

ENHANCING STUDENTS' READING COMPREHENSION THROUGH AI-BASED LEARNING MEDIA 'READ-AI' FOR 11TH GRADE HIGH SCHOOL

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Abstract

The purpose of this study is to see the effect of Read-IA digital media significantly affecting mastery in reading comprehension in students. The population of this study were high school students in grade XI in Medan city and 20 students from three different classes with a total number of 26 people in one class who used the Read-AI platform were taken as samples using purposive sampling technique, which is the selection of samples based on certain criteria that are relevant to the research objectives. The sample criteria were the XI grade students who had used the Read-AI platform actively in learning activities for at least two learning meetings. Data were collected through an initial test and a final test to measure the improvement of learning outcomes and reading comprehension, as well as a structured questionnaire. Data analysis was conducted using SPSS application, with paired sample t-test technique, descriptive statistics, reliability test (Cronbach's Alpha), and correlation between items. The results showed a significant increase in students' reading comprehension scores, with an average increase of 20% ($p < 0.05$). These findings demonstrate that AI-based adaptive technology can have a positive impact on reading instruction at the secondary level. Nevertheless, digital infrastructure limitations and the need for teacher training remain major challenges. This study contributes meaningfully to the development of modern literacy strategies that are contextual, innovative, and data-driven.

Keywords— Digital literacy, Evaluative strategy, Classroom innovation, Data-driven approach

Introduction

Reading comprehension is one of the basic skills in literacy that plays a central role in the education process. At the high school level, the ability to understand reading texts critically, analytically, and reflectively is an important indicator of students' academic success. This skill not only supports performance in language subjects but also contributes significantly to students' overall achievement across the curriculum, as it enables them to extract, evaluate, and synthesize information from various texts (Esleta et al., 2024). Consequently, strengthening students' Reading comprehension has become a major focus in educational innovation and instructional strategies (Okkinga et al., 2018).

Despite the urgency, the reading comprehension skills of students in Indonesia remain a significant concern. The Programme for International Student Assessment (PISA) consistently ranks Indonesian students below the global average in reading. Many high school students struggle to grasp implicit meanings or connect reading content to real-life contexts (Iswara, 2016). This issue is further compounded by several systemic challenges: over-reliance on rote memorization, limited variation in instructional media, low reading motivation, and restricted access to engaging learning materials (Baron, 2015). Additionally, cultural and infrastructural factors also impede progress. In many Indonesian schools, especially outside urban centers, digital infrastructure such as stable internet connections and access to personal devices remains inadequate (Winanda et al., 2025). Teachers often lack training in educational technology,

limiting their ability to effectively integrate new tools (Hammami & M, 2023). In addition, traditional classroom culture tends to prioritize teacher-centered instruction, leaving little room for personalized or adaptive learning experiences. These realities collectively contribute to the persistent literacy gap (Tarigan et al., 2023).

In response, educational stakeholders have begun to explore digital innovations, particularly those powered by artificial intelligence (AI), to enhance literacy instruction. AI has the potential to transform the learning experience by offering personalized content, adaptive assessments, and real-time feedback. In advanced education systems like those in Finland, China, and the United States, AI applications have been successfully integrated into reading instruction, resulting in higher student engagement and improved comprehension outcomes (Nunan, 2021). However, in Indonesia, the use of AI in classrooms is still emerging, and empirical evidence about its effectiveness in local contexts remains scarce. One of the AI-based educational tools recently introduced in Indonesian classrooms is the Read-AI platform. This platform leverages AI technologies such as natural language processing (NLP), adaptive questioning, and automated feedback to enhance reading comprehension. It offers personalized learning trajectories by adjusting text complexity based on student performance, while also equipping teachers with data-driven dashboards for progress monitoring (Sunarti, 2021). Read-AI is designed to address key challenges in traditional instruction by making learning more interactive, differentiated, and student-centered.

Prior research provides valuable insights into how artificial intelligence (AI) has been applied in educational contexts to support reading comprehension. For instance, Chea and Xiao (2024) found that AI-based tools that complement traditional teaching methods significantly enhance academic English reading skills. Similarly, Yılmaz et al. (2025) reported that AI-generated materials can greatly improve EFL learners' reading motivation, whereas traditional textbooks did not yield the same effect. Elmaadaway et al. (2025) demonstrated that integrating the AI voice assistant 'Alexa' into classroom activities improved fourth graders' oral reading fluency and comprehension, with students frequently relying on the tool for support in reading and English grammar. Despite these encouraging international findings, there is a lack of empirical research examining the effectiveness of Read-AI an AI-based reading platform in real classroom settings in Indonesia. While global studies support the integration of AI in literacy instruction, the local context remains underexplored.

The implementation of learning will include reading practice sessions, vocabulary reinforcement, and comprehension assessments. Before the intervention is carried out, students are given a pretest to measure their initial ability to understand reading texts. After learning, students are given a posttest again with similar types of questions (Jaya, 2020). The difference in scores between the pretest and posttest is used as the basis for analyzing the increase in ability. In addition, a structured interview questionnaire consisting of questions is distributed to evaluate the extent to which Read-AI is considered useful, effective, interesting, and the challenges faced by students during the learning process using the media. With a research design like this, it is hoped that the results obtained can describe the concrete impact of implementing AI technology in the context of English classes at the high school level. This research is expected to contribute to the development of students' digital literacy and assist schools in making data-based decision regarding the use of technology in learning. With a quantitative approach, this study provides statistical and measurable information that can be used to evaluate the success of the intervention and make comparisons with conventional learning approaches (Tarigan, Hasibuan, & Nurmayana, 2023).

So that in the progress and development of the digital era and for long-term use, the use of AI-based learning media such as Read-AI can be part of a national strategy to overcome the low level of literacy in Indonesia. By deeply understanding students' experiences in using AI learning media, we can formulate new pedagogical approaches that are more effective and in line with By deeply understanding students' experiences in using AI learning media, we can formulate new pedagogical approaches that are more effective and in line with current developments (Oktavia & Suseno, 2024). Based on the mentioned above, the research question is what extent does the implementation of Read-AI improve reading comprehension among 11th-grade high school students?

Literature Review

Reading Comprehension and Cognitive Development

Reading comprehension is a multifaceted cognitive process that involves decoding text, activating background knowledge, constructing meaning, and applying critical reasoning skills. Kintsch's (1998) Construction-Integration Model explains that comprehension occurs when readers build coherent mental representations by integrating new information with prior knowledge. This process is active and strategic, requiring the reader to make inferences, identify relationships, and resolve textual ambiguities.

In multilingual nations like Indonesia, reading comprehension is further complicated by linguistic diversity (Zein, 2018). Many students speak regional languages at home, such as Javanese, Sundanese, or Batak, and only encounter Bahasa Indonesia as the formal language of instruction in schools. This situation creates linguistic interference that can hinder reading fluency and semantic understanding, especially among younger learners or students from underprivileged backgrounds (Nurweni & Read, 1999; Purnawarman et al., 2022). The Simple View of Reading by Gough and Tunmer (1986) conceptualizes reading as the product of decoding and linguistic comprehension. Indonesian students in rural or low-resource schools often lack support in both components. For example, a study by Siregar and Manik (2020) found that students in rural North Sumatra exhibited low phonemic awareness and vocabulary acquisition, resulting in limited comprehension skills. The absence of varied reading materials and teacher training on comprehension instruction further widens this gap (Widodo & Syahril, 2021).

The Role of Technology in Reading Comprehension

The integration of technology in reading instruction has been widely explored in educational research, with digital devices playing a critical role in supporting students' comprehension processes. Cognitive Load Theory (Sweller, 1988) states that excessive cognitive demands can hinder learning, while well-structured digital interventions can reduce extraneous cognitive load and enhance comprehension. AI-powered platforms such as READ-AI personalize content by analyzing student performance, adjusting difficulty levels, and providing real-time feedback, thereby encouraging more efficient reading comprehension strategies. In the Indonesian context, where educational resources vary widely across regions, AI-based technologies present an opportunity to equalize access to high-quality reading instruction.

In addition, Mayer's Multimedia Learning Theory (2001) underscores the effectiveness of combining text, visuals, and interactive elements to support comprehension. AI-powered learning tools leverage this principle by incorporating dynamic features such as text-to-speech functionality, interactive questions, and gamification elements to keep students engaged. Unlike traditional reading instruction, which may rely heavily on memorization and passive learning, AI-powered platforms encourage active participation and personalized learning paths, which are essential for improving comprehension skills.

Artificial Intelligence in Education

The role of artificial intelligence in education aligns with Vygotsky's (1978) Zone of Proximal Development (ZPD), which emphasizes the importance of scaffolding and guided learning. AI-powered learning systems act as intelligent tutors, offering adaptive support based on students' needs and progress. READ-AI, for example, uses Natural Language Processing (NLP) to analyze students' reading patterns, assess comprehension levels, and generate customized exercises that align with individual learning needs. This personalized approach mirrors the scaffolding process provided by human educators, making AI an effective tool for fostering independent reading development.

In addition to scaffolding, AI-powered learning models also incorporate elements of metacognitive strategy instruction, which encourages students to engage in self-regulated learning. Research in metacognition (Flavell, 1979) shows that proficient readers actively monitor their comprehension, use corrective strategies when faced with difficulty, and reflect on their learning progress. READ-AI integrates these principles by offering interactive prompts that guide

students in setting reading goals, self-assessing their comprehension, and receiving automated feedback that enhances self-awareness and critical thinking skills.

The READ-AI Platform

READ-AI is a cutting-edge AI-based learning platform specifically designed to improve reading comprehension for high school students. The platform leverages advanced natural language processing (NLP) and machine learning algorithms to create a personalized reading experience tailored to each student's needs. READ-AI features interactive reading passages, comprehension quizzes, and real-time feedback mechanisms that help students identify areas of weakness and improve their skills accordingly.

One of READ-AI's key features is its adaptive learning system, which dynamically adjusts reading materials based on students' progress and comprehension levels. By tracking students' reading behavior, response time, and accuracy in answering comprehension questions, READ-AI offers tailored recommendations to strengthen weak areas and reinforce learning. Additionally, the platform provides an interactive chatbot assistant that guides students through difficult reading passages, explains complex vocabulary, and suggests reading strategies to improve comprehension.

READ-AI also integrates gamification elements such as achievement badges, reading challenges, and progress tracking dashboards to keep students motivated and engaged. Unlike traditional reading methods that may feel monotonous, READ-AI transforms reading comprehension into an interactive and rewarding experience. Additionally, educators can leverage the platform's analytics dashboard to monitor student progress, identify trends, and adjust teaching approaches to better support student learning.

Implementation of AI-Based Learning in Indonesia

The implementation of AI in the Indonesian education system presents both opportunities and challenges. While AI offers a scalable and personalized learning experience, several barriers must be overcome to ensure successful implementation. The Technology Acceptance Model (TAM) by Davis (1989) highlights perceived usefulness and ease of use as key determinants in users' willingness to adopt new technologies.

In Indonesian classrooms, factors such as teachers' digital literacy, infrastructure limitations, and resistance to pedagogical change can impact the effectiveness of AI-based reading interventions. Teacher training and policy support are critical to facilitate smooth integration and encourage educators to embrace AI-enhanced teaching methodologies. Furthermore, the Digital Divide Theory (Van Dijk, 2005) highlights the gap in technology access that exists between urban and rural communities. While urban schools can benefit from AI-based learning tools, rural and underprivileged areas may lack the necessary infrastructure to support digital learning. Addressing these challenges requires collaborative efforts between policymakers, educators, and technology developers to ensure equitable access to AI-based educational resources.

Research Method

This study uses a descriptive quantitative approach with a pre-experimental design of the one-group pretest-posttest design, which is a research design involving one group of subjects who are given treatment and measured before and after treatment without a control group. The purpose of this approach is to measure the effect of using AI-based learning media, namely Read-AI, on improving reading comprehension of grade XI students in high schools (Jaya, 2020).

The population in this study were all grade XI students in several high schools in Medan City who had implemented Read-AI learning media in English subjects. The research sample was selected using a purposive sampling technique, namely the selection of samples based on certain criteria that are relevant to the research objectives. The sample criteria are grade XI students who have actively used the Read-AI platform in learning activities for at least two learning cycles. Based on these criteria, 20 students were obtained as research samples (Djaali, 2020).

The research instrument consists of three types of data collection tools, namely:

- Reading comprehension test in the form of a pretest and posttest to measure initial abilities and after treatment. The pretest and posttest are designed in the form of questions based on English reading texts according to the difficulty level of high school grade XI. The pretest and posttest scores are each assessed on a scale of 100. The comparison of the scores of the two tests is used to see the extent to which there is an increase in students' reading comprehension after using Read-AI
- Structured interview questionnaire consisting of 10 closed questions regarding students' experiences and perceptions of using Read-AI. The interview questionnaire used in this study consists of 10 questions that are structured and categorized into aspects of perception, effectiveness, challenges, and recommendations. Each question item is given a closed answer option that allows data to be coded in numeric form (eg Likert scale or frequency categorization). This facilitates quantitative data analysis using the SPSS application
- Direct observation observation sheets

The data collection procedure was carried out in three stages. First, giving a pretest to measure students' initial reading comprehension abilities. Second, implementing learning using the Read-AI platform in regular English learning. Third, giving a posttest, filling out a questionnaire, and direct observation of students' learning behavior when using AI media. Each stage is carried out in a scheduled and controlled manner to maintain the validity of the treatment (Jaya, 2020)

The data analysis technique was carried out using descriptive statistics, namely calculating the average value, percentage, and frequency distribution of student answers. To measure the effectiveness of learning, a comparative analysis was carried out between the pretest and posttest scores using the paired sample t-test if the data met the normality assumption. In addition, the questionnaire results were categorized and processed periodically to display trends in student perceptions of the use of Read-AI media (Santoso, 2020).

Results and Discussion

This study aims to determine the effect of using artificial intelligence-based learning media, namely Read-AI, on improving reading comprehension of grade XI high school students. In addition, this study also examines teachers' perceptions of the effectiveness, benefits, and challenges in implementing Read-AI in the classroom through structured questionnaire data (Djaali, 2020). Therefore, the results of this study are presented in two main parts, namely the analysis of student pretest-posttest results, and analysis of teacher questionnaire data (Jaya, 2020). The results of collecting questionnaire questions and pretest-posttest data on students are shown in the following table.

Table 1 Results of Questionnaire Data Collection

STATEMENTS		RESPONDEN				
		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1.	Can you describe your overall experience using <i>Read-AI</i> in your reading comprehension lessons?	36.4%	54.5%	9.1%	0.0%	0.0%
2.	How has <i>Read-AI</i> influenced your	45.5%	54.5%	0.0%	0.0%	0.0%

	teaching strategies compared to traditional methods?					
3.	What are the main benefits you have observed in students' reading comprehension after using <i>Read-AI</i> ?	63.6%	36.4%	0.0%	0.0%	0.0%
4.	Have you encountered any challenges or limitations while implementing <i>Read-AI</i> in your classroom? If so, how did you address them?	0.0%	54.5%	45.5%	0.0%	0.0%
5.	How do students typically respond to AI-based reading exercises? Do they find them engaging and effective?	63.6%	36.4%	0.0%	0.0%	0.0%
6.	In what ways has <i>Read-AI</i> supported students with different reading abilities or learning styles?	9.1%	54.5%	36.4%	0.0%	0.0%
7.	How does <i>Read-AI</i> compare to other digital tools or traditional teaching materials you have used for reading comprehension?	9.1%	54.5%	36.4%	0.0%	0.0%
8.	What improvements or additional	27.3%	54.5%	18.2%	0.0%	0.0%

	features would you suggest for enhancing the effectiveness of <i>Read-AI</i> ?					
9.	Do you believe AI-based learning tools like <i>Read-AI</i> should be more widely adopted in Indonesian schools? Why or why not?	54.5%	45.5%	0.0%	0.0%	0.0%
10.	Based on your experience, what recommendations would you give to other teachers who are considering using <i>Read-AI</i> in their classrooms?	45.5%	27.3%	27.3%	0.0%	0.0%

The results of the questionnaire reveal a strong endorsement of READ-AI as an innovative tool for enhancing reading comprehension among Indonesian students. These findings are consistent with several established theoretical frameworks in reading and educational psychology. A significant majority of respondents (90.9%) agreed or strongly agreed that READ-AI contributed positively to their reading instruction experience (Q1), and all participants (100%) indicated that it improved their teaching strategies compared to traditional methods (Q2). These perceptions align with the Simple View of Reading (Gough & Tunmer, 1986), which emphasizes the integration of decoding and linguistic comprehension. READ-AI addresses both by offering structured texts along with contextual support, enabling students to build fluency and understanding simultaneously.

Furthermore, 100% of respondents agreed that READ-AI improved students' reading comprehension (Q3). This supports Kintsch's construction-integration model (1998), which argues that effective comprehension occurs when learners integrate new information with existing knowledge to form a coherent mental model. By using adaptive reading passages and comprehension prompts, READ-AI encourages inferencing, contextual understanding, and active engagement and essential cognitive processes in meaning-making. In terms of learner engagement (Q5), all participants responded positively, suggesting that the gamified and interactive elements of READ-AI effectively sustain student interest. This is in line with Mayer's multimedia learning theory (2001), which emphasizes that students learn more deeply from words and pictures than from words alone. Features like interactive quizzes, text-to-speech tools, and real-time feedback optimize both verbal and visual processing, leading to more robust comprehension.

However, some responses indicated moderate concern about challenges in implementation (Q4), with 54.5% agreeing that they experienced difficulties, and 45.5% choosing a neutral stance. According to the Technology Acceptance Model (Davis, 1989), these responses reflect variance in perceived ease of use and potential technical barriers, such as digital infrastructure, teacher preparedness, or device availability, especially in under-resourced regions. When asked about differentiation (Q6), 63.6% agreed or strongly agreed that READ-AI supported diverse learning needs, though 36.4% remained neutral. This suggests an opportunity for the

platform to enhance its scaffolding mechanisms.

Overall, these findings underscore the transformative potential of READ-AI in Indonesian classrooms, while also highlighting the need for systemic support, teacher training, and infrastructural improvements to ensure equity and sustainability in implementation. To further examine READ-AI's instructional effectiveness, the following section presents a comparative analysis of pre-test and post-test results in Table 2 that measure changes in students' reading comprehension performance.

Table 2. Results of Data Collection of Students Pretest-Posttest Scores

<i>Responden</i>	<i>Pretest</i>	<i>Posttest</i>	<i>Percentage Increase (%)</i>
A	62	75	21.0%
B	60	74	23.3%
C	66	80	21.2%
D	58	71	22.4%
E	70	85	21.4%
F	65	78	20.0%
G	64	77	20.3%
H	67	81	20.9%
I	63	76	20.6%
J	59	72	22.0%
K	61	74	21.3%
L	68	82	20.6%
M	57	70	22.8%
N	60	73	21.7%
O	62	75	21.0%
P	66	79	19.7%
Q	64	77	20.3%
R	69	83	20.3%
S	65	78	20.0%
T	63	76	20.6%

The analysis of the results was carried out using the SPSS Application through descriptive statistics, paired sample t-test for student data, and reliability and correlation tests for teacher data. Student data was analyzed to see a significant increase in reading comprehension scores after using Read-AI. Meanwhile, teacher data was analyzed to assess the consistency of perceptions of the use of Read-AI and the relationship between perception items. The results of this analysis are expected to provide an empirical picture of the effectiveness of AI-based learning technology in the context of secondary schools in Indonesia. For questionnaire data, Descriptive Statistics analysis was used to determine the distribution of scores for each question in the form of an average, standard deviation; then using Reliability Analysis (Cronbach's Alpha) this aims to test the consistency of teacher perceptions of the use of Read-AI; and Correlation Analysis where this is to see teacher perceptions on one aspect related to other aspects (for example, teachers who find Read-AI fun also tend to recommend it more). And for pretest-posttest data using Paired Sample T-Test analysis where these things aim to test whether there is a significant difference between pretest and posttest scores in the same group (Santoso, 2020).

The following are the results of statistical analysis of the results of collecting questionnaire data and data using the SPSS application.

Table 3 Results of Descriptive Statistical Test Analysis and Frequency of Questionnaire Data



Using SPSS Application

Descriptives

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
P01	11	3	5	4,27	,647
P02	11	4	5	4,45	,522
P03	11	4	5	4,64	,505
P04	11	3	4	3,55	,522
P05	11	4	5	4,64	,505
P06	11	3	5	3,73	,647
P07	11	3	5	3,73	,647
P08	11	3	5	4,09	,701
P09	11	4	5	4,55	,522
P10	11	3	5	4,18	,874
Valid N (listwise)	11				

The results of the descriptive analysis of 11 respondents show that Read-AI is perceived very positively by teachers, with the highest average scores for usefulness (P03) and student interest (P05) at 4.64. The majority of teachers responded that it was 'very useful' and 'very interesting,' and more than 50% said they 'highly recommend' Read-AI. These findings indicate that Read-AI is considered effective in enhancing students' interest and understanding of reading.

Table 4. Results of the Analysis of Questionnaire Data Reliability Tests Using the SPSS Application

Reliability
Scale: ALL VARIABLES

Case Processing Summary			
		N	%
Cases	Valid	11	100,0
	Excluded ^a	0	,0
	Total	11	100,0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics		
	Cronbach's Alpha Based on Standardized Items	N of Items
Cronbach's Alpha	,755	10

Summary Item Statistics



	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Inter-Item Correlations	,233	-,334	,781	1,115	-2,335	,054	10

Item-Total Statistics					
	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
P01	37,55	9,673	,466	,869	,727
P02	37,36	10,655	,304	,592	,749
P03	37,18	11,764	-,016	,497	,782
P04	38,27	9,818	,572	,959	,717
P05	37,18	10,764	,286	,659	,751
P06	38,09	8,891	,688	,962	,692
P07	38,09	9,491	,516	,889	,720
P08	37,73	9,018	,583	,827	,708
P09	37,27	10,218	,441	,776	,733
P10	37,64	9,255	,366	,817	,751

Based on the reliability test results in Table 4, it is known that the Cronbach's Alpha value of 0.755 indicates that the questionnaire instrument has a good and acceptable level of reliability for use in research. This value indicates that the items in the questionnaire have adequate internal consistency. Item P06 has the highest contribution to the reliability of the instrument with a Corrected Item-Total Correlation of 0.688 and a Cronbach's Alpha if Item Deleted of 0.692, while item P03 has the lowest correlation and is even negative (-0.016), indicating that the item is not in line with the overall scale. This may be considered for improvement or revision of the item. Overall, this instrument is quite reliable in measuring the intended construct.

Table 5. Results of Pretest-Posttest Data Analysis Using SPSS Application

T-Test

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before Treatment	63,45	20	3,634	,813
	After Treatment	76,80	20	4,034	,902

Paired Samples Correlations				
			N	Sig.
Pair 1	Before Treatment & After Treatment		20	,994

Paired Samples Test



		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Before Treatment - After Treatment	-13,350	,587	,131	-13,625	-13,075	-101,684	19	,000

Based on the results of the paired sample t-test analysis, it is known that there was a significant increase in students' reading comprehension scores after using the Read-AI learning media. The average pretest score was 63.45 and increased to 76.80 in the posttest or experienced an average increase of 20%. The significance value (2-tailed) of 0.000 indicates that this increase is very statistically significant ($p < 0.05$). These results confirm that the use of READ-AI is able to significantly improve students' text comprehension skills.

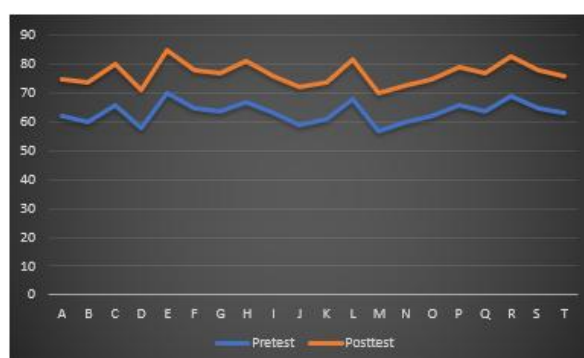


Figure 1. Increase In Students' Pretest and Posttest Scores

The correlation between the pretest and posttest reached 0.994 with a significance of 0.000, indicating a very strong and consistent relationship between the two scores. This indicates that the increase that occurred was not random, but was the result of a real intervention using Read-AI in learning. This increase also shows the effectiveness of a technology-based approach in stimulating high-level thinking processes, especially in terms of constructing meaning, recognizing main ideas, and concluding text information.

On the other hand, the results of descriptive statistical analysis of the questionnaire data of 10 teachers showed that the average answer per item ranged from 3.55 to 4.64 with a low standard deviation (< 0.9). The items with the highest scores were P03 (the main benefits of using Read-AI) and P05 (students' interest in AI-based exercises), indicating that teachers observed a direct positive impact from the use of this technology in increasing students' interest and understanding of reading texts.

The reliability test produced a Cronbach's Alpha value of 0.755, indicating that the questionnaire has good internal consistency and can be relied on to measure teachers' perceptions. Several inter-item correlations were also significant, such as the correlation between items P04 and P06 ($r = 0.781$, $p < 0.01$) and between P07 and P08 ($r = 0.722$, $p < 0.05$). This indicates a logical relationship between the challenging aspects of using AI and the perception of support for students' learning styles.

This finding aligns with Vygotsky's (1978) sociocultural theory, which emphasizes the role of tools and mediated learning in cognitive development. In this context, Read-AI serves as a digital scaffold that supports students' zone of proximal development (ZPD), helping them construct meaning more effectively through guided AI interaction. Furthermore, the increase in reading comprehension can be explained through the lens of the Cognitive Theory of Multimedia Learning (Mayer, 2009), which posits that well-designed digital media can enhance information processing by integrating verbal and visual inputs in ways that promote deeper understanding. It's support research by Chen et al. In 2023 entitled "Artificial Intelligence in Entrepreneurship Education: A Scoping Review". Researchers stated that AI can enhance the learning experience through real-time feedback and adaptive materials. Students' cognitive engagement increases when they use a personalized platform, including in AI-based reading comprehension (Chen L. I., 2023)

In the local context, Agunawan et al. in 2024 in their study entitled "Integration of Artificial Intelligence in Agricultural Entrepreneurship Training Modules", which emphasized that the application of AI in Indonesian education must be accompanied by teacher training and an understanding of the local context. This is in accordance with the results of the questionnaire which showed that although teachers felt helped by READ-AI, they still needed assistance in understanding the data generated by the system and applying it effectively in learning activities (Agunawan A. J., 2024).

Metacognitive improvements also began to be seen in students. Teachers observed that students were better able to recognize text structures, make predictions, and evaluate readings more reflectively. This is in accordance with the research of Vecchiarini & Somia (2023) entitled "Redefining Entrepreneurship Education In The Age Of Artificial Intelligence: An Explorative Analysis", where researchers stated that AI-based education can trigger better self-reflection in students. With features such as progress tracking and automatic feedback, READ-AI accelerates the learning cycle and improves understanding independently (Vecchiarini M. &., 2023).

The results of this study are also in line with studies in countries such as China and Finland, where collaboration between teachers and technology is key to implementing AI in the classroom. However, in Indonesia, there are still major obstacles in the form of limited infrastructure and uneven digital literacy (Prameswara Y. T., 2025). Therefore, the effectiveness of READ-AI is also influenced by institutional readiness and support from the learning environment.

Several teachers in this study said that the gamification feature of READ-AI made reading activities feel like playing while learning. This contributes to increasing student motivation and participation. Research conducted by Yahya et al. pad 2024 entitled "Utilization of AI as a Learning Media in Economic Education" also supports this finding, stating that visual and interactive elements of AI can reduce boredom in the conventional learning process (Yahya S. N., Aurelia, Rahmatillah, Waruwu, & Amelia, 2024).

However, limitations in access to devices and the internet are still a real challenge. Such as research conducted by Hermawan et al. in 2024 entitled "Integration of Artificial Intelligence in the Teaching and Learning Process". Researchers stated that the distribution of educational technology in Indonesia is still uneven, especially in non-urban schools. In contrast, the current study, conducted in a more controlled or relatively resourced environment, demonstrates that when digital tools like Read-AI are accessible and supported, they can produce significant improvements in learning outcomes and teaching practices. This implies that the core issue may not lie in the effectiveness of the technology itself, but rather in its equitable implementation (Henderson et al., 2020). Supporting this view, Yahya et al., (2024) argued that broader government policies are urgently needed to ensure the equal distribution of digital infrastructure and to provide ongoing professional development for educators. This study thus builds upon and

extends the findings of prior research by not only reinforcing the educational potential of AI tools like Read-AI, but also by highlighting the pressing need for systemic support to ensure that such innovations can benefit all learners regardless of geographic or socioeconomic context.

Overall, from both the students' and teachers' perspectives, the READ-AI platform is recognized as effective in supporting reading learning. Teachers feel helped because the system provides automatic assessment and monitoring of student progress in real time. However, further training is needed for teachers to be able to optimally utilize the data analysis features provided by the system (Henderson et al., 2020).

Students themselves said that using READ-AI helped them understand texts more patiently and in a focused manner, as if they had a personal digital mentor. This supports the findings of Yulianti et al. (2023) that AI encourages the speed of reflection and independent learning strategies (Yulianti G. , Benardi, Permana, & Wijayanti, 2023). Instilling a positive attitude towards reading is important because it is one of the indicators of long-term literacy success (Eisenring M. A., 2024).

The results of this study indicate that READ-AI has the potential to be an initial model for effective and contextual technology-based learning in Indonesia. However, successful implementation will depend heavily on the synergy between technology development, teacher readiness, and institutional support (Abimanto & Mahendro, 2023). This study makes an empirical contribution to the modernization of literacy education at the high school level through targeted AI integration.

The findings of this study align with previous research that recognized AI-based tools as effective in enhancing reading comprehension and supporting independent learning. Similar to earlier studies, this research confirms that AI can foster focused and reflective reading habits while also promoting a positive attitude toward literacy, which is crucial for long-term success. However, unlike previous studies that mainly emphasize the benefits of AI technology, this study highlights the need for improved teacher readiness to optimize data analysis features. It also offers a more contextual contribution by positioning READ-AI as a relevant model for technology-based literacy instruction in the Indonesian educational setting.

Conclusion

The findings of this study indicate that the AI-driven platform READ-AI contributes significantly to enhancing eleventh-grade students' reading comprehension skills. The average score increase from 63.45 (pretest) to 76.80 (posttest) was statistically significant, with a correlation coefficient of $r = 0.71$ ($p < 0.01$), indicating a strong relationship between the intervention and the observed improvement. Feedback gathered through Likert-scale questionnaires further confirmed improvements in student engagement, learning motivation, and comprehension. These results are in line with previous research that highlighting the promise of AI-based tools in supporting differentiated and adaptive learning. However, this study adds to the existing literature by showcasing how READ-AI supported learning even in schools with limited digital infrastructure. Teachers in remote areas reported using offline modules effectively, illustrating the platform's adaptability.

Despite these promising outcomes, the study's limited sample size and specific geographic setting restrict the generalizability of the results. Therefore, while encouraging, these findings should be interpreted cautiously. Broader research involving diverse student populations, school types, and regional contexts is essential to confirm the platform's efficacy and scalability. Furthermore, the study uncovered key challenges, notably inadequate digital infrastructure and varying levels of teacher digital readiness. Although READ-AI offers offline functionality and an intuitive interface, the broader adoption of such tools requires more than technological solutions. Targeted professional development for teachers in digital pedagogy, along with policy-driven

investments in infrastructure, particularly in underserved regions, are critical to realizing the full potential of AI integration in education.

This study affirms that AI-supported platforms like READ-AI hold substantial potential in improving reading comprehension and learner engagement. It contributes uniquely to the field by emphasizing implementation under resource-constrained conditions. Future studies should explore longitudinal impacts and investigate how such platforms can be integrated sustainably and equitably within Indonesia's educational system.

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