

# Enhancing University Students' Academic Reading Comprehension through ChatGPT-Assisted Instruction in Indonesian Higher Education

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## ABSTRACT

Academic reading comprehension is an essential competency in higher education because students are required to critically understand and evaluate academic texts. However, many university students still experience difficulties in comprehending academic materials due to limited reading strategies and low engagement. This study aimed to investigate the implementation of ChatGPT-assisted instruction and examine its contribution to enhancing students' academic reading comprehension in higher education. This study employed a mixed-methods approach with a quasi-experimental design involving 60 undergraduate students divided into an experimental group and a control group. The intervention was conducted for eight weeks. The data were collected through reading comprehension tests, classroom observations, and semi-structured interviews and analyzed using quantitative statistical analysis and thematic analysis. The findings revealed that students who participated in AI-assisted instruction achieved significantly higher improvement in reading comprehension compared to those who received conventional instruction. The statistical analysis showed significant improvement in the experimental group ( $p = 0.001$ ). The qualitative findings also indicated that AI-assisted instruction increased students' engagement, motivation, and interaction during reading activities. The study concludes that AI-assisted instruction can serve as an effective pedagogical approach to support academic literacy development in higher education.

**Keywords:** academic reading, AI-assisted instruction, reading comprehension, higher education, digital literacy

## 1. Introduction

Academic reading comprehension has become one of the fundamental competencies required in higher education because university students are expected to understand, analyze, evaluate, and synthesize information from various academic texts critically and independently. In academic contexts, reading is not merely a receptive activity but also a complex cognitive process involving interpretation, critical thinking, and knowledge construction. Strong academic reading comprehension enables students to engage effectively in academic discussions, research activities, and scholarly writing. Conversely, insufficient reading comprehension often hinders students' academic achievement and limits their ability to participate actively in higher-order learning processes. Previous studies have reported that many university students still experience difficulties in understanding academic texts due to limited vocabulary knowledge, inadequate reading strategies, low motivation, and insufficient critical engagement with academic discourse (Sanz-Tejeda et al., 2026; Valero-Ancco et al., 2025).

The increasing complexity of academic texts and the rapid development of digital learning environments have encouraged educators to seek more innovative instructional approaches to support students' reading comprehension development. One emerging innovation in contemporary education is the integration of artificial intelligence (AI) into teaching and learning processes. AI-assisted instruction refers to the utilization of AI technologies to provide adaptive feedback, personalized

support, interactive learning experiences, and automated assistance during instructional activities. In academic reading classrooms, AI technologies can assist students in identifying key ideas, summarizing information, clarifying difficult concepts, generating guiding questions, and monitoring comprehension during reading activities. The emergence of generative AI tools such as ChatGPT has particularly transformed educational practices by creating more interactive and student-centered learning environments in higher education (Conde et al., 2026).

Recent studies have demonstrated that AI-assisted instruction may positively contribute to students' academic literacy and reading development. Zhang et al., (2025) found that AI-enhanced reading support combining visual and textual assistance improved students' engagement and interaction during reading activities. Similarly, Simbolon & Mallo, (2021) reported that AI-assisted critical reading activities encouraged learners to employ deeper metacognitive strategies and interactive reading behaviors. In addition, revealed that postgraduate students utilized generative AI tools to support comprehension monitoring, vocabulary clarification, and analytical reading processes in academic reading tasks (Rosmiyati et al., 2025). These findings indicate that AI technologies have the potential to facilitate more meaningful reading experiences and improve students' comprehension performance in higher education contexts. Furthermore, AI-assisted learning environments may promote self-regulated learning and independent reading practices among university students. explained that AI-supported reading activities encouraged students to manage their reading processes more effectively through self-monitoring and strategic learning behaviors (Pan et al., 2024). found that the use of AI chatbots in higher education positively influenced students' learning outcomes and academic performance when integrated appropriately into instructional settings (Wu & Yu, 2024). In language learning contexts, also demonstrated that AI-assisted reading strategy instruction significantly improved students' reading comprehension compared to conventional teacher-led instruction (Wei, 2023). These studies suggest that AI-assisted instruction can serve as an effective pedagogical support system in academic reading classrooms.

Despite the promising benefits of AI-assisted instruction, several pedagogical concerns remain. Scholars have argued that excessive dependence on AI technologies may reduce students' critical thinking abilities and encourage superficial learning habits if AI tools are used without proper instructional guidance (Ayala-Pazmiño, 2023). Some students may rely excessively on AI-generated summaries and interpretations rather than actively engaging in analytical and reflective reading processes. further emphasized concerns regarding academic integrity, ethical AI use, and students' overreliance on generative AI technologies in educational settings (Chan & Hu, 2023). Therefore, the integration of AI in academic reading instruction should not merely focus on technological adoption but also emphasize the development of critical literacy, reflective learning, and responsible AI use in higher education.

In recent years, research on AI-assisted academic reading has continued to grow in international educational contexts. Described large language models (LLMs) as potential academic reading companions capable of supporting students' comprehension and interaction with academic texts (Chen & Leitch, 2024). Similarly, highlighted the contribution of transformer-based AI technologies in facilitating English reading comprehension processes (Kim & Cha, 2023). Other studies have also explored students' behaviors, identities, and perceptions during AI-assisted academic reading activities and found that AI technologies may reshape students' learning experiences and reading engagement in higher education contexts ("Exploring Behaviors, Perceptions, and Identities of Graduate Students in AI-Assisted Academic Reading," 2026). Additionally, recent evidence suggests that AI-assisted learning environments may influence both deep and surface learning processes depending on how AI technologies are pedagogically implemented ("When Learning Meets the Machine," 2026).

Although studies on AI integration in education have increased substantially, research specifically investigating AI-assisted academic reading comprehension in Indonesian higher education contexts remains relatively limited. Existing studies in Indonesia have predominantly focused on AI use in writing instruction, digital learning adoption, or students' general perceptions toward AI technologies. Limited attention has been given to examining how AI-assisted instruction contributes to students' academic reading comprehension development, particularly in facilitating reading strategies, critical engagement, and comprehension processes in academic reading classrooms. This gap indicates the need for further investigation into the pedagogical implementation of AI-assisted instruction in academic reading learning within Indonesian university contexts.

Although previous studies have investigated AI-assisted language learning, most studies primarily focused on writing instruction, vocabulary learning, or students' general perceptions of AI technologies. Limited studies have specifically examined how AI-assisted instruction supports academic reading comprehension in Indonesian higher education contexts using mixed-method approaches. Furthermore, previous studies rarely explored both students' comprehension improvement and classroom engagement simultaneously. Therefore, this study attempts to fill these gaps by investigating the implementation of AI-assisted instruction in academic reading classrooms and examining its contribution to students' reading comprehension and learning engagement.

This study is also grounded in constructivist learning theory and metacognitive reading strategy theory, which emphasize active meaning construction, strategic reading processes, and guided learning support. AI-assisted instruction may function as cognitive scaffolding that helps students monitor comprehension, identify key information, clarify unfamiliar concepts, and engage critically with academic texts. Therefore, this study aims to investigate the implementation of AI-assisted instruction in academic reading classrooms and examine its impact on students' academic reading comprehension, engagement, and learning experiences in Indonesian higher education contexts.

## 2. Method

This study employed a mixed-methods approach with a quasi-experimental design to investigate the implementation of AI-assisted instruction in enhancing students' academic reading comprehension in higher education. The mixed-methods approach was selected because it enables researchers to obtain comprehensive findings by combining quantitative and qualitative data to understand instructional effectiveness and students' learning experiences simultaneously (Creswell & Creswell, 2018). The quasi-experimental design was utilized to examine the differences in students' reading comprehension achievement before and after the implementation of AI-assisted instruction. Respondents, The participants of this study were undergraduate students enrolled in academic reading courses at a university in Indonesia during the 2025/2026 academic year. The respondents were selected using purposive sampling because the participants were considered appropriate for investigating academic reading comprehension development in higher education contexts. Purposive sampling allows researchers to select participants based on specific characteristics relevant to the objectives of the study (Etikan & Bala, 2017). A total of 60 undergraduate students participated in this study and were divided into two groups: an experimental group and a control group. The experimental group received AI-assisted instruction during academic reading activities, while the control group received conventional reading instruction. The participants were enrolled in an academic reading course and had intermediate English proficiency levels based on institutional placement assessments. The experimental group received ChatGPT-assisted instruction, while the control group received conventional reading instruction using printed materials and teacher-centered learning activities. Both groups were taught by the same lecturer to maintain instructional consistency throughout the study.

Table 1. Participants of the Study

Group	Number of Students	Instruction Type
Experimental Group	30	AI-Assisted Instruction
Control Group	30	Conventional Instruction
Total	60	-

**Instruments,** Several instruments were utilized to collect the data in this study, including reading comprehension tests, observation sheets, and semi-structured interview guidelines. **Academic Reading Comprehension Test** The reading comprehension test was administered as a pre-test and post-test to measure students' comprehension development before and after the instructional treatment. The test consisted of academic reading passages followed by comprehension questions focusing on identifying main ideas, making inferences, interpreting arguments, and evaluating information. The test items were developed based on academic reading indicators proposed by (Grabe & Stoller, 2020). The reading comprehension test was validated by two experts in language education before being administered to the participants. In addition, pilot testing was conducted to ensure the clarity and appropriateness of the test items for undergraduate students. **Observation Sheet** Observation sheets were used to document students' engagement, interaction, and participation during AI-assisted reading activities. The observation focused on students' use of AI tools, reading behaviors, collaborative interaction, and classroom participation. The observation sheets were designed to identify students' engagement, interaction patterns, collaborative participation, and strategic reading behaviors during AI-assisted instruction.

**Semi-Structured Interviews** Semi-structured interviews were conducted with selected students from the experimental group to explore their perceptions and experiences regarding AI-assisted instruction in academic reading learning. According to, semi-structured interviews enable researchers to obtain in-depth information about participants' experiences and perspectives (Creswell & Poth, 2018). The interview questions were developed to explore students' perceptions, learning experiences, benefits, and challenges during the implementation of AI-assisted instruction.

Table 2. Research Instruments

<b>Instrument</b>	<b>Purpose</b>	<b>Data Type</b>
Reading Comprehension Test	Measure students' comprehension achievement	Quantitative
Observation Sheet	Observe students' engagement and interaction	Qualitative
Semi-Structured Interview	Explore students' perceptions and experiences	Qualitative

**Procedures,** The study was conducted in several stages, including preparation, pre-test administration, instructional treatment, post-test administration, and data analysis. During the preparation stage, the researchers developed instructional materials, reading comprehension tests, observation sheets, and interview guidelines. AI-assisted instructional activities were designed using ChatGPT as a generative AI tool to support students' academic reading processes, including summarizing texts, generating guiding questions, clarifying vocabulary, identifying main ideas, and monitoring comprehension during reading activities. The pre-test was administered to both groups before the instructional treatment to identify students' initial reading comprehension levels. After the pre-test, the experimental group participated in AI-assisted academic reading instruction for eight weeks, while the control group received conventional reading instruction using teacher-centered approaches and printed learning materials. The instructional treatment consisted of sixteen classroom meetings conducted twice a week, with each session lasting approximately 90 minutes. During the instructional sessions, students engaged in guided reading activities, collaborative discussions, AI-assisted comprehension tasks, and reflective learning exercises under the lecturer's supervision.

During the treatment sessions, students in the experimental group utilized AI tools to assist their reading activities under the guidance of the lecturer. The instructional activities emphasized critical reading, reflective discussion, comprehension monitoring, and strategic reading behaviors. Previous studies have indicated that AI-assisted reading environments may enhance students' metacognitive reading strategies and engagement during academic reading activities (Lin et al., 2026). After the treatment period, a post-test was administered to both groups to examine students' reading comprehension improvement. Subsequently, classroom observations and interviews were conducted to obtain qualitative insights into students' experiences with AI-assisted instruction.

Table 3. Research Procedures

<b>Stage</b>	<b>Activities</b>
Preparation	Developing instruments and instructional materials
Pre-Test	Measuring students' initial reading comprehension
Treatment	Implementing AI-assisted instruction
Observation	Observing students' engagement and interaction
Post-Test	Measuring students' reading comprehension improvement

Interview Data Analysis	Exploring students' perceptions and experiences Analyzing quantitative and qualitative data
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Data Analysis Prior to inferential statistical analysis, normality and homogeneity tests were conducted to ensure that the data met the assumptions for parametric testing. Descriptive statistics were used to calculate the mean scores, standard deviations, and students' reading comprehension improvement. Inferential statistical analysis using paired sample t-tests and independent sample t-tests was conducted to examine significant differences within and between groups. Statistical analysis was performed using SPSS software. Meanwhile, qualitative data obtained from classroom observations and interviews were analyzed using thematic analysis. Braun & Clarke, (2021) explained that thematic analysis enables researchers to identify, analyze, and interpret patterns within qualitative data systematically. The qualitative analysis focused on identifying themes related to students' engagement, perceptions, reading strategies, and experiences during AI-assisted instruction. The integration of quantitative and qualitative findings was conducted to provide comprehensive insights into the effectiveness of AI-assisted instruction in enhancing academic reading comprehension in higher education.

Ethical Procedure This study followed ethical research principles to ensure the protection of participants' rights, privacy, and confidentiality. Prior to the study, the researchers obtained institutional permission from the university and informed consent from all participants. The participants were informed about the objectives of the study, research procedures, voluntary participation, and confidentiality of the collected data. Participants were also informed that they could withdraw from the study at any stage without negative consequences. The researchers ensured that all collected data were used solely for academic purposes and stored securely to maintain confidentiality. Ethical considerations in educational research are essential to maintain research integrity and participants' trust throughout the research process (Creswell & Poth, 2018).

### 3. Results and Discussion

The Implementation of AI-Assisted Instruction in Academic Reading Learning, The implementation of AI-assisted instruction in academic reading learning showed significant influence on students' classroom participation, reading engagement, and interaction during learning activities. The instructional process integrated AI technologies into academic reading tasks through guided activities such as identifying main ideas, summarizing texts, clarifying unfamiliar vocabulary, generating comprehension questions, and discussing textual meanings collaboratively. In this instructional setting, the lecturer acted as a facilitator who guided students to utilize AI technologies critically and responsibly throughout the reading process. Based on classroom observations, students in the experimental group demonstrated higher levels of engagement and participation compared to students in the control group. Students actively interacted with AI-generated explanations and used them as scaffolding to comprehend complex academic texts. The implementation of AI-assisted instruction also created a more interactive learning atmosphere because students could receive immediate clarification and feedback during reading activities. These findings support Zhang et al., (2025), who argued that AI-enhanced instructional support increases students' engagement and interaction during academic reading activities.

Furthermore, the integration of AI technologies encouraged students to employ more strategic reading behaviors. Students demonstrated improved abilities in comprehension monitoring, inferencing, summarizing, questioning, and evaluating textual information during reading activities. AI-assisted instruction also supported students in understanding the structure and organization of academic texts more systematically. This finding is in line with Kasneci et al., (2023), who found that AI-assisted critical reading activities encourage deeper metacognitive reading strategies and interactive reading behaviors among learners. In addition, several students reported that AI technologies helped reduce anxiety when reading difficult academic texts. AI-generated explanations and summaries enabled students to understand unfamiliar concepts and vocabulary more efficiently. Chen & Leitch, (2024) similarly described AI technologies as academic reading companions capable of supporting students' interaction with scholarly texts and increasing reading confidence in higher education contexts.

Table 4. Students' Engagement during AI-Assisted Instruction

Indicators	Experimental Group	Control Group
Active Participation	High	Moderate
Classroom Interaction	High	Low
Reading Engagement	High	Moderate
Use of Reading Strategies	High	Low
Collaborative Discussion	High	Moderate

The findings indicate that AI-assisted instruction functioned as an effective pedagogical support system that enhanced students' engagement, interaction, and participation during academic reading learning. The integration of AI technologies contributed to more student-centered and interactive learning experiences in higher education contexts. Students' Academic Reading Comprehension Improvement The quantitative findings revealed that students who participated in AI-assisted instruction demonstrated substantial improvement in academic reading comprehension achievement. The experimental group achieved significantly higher post-test scores compared to the control group after the instructional treatment. These findings suggest that AI-assisted instruction positively contributed to students' comprehension development and academic literacy skills.

Table 5. Pre-Test and Post-Test Scores of Students' Academic Reading Comprehension

Group	N	Pre-Test Mean	Post-Test Mean	SD	t-value	p-value	Interpretation
Experimental Group	30	67.4	84.6	4.21	5.87	0.001	Strong Improvement
Control Group	30	66.8	74.2	5.13	2.41	0.032	Moderate Improvement

Table 5 demonstrates that the experimental group achieved considerably higher improvement in academic reading comprehension compared to the control group. The mean score of the experimental group increased from 67.4 in the pre-test to 84.6 in the post-test, resulting in an improvement score of 17.2 points. Meanwhile, the control group showed a smaller improvement from 66.8 to 74.2 with an improvement score of 7.4 points. The statistical analysis indicated that the improvement in the experimental group was statistically significant ( $p < 0.05$ ). The findings suggest that AI-assisted instruction positively influenced students' academic reading comprehension and strategic reading behaviors. Students in the experimental group demonstrated better abilities in identifying key ideas, interpreting arguments, evaluating information, and making critical inferences compared to those in the control group. In contrast, the control group showed only moderate improvement under conventional instructional approaches.

The improvement may occur because AI-assisted instruction provides immediate scaffolding and interactive feedback that support students' metacognitive reading processes. Unlike conventional instruction, AI technologies enable students to clarify unfamiliar concepts instantly, monitor comprehension independently, and engage more actively with academic texts. These instructional supports may reduce students' cognitive burden and facilitate deeper comprehension processes during reading activities. From a constructivist perspective, AI-assisted instruction may function as cognitive scaffolding that supports students in constructing meaning and developing strategic reading behaviors during academic reading activities. In addition, metacognitive reading theory suggests that immediate feedback and guided comprehension support may strengthen students' self-monitoring and reflective reading processes.

AI-assisted learning environments provided immediate feedback, vocabulary support, text summaries, and guiding questions that facilitated students' comprehension processes and reduced reading difficulties. These instructional supports may help reduce cognitive burden and encourage more active engagement during academic reading activities. Similarly found that AI-supported academic reading environments strengthen students' comprehension-monitoring strategies and metacognitive awareness during reading activities (Qi et al., 2025). However, the present study extends previous findings by demonstrating that AI-assisted instruction not only improves students' comprehension achievement but also increases classroom engagement and interactive learning experiences in Indonesian higher education contexts. In addition, Fu et al., (2026) explained that AI-supported reading instruction promotes self-regulated learning behaviors and strategic reading practices among university students. Therefore, AI-assisted instruction not only improved comprehension achievement but also supported students' independent learning processes.

Another important finding was that students became more motivated to engage with academic texts because AI technologies made reading activities more interactive and less intimidating. Previous studies have emphasized that reading motivation and engagement significantly influence comprehension development in higher education contexts (Valero-Ancco et al., 2025). In this study, AI-assisted instruction appeared to facilitate more effective information processing and reduce students' cognitive burden during reading activities. Nevertheless, excessive dependence on AI-generated explanations may potentially reduce students' independent analytical reading abilities if instructional supervision is not implemented appropriately. Therefore, lecturer guidance remains essential to ensure that AI technologies function as learning support tools rather than replacing students' critical thinking processes.

Table 6. Students' Academic Reading Comprehension Improvement

Group	Pre-Test	Post-Test
<i>Experimental Group</i>	67.4	84.6
<i>Control Group</i>	66.8	74.2

Table 6 illustrates the improvement of students' academic reading comprehension scores after the implementation of AI-assisted instruction. The experimental group demonstrated substantially higher improvement compared to the control group, indicating that AI-assisted instruction positively contributed to students' comprehension development in higher education contexts. Overall, the findings confirm that AI-assisted instruction has significant potential to support academic literacy development and improve students' academic reading comprehension in higher education settings. These findings are also consistent with Aldamen et al., (2026), who reported that AI-assisted reading strategy instruction significantly improved students' reading comprehension achievement compared to conventional teacher-centered instruction. Students' Perceptions toward AI-Assisted Instruction, The qualitative findings obtained from semi-structured interviews revealed that most students responded positively toward the implementation of AI-assisted instruction in academic reading learning. Students perceived AI technologies as supportive learning tools that facilitated their understanding of complex academic texts and increased their motivation to participate in reading activities.

One participant stated:

“AI helps me understand difficult academic texts more quickly because I can directly ask questions and receive immediate explanations.”

Another participant explained:

“Using AI during reading activities makes learning more interactive and helps me identify important information from the texts.”

The interview findings revealed several perceived benefits of AI-assisted instruction, including immediate feedback, improved comprehension support, increased learning motivation, interactive learning experiences, and greater learning independence. These findings correspond with Conde et al. (2026), who reported that university students perceived generative AI technologies as supportive tools that enhanced learning engagement and academic activities. Moreover, students reported that AI-assisted instruction reduced their anxiety when reading difficult academic materials. AI-generated explanations and summaries helped students understand complex vocabulary and academic concepts more effectively. Li et al., (2026) similarly highlighted that transformer-based AI technologies contribute positively to English reading comprehension processes and language learning experiences. These positive perceptions may indicate that AI-assisted learning environments support students' emotional engagement and learning confidence during academic reading activities. Interactive AI support may also encourage more autonomous and self-regulated learning behaviors among university students.

Despite these positive perceptions, several students also expressed concerns regarding excessive dependence on AI technologies. Some participants argued that students should not rely entirely on AI-generated summaries because critical thinking and independent reading abilities remain essential competencies in higher education. This finding supports Yu et al., (2026), who emphasized that the integration of AI in education should be balanced with critical literacy development and responsible AI use. In addition, students acknowledged that AI technologies should function as learning support rather than replacing human thinking and academic effort. The lecturer's guidance remained important to ensure that students critically evaluated AI-generated information

and maintained reflective learning practices throughout the learning process. Sanz-Tejeda et al., (2026) similarly argued that the effectiveness of AI-assisted learning largely depends on pedagogical implementation and instructional supervision.

Table 7. Students' Perceptions toward AI-Assisted Instruction

Themes	Students' Responses
Reading Support	AI helped clarify difficult academic texts
Motivation	AI increased students' learning motivation
Interaction	AI created more interactive learning experiences
Independence	AI supported self-regulated learning
Concern	Overreliance on AI may reduce critical thinking

Overall, the findings indicate that AI-assisted instruction not only improved students' academic reading comprehension but also enhanced students' engagement, confidence, motivation, and learning experiences in higher education. Nevertheless, the pedagogical implementation of AI technologies should remain focused on supporting critical literacy development, reflective learning, and responsible AI use rather than replacing students' independent cognitive processes.

**Research Limitations,** This study has several limitations. First, the study involved a relatively small number of participants from a single university, which may limit the generalizability of the findings. Second, the instructional intervention was conducted within a relatively short duration of eight weeks. Third, this study primarily focused on students' academic reading comprehension achievement and classroom engagement and did not examine long-term retention or broader academic literacy development. In addition, the study only utilized ChatGPT-assisted instruction and did not compare different AI technologies or instructional models. Therefore, future studies are recommended to involve larger participant groups, longer intervention periods, and broader educational contexts to obtain more comprehensive findings regarding AI-assisted academic reading instruction.

#### 4. Conclusion

This study concludes that AI-assisted instruction significantly contributed to enhancing students' academic reading comprehension in higher education contexts. The findings demonstrated that the integration of AI technologies into academic reading learning improved students' reading engagement, classroom interaction, strategic reading behaviors, and comprehension achievement. Students who participated in AI-assisted instruction achieved higher reading comprehension improvement compared to those who received conventional instruction. In addition, the qualitative findings revealed that students perceived AI technologies as supportive learning tools that facilitated understanding of complex academic texts, increased learning motivation, and promoted more interactive and independent learning experiences.

The findings of this study contribute to the growing discussion of AI-assisted language learning and technology-enhanced academic literacy instruction in higher education. The study also highlights the pedagogical potential of AI technologies as cognitive scaffolding tools that support students' metacognitive reading processes and classroom engagement. Nevertheless, the study emphasizes the importance of balancing AI integration with critical literacy development and responsible AI use to avoid excessive dependence on technology. Therefore, AI-assisted instruction can be considered an effective pedagogical approach for supporting academic literacy development in higher education when implemented critically, ethically, and reflectively. Future studies are recommended to investigate AI-assisted academic reading instruction in broader educational contexts, involve larger participant groups, and examine the long-term impact of AI integration on students' academic literacy and critical reading development.

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