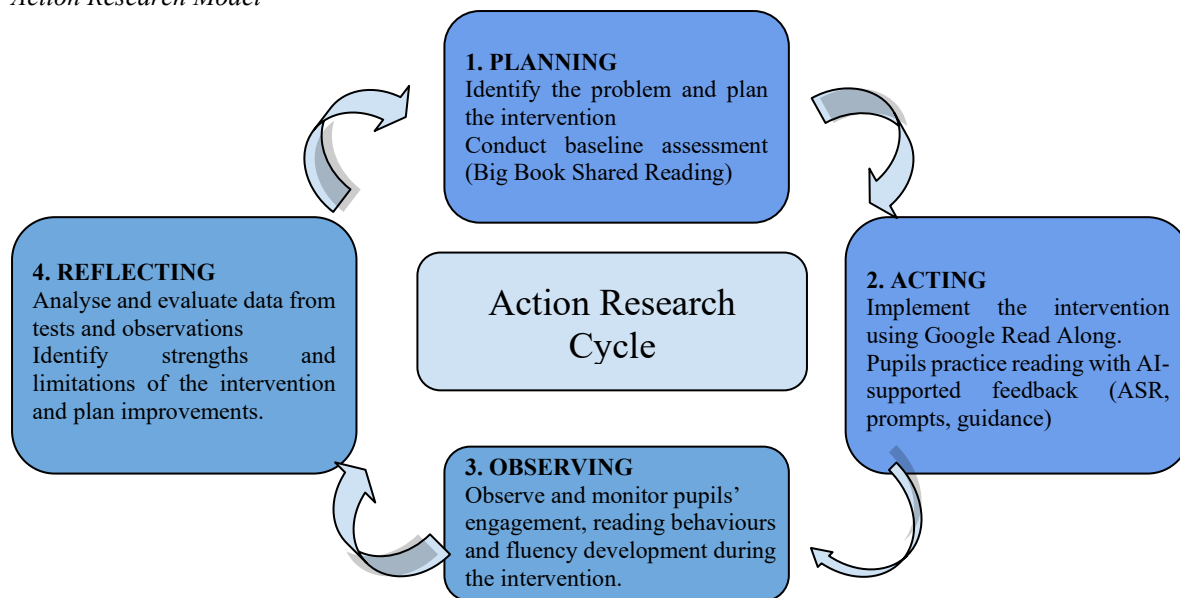
Research Design

A mixed-method pre-test and post-test intervention design was employed. Quantitative data on changes in reading fluency and comprehension were collected using pre- and post-tests. Qualitative data were gathered to understand pupils' experiences and perceptions of the application. This approach provided evidence of the impact of digital reading intervention on literacy development (Creswell & Creswell, 2023). No control group was used in this study; therefore, causal inference should be interpreted with caution.

Action Research Model

This study adopted an action research approach by Whitehead and McNiff (2006). Action research is a cyclical process of planning, acting, observing, and reflecting (see Figure 1). In this study, the model guided the implementation of Google Read Along in the classroom and supported systematic reflection on its impact on pupils' reading development.

Figure 1
Action Research Model



Planning

Prior to the baseline assessment, the researcher witnessed in everyday English lessons how pupils would often get stuck on unknown words, waiting for the teacher to step in before they could carry on reading. These recurring difficulties informed the planning of the Google Read Along intervention.

Acting

Following the establishment of the baseline, the researcher utilized Google Read Along for a six-week duration, allowing pupils to practice reading independently with prompt AI feedback. Participants using Google Read Along get to practice reading aloud, with immediate feedback on their pronunciation and accuracy provided by features such as automatic speech recognition (ASR), interactive prompts, and guided support.

Observing

The pupils' behaviours throughout the classroom were closely monitored during the application of the intervention. Throughout the intervention, the researcher saw improvements in pupils' self-assurance when reading, their engagement in reading exercises, and their willingness to tackle unfamiliar words independently.

Reflecting

Reflection focused not only on improvements in test scores but also on changes in pupils' classroom behaviour and reading independence throughout the intervention. This phase enabled the researcher to evaluate the strengths and limitations of using AI-supported reading technology to enhance pupils' reading development (Kemmis et al., 2014).

Participants

The group of participants for this research comprised 30 Year 5 ESL learners from a government primary school in Pasir Gudang, Malaysia. All participants were aged 11 years old and from low socioeconomic backgrounds, having limited access to English texts and technology for language learning outside of school.

Using purposive sampling, we gathered participants that English teachers suggested had low to moderate reading abilities and little exposure to English beyond the classroom. Following the Google Read Along intervention, each participant was administered a pre-test, post-test, and perception questionnaire.

Research Instruments

Data was collected using four instruments.

Reading Comprehension Test

The researcher constructed the reading comprehension test through CEFR A1 descriptors and Year 5 English Language Curriculum Standards (DSKP). The comprehension test designed by the researcher involved a brief text and ten multiple-choice items assessing literal reading comprehension. Two experienced ESL teachers piloted-tested and approved the content and face validity of the instrument for Year 5 pupils. The researcher administered the test before and after six weeks of intervention.

Oral Reading Fluency Assessment (Multidimensional Fluency Scale)

Reading fluency was measured using a one-minute oral reading assessment based on the Multidimensional Fluency Scale. To measure reading fluency, pupils completed a one-minute oral reading test, the results of which were evaluated using the Multidimensional Fluency Scale (Rasinski, 2004). For the assessment, children read aloud a passage graded to CEFR standards, around 200 words long. Word Correct Per Minute (WCPM) along with four fluency components were recorded: expression and volume, phrasing, smoothness, and rate. Both the pre-test and post-test utilized passages at the same CEFR level. The researcher piloted the assessment tool on a similar population of Year 5 pupils to ensure suitability.

Learner Engagement and Perception Questionnaire (TAM-Based)

A questionnaire, adapted from the Technology Acceptance Model (Davis, 1989), was employed to understand the learners' perspectives on the application. The questionnaire comprised four scales which measured perceived usefulness, perceived ease of use, attitude toward use, and behavioural intention to use. Responses were provided on a four-point Likert scale and accompanied by emoticons (e.g., 😊 😐 😞 😡) to aid understanding for Year 5 pupils. The questionnaire was administered after the intervention.

Teacher Observation Note

Qualitative data on learners' behavior, engagement, and difficulties during the intervention were collected via teacher observation notes. Through a structured checklist, we systematically recorded observations related to engagement, attention, responsiveness, and improvements in reading fluency. Observations of the learners were made passively throughout the lessons, and these were subsequently cross-referenced with WCPM scores.

Data Analysis

Quantitative data from the reading comprehension test, oral reading fluency test and questionnaire were analysed with the aid of descriptive and inferential statistics. Mean scores and standard deviations served as the basis for reporting participant performance prior to and following the intervention. A paired- samples t-test was used to see if there were statistically significant differences between pre-test and post-test scores (Ross & Willson, 2017). SPSS was used to conduct all quantitative analyses. Teacher observation notes were analysed qualitatively through thematic analysis and the six-phase framework by Braun and Clarke (20 21). The main themes present in the observation notes focused on participants' engagement, motivation, behaviour, and confidence while reading. A comprehensive interpretation of the results was made possible by triangulating the quantitative and qualitative data (Morgan, 2024).

Results

Data were collected from 30 Year 5 ESL pupils using pre-test and post-test assessments, supported by a reading fluency measure, perception questionnaire, and teacher observation notes.

The Effect of Google Read Along on the Reading Comprehension of Year 5 ESL Learners

A 10-item reading comprehension test was administered as both pre-test and post-test to measure pupils' performance. Scores were recorded out of 10. Table 1 shows that all pupils scored higher in the post-test, indicating improved reading comprehension after the Google Read Along intervention. Gains were observed across all proficiency levels, although the magnitude varied.

Table 1

Pre-Test and Post-Test Reading Comprehension Scores of Individual Pupils

Proficiency	Participant	Pre-Test	Post-Test	Difference
High	A	6	9	3
	B	6	7	1
	C	6	8	2
Intermediate	D	5	7	2
	E	5	7	2
	F	5	9	4

	G	5	7	2
	H	5	8	3
	I	5	7	2
	J	5	8	3
	K	5	8	2
	L	5	7	3
	M	4	6	4
	N	4	7	3
	O	4	6	2
	P	4	6	3
	Q	4	7	2
	R	4	6	2
	S	4	7	3
	T	4	6	2
	U	4	8	4
	V	4	7	3
	W	4	6	2
	X	4	9	5
	Y	4	6	2
Low	Z	3	6	3
	AA	3	7	4
	AB	3	8	5
	AC	3	6	3
	AD	2	8	6

All pupils demonstrated higher post-test scores compared to pre-test performance, indicating improvement in reading comprehension following the intervention. Gains were observed across high, intermediate, and low proficiency groups.

High-proficiency pupils showed moderate improvement, while intermediate and low-proficiency learners demonstrated larger score gains. Teacher observation notes indicated that pupils gradually showed better understanding of texts, improved accuracy in answering questions, and increased independence during reading tasks.

High Proficiency Learners (A-C)

The high-proficiency group consisted of three pupils who began the study with pre-test scores of 6 marks. Following the Google Read Along intervention, all three pupils demonstrated improvement in their reading comprehension scores. Participant A recorded the highest post-test score of 9 marks while participant B was noted with the lowest score with 7 marks. Overall, improvements within this group ranged from one to three marks, indicating that pupils with relatively higher initial proficiency also benefited from the Google Read Along intervention.

Teacher observation notes further supported these findings. During the initial intervention sessions, high-proficiency pupils generally demonstrated relatively fluent reading but occasionally hesitated when encountering unfamiliar vocabulary. One observation note recorded that *"Participant A read fluently but paused when pronouncing unknown words and self-corrected themselves upon teacher's feedback."* At Week 6, participant A was recorded as *"was able to read the passage smoothly with almost perfect pronunciation, good expression, and completed the task independently without teacher's aid."* which demonstrated improved oral reading fluency, greater confidence, and more accurate responses to comprehension questions.

Intermediate Proficiency Learners (D-Y)

The intermediate-proficiency group consisted of 22 pupils with pre-test scores ranging from 4 to 5 marks. Of these, nine pupils (40.9%) scored 5 marks, while 13 pupils (59.1%) scored 4 marks.

Following the intervention, all pupils demonstrated improvement in their reading comprehension scores. The majority of pupils improved by two marks, while others demonstrated gains of three to five marks. Participant X recorded the largest improvement within this group, increasing from 4 marks in the pre-test to 9 marks in the post-test. Overall, improvements ranged from two to five marks, indicating consistent progress in reading comprehension among pupils with intermediate proficiency.

Teacher observation notes were consistent with the quantitative results. During Week 2, several intermediate-proficiency pupils paused frequently when reading unfamiliar words and occasionally relied on teacher prompts to continue reading. One observation note recorded that *"Participant X exhibits slow reading with several pronunciation errors and needs time-to-time prompting to complete one passage."* By the final week, the same pupil *"read more fluently with fewer pauses, improved pronunciation accuracy, and completed the passage with no peer or teacher support."* Similar improvements were observed among other intermediate-proficiency pupils, who demonstrated increased reading confidence, smoother oral reading, and greater participation during comprehension activities. These observations complement the quantitative findings and provide qualitative evidence of positive changes in pupils' reading development.

Low Proficiency Learners (Z-AD)

The low-proficiency group consisted of five pupils with pre-test scores ranging from 2 to 3 marks. Four pupils (80%) scored 3 marks, while one pupil (20%) scored 2 marks in the pre-test.

Following the intervention, all pupils demonstrated substantial improvement in their post-test scores, with gains ranging from three to six marks. Participant AD recorded the greatest improvement, increasing from 2 marks in the pre-test to 8 marks in the post-test.

Observation notes similarly indicated improvements in pupils' reading behaviours. During Week 1, several low-proficiency pupils required frequent teacher prompting and paused repeatedly when reading unfamiliar words. One observation note recorded that *"Participant AD keeps stopping and doesn't want to ask help."* During the 5th week, that participant was recorded to *"completed the reading passage with less pauses and asked no help."* Similar improvements were observed among other low-proficiency pupils, who demonstrated greater reading confidence, smoother oral reading, and increased participation during comprehension activities.

While the descriptive analysis demonstrated improvements across all proficiency groups, a paired-samples *t*-test was conducted to determine whether the overall improvement in reading comprehension was statistically significant. Prior to conducting the paired-samples *t*-test, the normality of the difference scores was examined using the Shapiro-Wilk test. The results indicated that the assumption of normality was met ($p > .05$). Therefore, the assumptions for conducting the paired-samples *t*-test were satisfied.

Table 2 shows that the mean pre-test score increased from 4.53 to 7.03 in the post-test, representing a mean improvement of 2.50 marks.

Table 2
Paired-Samples t-Test Results for Pre-Test and Post-Test Reading Comprehension Scores

Pair	N	Mean Pre	Mean Post	Difference	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Pre-Test vs Post-Test	30	4.53	7.03	2.50	1.32	0.24	12.41	29	0.000*

The paired-samples *t*-test revealed a statistically significant difference between the pre-test and post-test scores, $t(29) = 12.41$, $p < .001$. The calculated effect size (Cohen's $d = 2.26$) indicates a large practical effect, suggesting that the intervention was associated with substantial improvements in pupils' reading comprehension.

Teacher observation notes supported the quantitative findings. Throughout the six-week intervention, pupils demonstrated increased confidence, improved reading fluency, reduced dependence on teacher assistance, and greater participation during reading comprehension activities.

Improvement in Reading Rate (WCPM) Through the Use of Google Read Along

In this study, reading fluency was measured using Words Correct Per Minute (WCPM) and the Multidimensional Fluency Scale (MFS). This dual-measure approach provided a comprehensive evaluation of pupils' oral reading performance following the Google Read Along intervention.

The results indicate in table 3 that all 30 participants demonstrated improvement in reading fluency following the intervention. Pre-test WCPM scores ranged from 40 to 56, while post-test scores ranged from 45 to 59. Individual gains ranged from +1 to +8 WCPM, indicating consistent improvement across all proficiency levels.

Table 3
Pre-Test and Post-Test Reading Fluency (WCPM) Scores of Participants

Proficiency	Participant	Pre-Test WCPM	Post-Test WCPM	Difference
High	A	54	59	+5
	B	55	56	+1
	C	56	59	+3
Intermediate	D	52	56	+4
	E	50	53	+3
	F	46	50	+4
	G	47	49	+2

Low	H	51	57	+6
	I	48	52	+4
	J	49	52	+3
	K	47	50	+3
	L	46	51	+5
	M	50	54	+4
	N	51	55	+4
	O	47	50	+3
	P	45	52	+7
	Q	52	56	+4
	R	53	57	+4
	S	48	52	+4
	T	51	54	+3
	U	47	50	+3
	V	52	55	+3
	W	49	55	+6
	X	46	49	+3
	Y	48	53	+5
	Z	42	45	+3
	AA	44	50	+6
	AB	43	49	+6
	AC	40	48	+8
	AD	44	48	+4

The mean WCPM score increased from 48.93 (SD = 4.20) to 53.47 (SD = 4.01), indicating a mean gain of 4.53 WCPM.

A paired-samples *t*-test showed a statistically significant improvement in reading rate, $t(29) = 12.91$, $p < .001$. The effect size was large (Cohen's $d = 1.98$), indicating that the Google Read Along intervention had a substantial positive effect on pupils' reading speed and accuracy.

Teacher Observation Notes

Teacher observation notes supported the quantitative findings by highlighting changes in pupils' reading behaviours throughout the intervention.

During the initial phase, high-proficiency pupils read fluently but occasionally hesitated with unfamiliar vocabulary. *Participant A* paused briefly when encountering difficult words. The teacher noted, "*Participant A can read fluently but pauses when seeing difficult words but corrects pronunciation after guidance.*" This reflects minor lexical uncertainty affecting reading continuity.

Intermediate pupils showed more frequent pauses and relied on teacher support. *Participant D* read slowly with pronunciation errors, as reflected in, *Participant D* where they "*struggles with longer sentences and needs support to continue reading.*" This indicates ongoing decoding difficulties affecting fluency.

Low-proficiency pupils experienced the greatest difficulty, with word-by-word reading and heavy dependence on assistance. Participants such as *Z, AA, and AC* frequently paused, as noted, "*Most low-proficiency pupils stop after almost every word and wait for teacher or friend's help before continuing.*" This reflects their limited reading automaticity and reliance on teacher scaffolding during the early stages of the intervention.

In the last week, improvements were evident across all groups. High-proficiency pupils read more fluently with minimal hesitation. Intermediate pupils demonstrated smoother reading and improved accuracy as seen in the observation notes.

Low-proficiency pupils showed clear progress toward independence. *Participant AD* completed passages with minimal support as it was noted that "*Participant AD, who previously hesitated, is now able to read passages completely with least amount of help and with an engaging flow.*"

Table 4 shows the comparison of pre-test and post-test oral reading fluency scores by participant. The MFS results show consistent improvement across all four dimensions of oral reading fluency. Most participants improved from level 2 to level 3 in expression and volume, phrasing, and smoothness. Improvements in pace were also observed, however, they were more gradual and varied across individuals, with several participants showing partial improvement or no change in this dimension.

Table 4
Comparison of Pre-Test and Post-Test Oral Reading Fluency Scores by Participant

Proficiency	Participants	Expression & Volume	Phrasing	Smoothness	Pace	Total
High	A	2→3	2→3	2→3	2→3	8→12
	B	2→3	2→3	2→3	2→2	8→11
	C	2→3	2→3	2→3	2→3	8→12
Intermediate	D	2→3	2→3	2→3	2→3	8→12
	E	2→3	2→3	2→3	2→3	8→12
	F	2→3	2→3	2→3	1→2	7→11
	G	2→3	2→3	2→3	1→2	7→11
	H	2→3	2→3	2→3	2→3	8→12

	I	2→3	2→3	2→3	2→3	8→12
	J	2→3	2→3	2→3	2→3	8→12
	K	2→3	2→3	2→3	1→2	7→11
	L	2→3	2→3	2→3	1→2	7→11
	M	2→3	2→3	2→3	2→3	8→12
	N	2→3	2→3	2→3	2→3	8→12
	O	2→3	2→3	2→3	1→3	7→12
	P	2→3	1→2	2→3	1→2	6→10
	Q	2→3	2→3	2→3	2→3	8→12
	R	2→3	2→3	2→3	2→3	8→12
	S	2→3	2→3	2→3	2→3	8→12
	T	2→3	2→3	2→3	1→3	8→12
	U	2→3	2→3	2→3	2→3	7→12
	V	2→3	2→3	2→3	1→3	8→12
	W	2→3	2→3	2→3	1→2	7→11
	X	1→2	2→2	2→3	1→2	6→10
	Y	2→3	2→3	2→3	1→2	7→11
Low	Z	1→2	1→2	2→2	1→2	5→8
	AA	1→2	2→2	2→3	1→2	6→9
	AB	1→2	2→2	1→3	1→2	5→8
	AC	1→2	1→2	1→2	1→2	4→8
	AD	1→2	1→2	2→3	1→2	5→9

These findings suggest that while expressive and structural aspects of reading developed more rapidly, pace improved at a slower rate, reflecting its more complex developmental nature.

Integrated Interpretation of WCPM and MFS

The integration of WCPM and MFS findings provides a comprehensive understanding of pupils' reading fluency development from both quantitative and qualitative perspectives.

The increase in WCPM indicates improved reading rate and accuracy, reflecting greater word recognition automaticity during oral reading. Meanwhile, MFS results demonstrate improvements in oral reading quality, particularly in expression, phrasing, smoothness, and pace. Improvements in smoothness and phrasing correspond with WCPM gains, as reduced hesitations and better word grouping enhanced reading continuity. Gains in expression and volume further suggest increased confidence and engagement during oral reading.

Although progress in pace was more gradual, this reflects the natural developmental sequence of prosodic fluency, which typically develops after accuracy and automaticity. Overall, the findings confirm that Google Read Along improved reading fluency in a balanced manner, enhancing both reading rate and oral reading quality.

Learners' Perception of the Usefulness of Google Read Along as a Reading Supporting Tool

Pupils' perceptions of Google Read Along were examined using a questionnaire administered before and after the intervention. The questionnaire compared pupils' perceptions of the traditional Big Book shared reading approach with Google Read Along across four dimensions: perceived usefulness, ease of use, enjoyment of reading, and motivation to continue reading. Teacher observation notes were used to support and triangulate the questionnaire findings. Table 5 dan Figure 2 present the comparison of Year 5 pupils' perceptions of reading support before and after the Google Read Along intervention (n = 30).

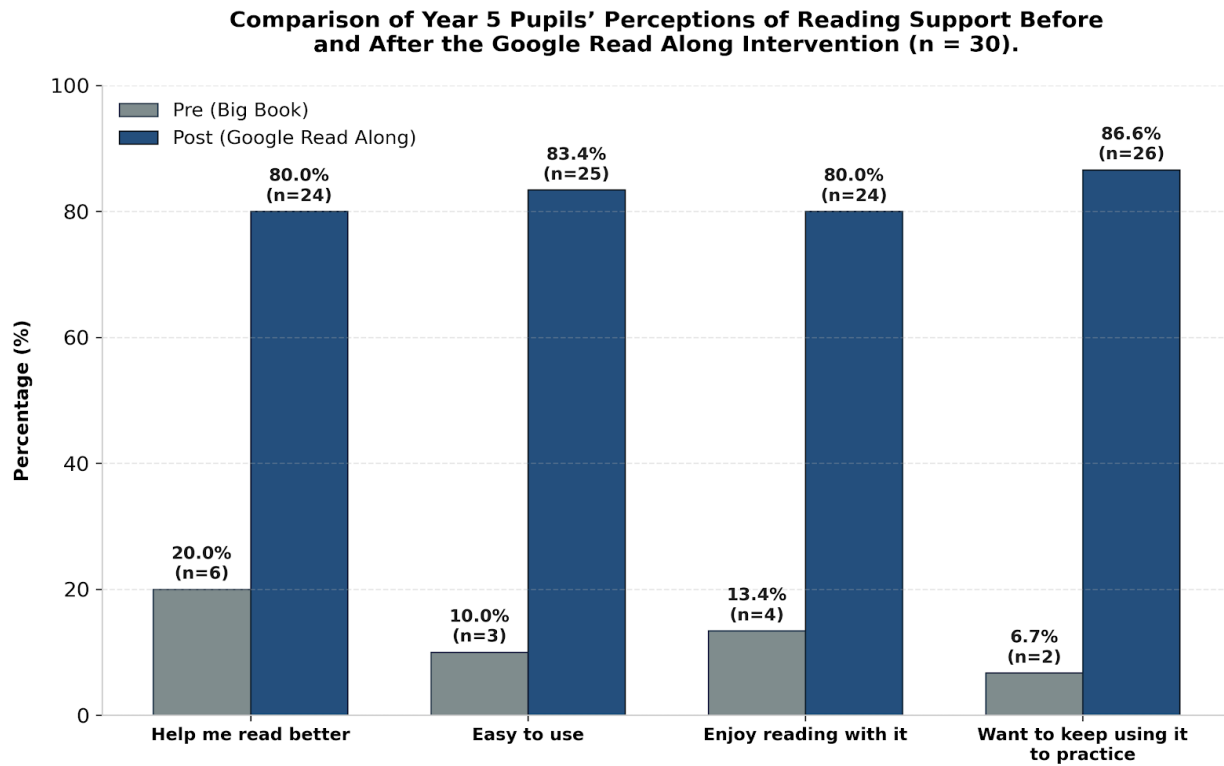
Table 5

Comparison of Year 5 Pupils' Perceptions of Reading Support Before and After the Google Read Along Intervention (n = 30).

Domain/Item	Time	Strongly Agree (%)	Agree (%)	I'm not Sure (%)	Disagree (%)	Strongly Disagree (%)
Help me read better	Pre (Big Book)	2 (6.7%)	4 (13.3%)	4 (13.3%)	7 (23.3%)	13 (43.3%)
	Post (Google Read Along)	17 (56.7%)	7 (23.3%)	1 (3.3%)	1 (3.3%)	4 (13.3%)
Easy to use	Pre (Big Book)	1 (3.3 %)	2 (6.7%)	6 (20.0%)	8 (26.7%)	13 (43.3%)
	Post (Google Read Along)	20 (66.7%)	5 (16.7%)	1 (3.3%)	1 (3.3%)	3 (10.0%)
Enjoy reading with it	Pre (Big Book)	2 (6.7%)	2 (6.7%)	5 (16.7%)	7 (23.3%)	15 (50.0%)
	Post (Google Read Along)	18 (60%)	6 (20.0%)	2 (6.7%)	1 (3.3%)	4 (13.3%)
Want to keep using it to practice reading	Pre (Big Book)	1 (3.3%)	1 (3.3%)	6 (20.0%)	9 (30.0%)	13 (43.3%)
	Post (Google Read Along)	19 (63.3%)	7 (23.3%)	1 (3.3%)	1 (3.3%)	4 (13.3%)

Figure 2

Comparison of Year 5 Pupils' Perceptions of Reading Support Before and After the Google Read Along Intervention (n = 30).



Item 1: Helps me read better

Before the intervention, most pupils did not perceive the Big Book as helping them improve their reading. Only 20.0% (n = 6) agreed or strongly agreed that it helped them read better, whereas 66.7% (n = 20) disagreed or strongly disagreed. Following the Google Read Along intervention, positive responses increased substantially, with 80.0% (n = 24) of pupils agreeing or strongly agreeing that the application helped them read better.

Teacher observation notes supported these findings. During the Big Book sessions, the teacher noted, “*Many pupils required repeated prompting before attempting unfamiliar words and often waited for teacher guidance before continuing.*” This suggests that pupils relied heavily on teacher support during reading. Following the intervention, the teacher observed, “*Most pupils attempted to read independently and required less guidance to complete the reading texts.*” These observations suggest that Google Read Along supported greater reading independence and reinforced pupils' positive perceptions of its usefulness as a reading support tool.

Item 2: Ease of Use

Before the intervention, only 10.0% (n = 3) of pupils agreed or strongly agreed that the reading activity was easy to use, while 70.0% (n = 21) disagreed or strongly disagreed. Following the intervention, positive responses increased markedly, with 83.3% (n = 25) agreeing or strongly agreeing that Google Read Along was easy to use.

Teacher observations reflected a similar pattern. During the initial sessions, the teacher recorded, “*Several pupils appeared hesitant when reading and frequently asked for assistance before continuing.*” This suggests that many pupils lacked confidence when using the traditional reading approach. By the end of the intervention, the teacher noted, “*Pupils used the application confidently and even helped their classmates during reading activities.*” These

observations support pupils' positive perceptions that Google Read Along was easy to use and encouraged greater independence during reading tasks.

Item 3: Enjoyment of Reading

Prior to the intervention, pupils demonstrated relatively low enjoyment of reading. Only 13.3% (n = 4) agreed or strongly agreed that they enjoyed reading with the Big Book, whereas 73.3% (n = 22) disagreed or strongly disagreed. Following the intervention, positive responses increased considerably, with 80.0% (n = 24) agreeing or strongly agreeing that they enjoyed reading with Google Read Along.

Teacher observation notes further supported these findings. During the Big Book sessions, the teacher observed, *“Only a few pupils volunteered to read aloud, while many appeared distracted or reluctant to participate.”* This indicates limited engagement during reading activities. In contrast, during the Google Read Along sessions, the teacher recorded, *“Pupils very happy, smiled, and volunteered to read aloud, and were actively engaged throughout the lesson.”* These observations suggest that Google Read Along created a more engaging reading environment, resulting in greater enjoyment and active participation during reading activities.

Item 4: Motivation to Continue Reading

Before the intervention, pupils demonstrated relatively low motivation to continue practising reading. Only 6.6% (n = 2) agreed or strongly agreed that they wanted to continue using the reading activity, while 73.3% (n = 22) disagreed or strongly disagreed. Following the intervention, positive responses increased substantially, with 86.7% (n = 26) agreeing or strongly agreeing that they wanted to continue using Google Read Along to practise reading.

Teacher observations supported these findings. During the initial sessions, the teacher noted, *“Many pupils completed the reading task only after repeated encouragement and showed no interest in rereading the passages.”* This reflects limited motivation to engage in repeated reading activities. By the end of the intervention, the teacher observed, *“A few pupils voluntarily repeated stories and requested additional reading texts after completing their assigned passages”*. These observations support pupils' increased motivation and willingness to practise reading independently.

Overall Analysis of Pupils' Perceptions

Overall, the questionnaire findings indicate a clear positive shift in pupils' perceptions following the Google Read Along intervention across all four dimensions. The proportion of pupils selecting Strongly Agree increased from 3.3%–6.7% before the intervention to 56.7%–66.7% after the intervention. Conversely, Strongly Disagree responses decreased from 43.3%–50.0% before the intervention to 10.0%–13.3% after the intervention.

Teacher observation notes further supported these findings. Throughout the intervention, pupils became more confident and independent readers, participated more actively during oral reading, required less teacher assistance, and demonstrated greater enjoyment and motivation during reading activities. Collectively, the questionnaire and observation findings suggest that pupils perceived Google Read Along as a useful, engaging, and user-friendly reading support tool that enhanced their reading experience, promoted independent reading practice, and fostered positive attitudes towards reading.

Discussions

This chapter presents the findings of the study in relation to the three research questions: (i) the effect of Google Read Along on reading accuracy, (ii) the effect on reading fluency (reading rate and prosody), and (iii) pupils' perceptions of Google Read Along as a reading support tool. Interpretation of the findings will be grounded in relevant theoretical perspectives and empirical studies.

Google Read Along had a positive effect on pupils' reading accuracy regardless of proficiency level, and greatest benefits were found for low-proficiency learners. The observed improvements in accuracy can be attributed to the

speech recognition capabilities, instantaneous corrective feedback, and structured practice provided, all of which help to minimize decoding mistakes and build automatic word recognition.

These results mirror Qi et al. (2025) and Avrianti et al. (2026) who found similar benefits of AI-mediated feedback and repeated oral reading practice on reading accuracy with emphasis on struggling readers. Daniel et al. (2021) also highlights that lower- proficiency pupils tend to benefit more from RR software because participants with higher reading proficiencies experience a ceiling effect.

As for theoretical justification, Automaticity Theory (LaBerge & Samuels, 1974) can explain how repetition allowed for greater reading accuracy as there was less decodable load allowing pupils to recognize more words on sight. This shift in cognitive load consequently paved the way for improved comprehension. Google Read Along's real-time, scaffolded feedback directly relates to Vygotsky's concept of the Zone of Proximal Development. As learners received support when needed during independent practice, they became less reliant on the teacher and took control of their own learning (Munshi et al., 2022). Krashen's Input Hypothesis (1985) is also relevant, considering the pupils were provided with comprehensible input, pitched slightly higher than their current abilities, through teacher feedback and leveled reading selections. Overall, reading accuracy develops through the combined effects of repetition, scaffolding, and appropriately levelled input rather than a single mechanism.

Participants demonstrated significant progress in their reading rate (WCPM) and the prosodic aspects of fluency, including expression, phrasing, and smoothness. Although progress was noted for every student, those at lower proficiency levels achieved greater gains, indicating a heightened benefit from the structured reading approach. This aligns with the findings presented by Shen et al. (2025) and Darus et al. who discovered that using AI for repeated reading decreases hesitation and improves automatic processing. Kim et al. (2021) defines fluency as multidimensional, involving both speed and expressive reading.

Developmental progression has also been observed with increases in accuracy and prosody preceding increases in rate. This result is consistent with what Rodgers et al. (2025) and Wang et al. who report that expressive fluency stabilizes before noticeable speed gains appear. This phenomenon might be understood through Automaticity Theory, where a decrease in the effort needed for word decoding enables readers to shift their focus toward better phrasing, expression, and the overall construction of meaning. These findings show that growth in fluency is both quantitative and qualitative.

Pupils perceived Google Read Along positively with respect to usefulness, ease of use, enjoyment, and motivation. Teachers' observations corroborated these positive views, noting how learners were more engaged with the tool, read more independently, and kept participating in reading activities. Yang (2026) and Maisani et al. (2022) found similar results in that learner confidence was increased when using AI-supported reading environments.

This acceptance follows the Technology Acceptance Model which states that perceived usefulness and ease of use affect a user's continued use of technology (Aziz et al., 2025). The study clearly demonstrated the presence of both factors, evidenced by the pupils expressed willingness to continue using the application.

Pupils' motivation can also be understood through the lens of Self-Determination Theory (Deci & Ryan, 2000) where autonomy was fulfilled by reading at their own pace, competence was developed by receiving corrective feedback, and engagement was promoted by the interactive rewarding system.

Overall, the results revealed that Google Read Along had a beneficial effect on the learners' reading progress in terms of cognitive and affective factors. This benefit was especially present for those with lower reading proficiency levels.

There was also positive correlation between accuracy, fluency, and affective measures, as learners who practiced more reading felt more confident and motivated to read more (Cubillos & Troncoso, 2025). These findings are explained through complementary roles of the theories, showing AI-enhanced learning supports automaticity, scaffolding, comprehensible input, feedback, and motivation.

Additionally, the findings have proven that AI-powered educational reading applications should be implemented in primary ESL classrooms, especially those with mixed reading levels that require individualized scaffolding (Aldaman et al., 2026). In summary, Google Read Along is an effective tool that teachers can use to enhance pupils' reading accuracy, fluency, and self-motivation during independent reading.

Conclusion

The findings demonstrate that Google Read Along is an effective supplementary AI-powered reading intervention for enhancing reading accuracy, reading fluency, and learners' perceptions among Year 5 Malaysian ESL pupils. Improvements were observed across all proficiency levels, with the greatest gains recorded among low-proficiency learners, indicating that AI-supported reading tools can provide differentiated support for pupils with varying reading abilities. Collectively, the findings suggest that Google Read Along contributes to both the cognitive dimension of reading development, through improvements in accuracy and fluency, and the affective dimension, through enhanced motivation, engagement, and positive perceptions towards reading.

Beyond measurable improvements in reading performance, pupils demonstrated more positive attitudes towards reading following the intervention. Compared with the traditional Big Book Shared Reading approach, pupils perceived Google Read Along as more useful, engaging, enjoyable, and motivating. These findings support previous research highlighting the motivational value of interactive and AI-supported learning environments in promoting active learner participation (Altamimi & Ogdol, 2023).

This study contributes to the limited research on AI-supported language learning by offering an empirical examination of the use of Google Read Along in a Malaysian primary ESL classroom. The study also provides insights into how key AI features, including speech recognition, immediate corrective feedback, scaffolding, and repeated reading, support reading development while promoting autonomous learning. In addition, the integration of established learning and motivational theories offers a theoretical explanation of the cognitive and motivational processes underlying pupils' reading gains.

Applied to a real-world context, these results show that Google Read Along can be used as an effective supplemental reading tool in primary ESL classrooms, especially those with diverse language proficiency levels where teachers may struggle to meet each student's unique learning needs. Additionally, these results help validate Malaysia's digital education efforts by highlighting how an AI-based approach can allow educators to provide a more equitable, differentiated, and student-focused approach to reading instruction (Jong et al., 2025). If paired with effective teaching strategies and given sufficient technology access, AI reading technologies show promise at increasing literacy rates for Malaysian primary ESL pupils (Ramasamy et al., 2024).

Limitations and Future Studies

Several limitations should be considered when interpreting the findings of this study. First, the study involved a purposive sample of 30 mixed-ability Year 5 ESL pupils from a single public primary school in Pasir Gudang. Consequently, the findings may not be generalisable to schools with different demographic characteristics, including rural schools, high-performing schools, or schools serving learners from different socioeconomic backgrounds (Gamble & Hewlett, 2026).

Second, the study employed a one-group pre-test–post-test design without a comparison or control group. Although significant improvements were observed following the intervention, the findings cannot conclusively attribute these improvements solely to Google Read Along, as other factors, such as classroom instruction, learners' maturation, or repeated exposure to reading activities, may also have contributed to the observed outcomes. Future studies employing experimental or quasi-experimental designs with appropriate comparison groups would provide stronger evidence regarding the effectiveness of AI-supported reading interventions.

Third, the intervention was conducted over a relatively short six-week period. Consequently, the study was unable to examine the long-term retention of reading gains or the sustainability of learners' motivation and engagement. In

addition, external factors, including parental support, access to digital devices, internet connectivity, learners' digital literacy, and teachers' technological competence, may have influenced both the implementation of the intervention and learners' reading outcomes (Alshakh, 2025; Anthonysamy, 2022).

Fourth, although Google Read Along has the adaptive scaffolding capabilities including speech recognition technology, corrective feedback, and assisted reading, Google Read Along as a program may not be sufficient to develop higher-level thinking skills when reading. Skills such as inferring, analyzing, and evaluating will most likely require teacher instruction in addition to AI assisted learning (Nasir & Yaccob, 2026).

Lastly, this study focused mainly on reading tests, questionnaires, and teacher observations. Consequently, limited information was obtained on learners' reading behaviours, strategy use, and shifts in motivation during the intervention. Interviews, focus groups, think-aloud protocols, classroom observations, or learning analytics might be included in future research to capture learners' experiences when utilising AI-supported reading applications.

Future studies should therefore involve larger and more diverse samples across different educational contexts to improve the generalisability of the findings (Ahmad et al., 2023). Longitudinal studies are recommended to examine the long-term effects of Google Read Along on reading development and learner motivation (Avranti et al., 2026). Comparative research involving different AI-powered reading applications would also help determine whether the observed improvements are specific to Google Read Along or reflect the broader effectiveness of AI-assisted reading technologies (Tessensohn et al., 2025). In addition, future research should investigate the effectiveness of AI-supported reading interventions among learners with special educational needs and explore the roles of parental involvement, teacher readiness, and digital learning environments in supporting reading development beyond the classroom.

Conflict of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

Acknowledgment

1. We would like to thank Universiti Kebangsaan Malaysia for their support and for providing the necessary resources and guidance throughout the completion of this study.

References

- Ahmad, N., Alias, F. A., & Abdul Razak, N. A. (2023). Understanding population and sample in research: Key concepts for valid conclusions. *e-Learning@CS (SIG), Universiti Teknologi MARA*. <https://appspenang.uitm.edu.my/sigcs/>
- Al-Bogami, R. M., & Alahmadi, N. A. (2025). Effects of an AI-based reading progress tool on third-grade EFL learners' oral reading fluency. *Computers and Education Open*, 9, 100283. <https://doi.org/10.1016/j.caeo.2025.100283>
- Aldamen, H., Alnemrat, A., Al-Deaibes, M., & Alsharefeen, R. (2026). Using AI to adapt reading input for mixed-proficiency EFL learners. *Frontiers in Education*, 11. <https://doi.org/10.3389/feduc.2026.1737903>
- Alshakh, A. (2025). Use of AI tools in navigating reading difficulties of adult EFL learners. *World Journal of English Language*, 15(8), 358. <https://doi.org/10.5430/wjel.v15n8p358>
- Altamimi, M. O., & Ogdol, R. (2023). The effects of a shared reading approach on improving students' comprehension. *International Journal of Research in Education and Science*, 9(2), 308–328. <https://doi.org/10.46328/ijres.3047>
- Anthonysamy, L. (2022). Motivational beliefs and digital literacy. *Heliyon*, 8(12). <https://doi.org/10.1016/j.heliyon.2022.e11913>
- Avrianti, N., Yuliana, Y. G. S., & Ikhsanudin. (2026). AI-based pronunciation training tools for English language learners: A systematic review. *Journal of English Education Program*, 7(1). <https://doi.org/10.26418/jeep.v7i1.99864>
- Aziz, R. A., Baharum, N. D., Ahmad, T. S. A. T. S., & Awang, S. (2025). WAAT implementation in academic writing. *Journal of Creative Practices in Language Learning and Teaching*, 13(3), 1–16. <https://doi.org/10.24191/cplt.v13i3.5735>

- Azmi, N. N., & Zahari, Z. (2024). E-books as a tool to improve reading comprehension among Year 4 ESL students. <https://doi.org/10.37134/ajelp.vol12.2.4.2024>
- Baharuddin, N. Q., & Hashim, H. (2020). Digital reading in ESL Malaysian classrooms. *Journal of Educational and Learning Studies*, 3(1), 7. <https://doi.org/10.32698/0832>
- Braun, V., & Clarke, V. (2021). *Thematic analysis: A practical guide*. SAGE.
- Brookhart, S. M. (2017). *How to give effective feedback to your students*. ASCD.
- Burns, A. (2010). *Doing action research in English language teaching*. Routledge.
- Chen, H., & Huang, Y. (2024). The impact of digital learning platforms on student motivation. *Journal of Education Humanities and Social Sciences*, 39, 391–395. <https://doi.org/10.54097/fab4wb46>
- Creswell, J. W., & Creswell, J. D. (2023). *Educational research*. Pearson.
- Cubillos, M., & Troncoso, R. (2025). The evolving relationship between reading motivation and achievement: A longitudinal study. *Education Sciences*, 15(10), 1274. <https://doi.org/10.3390/educsci15101274>
- Davis, F. D. (1989). Technology acceptance model. *MIS Quarterly*, 13(3), 319–340. <https://doi.org/10.2307/249008>
- Deci, E. L., & Ryan, R. M. (2000). Self-determination theory. *Psychological Inquiry*, 11(4), 227–268.
- Daniel, J., Vaughn, S., Roberts, G., & Grills, A. (2022). The importance of baseline word reading skills in examining student response to a multicomponent reading intervention. *Journal of Learning Disabilities*, 55(4), 259–271. <https://doi.org/10.1177/00222194211010349>
- Ekaputra, F. D., Herdiawan, R. D., & Nurhidayat, E. (2023). The effect of text-to-speech (TTS) as language exposure towards students' reading comprehension. *Papanda Journal of English Education*, 2(2), 71–76. <https://doi.org/10.56916/pjee.v2i2.887>
- Gamble, J., & Hewlett, L. (2026). Working across the gap: The ongoing challenge of generalizability in qualitative research. *International Journal of Research & Method in Education*, 49(1), 4–23. <https://doi.org/10.1080/1743727X.2025.2544015>
- Grabe, W., & Stoller, F. L. (2021). *Teaching and researching reading*. Routledge.
- Haleem, A., Javaid, M., Qadri, M. A., & Suman, R. (2022). Role of digital technologies in education. *Sustainable Operations and Computers*. <https://doi.org/10.1016/j.susoc.2022.05.004>
- Hossain, K. I. (2024). Reviewing the role of culture in English language learning: Challenges and opportunities for educators. *Social Sciences & Humanities Open*, 9, 100781. <https://doi.org/10.1016/j.ssaho.2023.100781>
- Jong, M., Ruzaini, A., Thulasy, S., Ravi, D. M., Munirah, W. A., Yunus, M. M., Hashim, H., & Salehi, H. (2025). Leveraging artificial intelligence (AI) to enhance differentiated learning strategies in Malaysian ESL learners: A conceptual paper. *ASEAN Artificial Intelligence Journal*, 2(1), 1–18. <https://doi.org/10.37934/aaaj.2.1.118>
- Kargiotidis, A., & Manolitsis, G. (2026). Understanding the role of reading and oral language skills growth in overcoming reading comprehension difficulties. *Behavioral Sciences*, 16(1), 90. <https://doi.org/10.3390/bs16010090>
- Kemmis, S., McTaggart, R., & Nixon, R. (2014). *Action research planner*. Springer.
- Khasawneh, M. A. S., & Belton, B. (2025). Disclosing the effects of automated feedback on reading comprehension, reading motivation, reading engagement, and reading anxiety through personalized technology-enhanced learning. *Computers in Human Behavior Reports*, 20, 100817. <https://doi.org/10.1016/j.chbr.2025.100817>
- Kim, Y. G., Quinn, J., & Petscher, Y. (2021). What is text reading fluency and is it a predictor or an outcome of reading comprehension? A longitudinal investigation. *Developmental Psychology*, 57(5), 718–732. <https://doi.org/10.1037/dev0001167>
- Krashen, S. D. (1982). *Principles and practice in SLA*. Pergamon.
- LaBerge, D., & Samuels, S. J. (1974). Reading automaticity theory. *Cognitive Psychology*, 6(2), 293–323.
- Maisani, R., Akhyar, T., & Mulyadi, M. (2022). Digital learning of English: EFL learners' perceptions and teaching activities. *Journal of English Language and Education*, 7(2), 36–43. <https://doi.org/10.31004/jele.v7i2.281>
- Morgan, H. (2024). Using triangulation and crystallization to make qualitative studies trustworthy and rigorous. *The Qualitative Report*, 29(7), 1844–1856. <https://doi.org/10.46743/2160-3715/2024.6071>

- Munshi, A., Biswas, G., Baker, R., Ocumpaugh, J., Hutt, S., & Paquette, L. (2022). Analysing adaptive scaffolds that help students develop self-regulated learning behaviours. *Journal of Computer Assisted Learning*, 39(2), 351–368. <https://doi.org/10.1111/jcal.12761>
- Nasir, N. S., & Yaccob, N. S. (2026). AI-integrated Reading with Google Read Along: ESL Primary Learners Gamified Intervention. *EDUCATUM Journal of Social Sciences*, 12(Special Issue 2), 134–152. <https://doi.org/10.37134/ejoss.vol12.sp2.12.2026>
- Qi, A. Y., Yunus, M. M., & Wong, W. L. (2025). Enhancing English reading skills through AI-based tools: A systematic review. *Quantum Journal of Social Sciences and Humanities*, 6(6), 373–390. <https://doi.org/10.55197/qjssh.v6i6.960>
- Ramasamy, J. V., Yunus, M. M., & Ismail, H. H. (2025). Effectiveness of Google Read-Along application in improving reading skills of rural area upper primary ESL classroom. *International Journal of Academic Research in Progressive Education and Development*, 14(1). <https://doi.org/10.6007/IJARPED/v14-i1/24948>
- Rodgers, E., D'Agostino, J. V., Levin, J. R., & Rasinski, T. V. (2025). Pairing phrase-cued text with readers theatre: Effects on reading prosody and automaticity. *Journal of Research in Reading*, 48(2), 153–174. <https://doi.org/10.1111/1467-9817.70002>
- Andrew Ross, & Victor L. Willson. (2017). Paired samples *t*-test. In *Basic and advanced statistical tests* (pp. 17–19). Sense Publishers. <https://doi.org/10.1007/978-94-6351-086-8>
- Schorr, A. (2023). The technology acceptance model (TAM) and its importance for digitalization research: A review. In N. Gerber & V. Zimmermann (Eds.), *International Symposium on Technikpsychologie (TecPsy) 2023* (pp. 55–65). Sciendo. <https://doi.org/10.2478/9788366675896-005>
- Shen, J., Qian, B., Ma, Q., & Deris, F. D. (2025). Exploring the impact of AI-assisted speaking practice on EFL learners' speaking proficiency and motivation: A mixed-method study. *International Journal of Academic Research in Progressive Education and Development*, 14(4). <https://doi.org/10.6007/IJARPED/v14-i4/26672>
- Tessensohn, T. C., Yunus, M. M., & Ismail, H. H. (2025). Using AI-powered tools in enhancing reading skills in the ESL classroom: A systematic review (2020–2024). *International Journal of Academic Research in Progressive Education and Development*, 14(2). <https://doi.org/10.6007/IJARPED/v14-i2/24959>
- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Wang, L.-C., Kung, S.-H., Chen, J.-K., & Kuo, H.-C. (2026). Repeated reading and Chinese oral-reading fluency: Is prosodic sensitivity an indispensable link? *Journal of Research in Reading*, 49(1), e70017. <https://doi.org/10.1111/1467-9817.70017>
- Whitehead, J., & McNiff, J. (2006). *Living theory action research*. SAGE.
- Xu, Y. (2023). The application of gamification on reading ability in primary and middle school English learning. *Journal of Education, Humanities and Social Sciences*, 22, 507–511. <https://doi.org/10.54097/ehss.v22i.12514>
- Yang, L. (2026). Empowering the autonomous learner: How AI-assisted language learning environments shape self-regulation, autonomy, and self-directed behaviors. *Language Teaching Research*. <https://doi.org/10.1177/13621688261422129>
- Ying, Z., Kahar, R., & Habil, H. (2025). The effectiveness of mobile-assisted language learning on improving Chinese EFL students' vocabulary learning. *LSP International Journal*, 12(2), 143–155. <https://doi.org/10.11113/lspi.v12.26004>