Optimizing AI-Assisted Reading Comprehension: Leveraging Chatgpt to Enhance Primary School Pupils' Analytical Skills

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ABSTRACT

This study systematically reviews the role of Artificial Intelligence (AI), particularly ChatGPT, in enhancing reading comprehension and analytical skills among primary school pupils. The objective is to evaluate the effectiveness, engagement outcomes, and pedagogical implications of AI-assisted learning in literacy education. Using the PRISMA 2020 framework, peer-reviewed studies published between 2020 and 2025 were identified from Scopus, ERIC, and Google Scholar. The inclusion criteria focused on empirical research involving AI-driven reading comprehension interventions at the primary education level. The findings reveal that AI-assisted tools like ChatGPT significantly improve pupils' engagement, reading comprehension, and analytical thinking by providing personalized feedback, adaptive questioning, and real-time support. Qualitative studies highlighted increased learner motivation and participation, while experimental research demonstrated measurable gains in reading performance and critical reasoning. Mixed-methods studies further emphasized the complementary role of AI in supporting teachers through automated assessment and individualized lesson planning. However, challenges such as limited long-term evidence, overreliance on AI, and ethical concerns including data privacy and content accuracy remain notable limitations. The review concludes that AI-powered platforms have the potential to transform reading instruction by promoting interactive, personalized, and data-driven literacy development. For sustainable integration, educators must receive AI literacy training, and policymakers should establish clear ethical frameworks. The study contributes to understanding how ChatGPT can serve as an assistive educational tool, complementing human-led instruction while fostering critical and independent reading skills among young learners.

Keywords: ChatGPT, AI-assisted learning, reading comprehension, analytical skills, primary education, systematic literature review

INTRODUCTION

Reading comprehension is a fundamental component of literacy development, enabling learners to construct meaning, interpret information, and apply higher-order thinking skills. However, many primary school pupils continue to struggle with understanding key ideas, making inferences, and engaging critically with texts. These challenges are often linked to limitations in traditional reading instruction, which may not fully support diverse learning needs or promote analytical reasoning skills.

The increasing integration of Artificial Intelligence (AI) in education has introduced new possibilities for enhancing literacy instruction. Among AI-powered tools, ChatGPT has gained particular attention due to its ability to provide real-time interaction, personalized feedback, and adaptive questioning. These features offer potential advantages for improving pupils' engagement, comprehension, and analytical reading performance.

Despite the growing interest in AI-assisted learning, research that specifically examines the impact of ChatGPT on primary school pupils' reading comprehension and analytical skills remains limited. Existing studies have explored AI in education broadly, yet few have isolated ChatGPT's role within early literacy contexts. This gap highlights the need for a systematic synthesis of empirical evidence focused on ChatGPT in primary education.

Therefore, this systematic literature review (SLR) aims to evaluate how ChatGPT has been used to support reading comprehension and analytical skills among primary school pupils. By reviewing recent empirical studies published between 2020 and 2025 and guided by the PRISMA 2020 framework, this study provides insights into the effectiveness, engagement outcomes, and pedagogical implications of integrating ChatGPT into reading instruction.

Background of the Study

Reading comprehension is a key indicator of academic success, as it enables pupils to decode text, construct meaning, and develop higher-order reasoning skills such as inference-making and critical interpretation. However, many primary school pupils face persistent challenges in understanding main ideas, identifying relationships within texts, and applying analytical thinking strategies. These difficulties are often linked to limited exposure to differentiated instruction, varying language proficiency levels, and insufficient opportunities for individualized learning support.

In recent years, Artificial Intelligence (AI) has emerged as a promising tool for addressing literacy challenges through interactive and adaptive learning environments. AI-based platforms provide immediate feedback, personalized explanations, and scaffolded support that traditional instructional methods may not always offer. Among these AI tools, ChatGPT has gained significant attention due to its ability to simulate human-like conversation, adapt questions to learners' proficiency levels, and provide step-by-step reasoning that can guide pupils through comprehension tasks.

Although AI in education has been widely studied, research focusing specifically on ChatGPT's impact on reading comprehension and analytical thinking among primary pupils remains limited. Existing studies often examine AI broadly or emphasize secondary and tertiary education contexts. This creates a gap in understanding how ChatGPT can support younger learners who are still developing foundational literacy and reasoning skills.

Therefore, this study reviews recent empirical research to evaluate ChatGPT's potential as an assistive tool for enhancing reading comprehension and analytical skills among primary school pupils. This review provides insights into its pedagogical value, effectiveness, and implications for literacy instruction.

Research Objectives

This study aims to systematically review recent literature on the use of AI-assisted tools—particularly ChatGPT—in enhancing reading comprehension and analytical skills among primary school pupils. The specific objectives are:

1. To examine the effectiveness of ChatGPT in improving reading comprehension skills among primary school pupils.

2. To explore how ChatGPT enhances pupils' analytical reading abilities, including inference-making and text interpretation.

3. To investigate pupils' engagement and perceptions regarding AI-assisted reading comprehension using ChatGPT.

Research Questions

The study is guided by the following research questions:

1. How effective is ChatGPT in enhancing reading comprehension performance among primary school pupils?

2. In what ways does ChatGPT support primary pupils in analyzing and interpreting texts?

3. What does the literature reveal about pupils' perceptions and engagement with ChatGPT in reading comprehension tasks?

Significance of the Study

This systematic literature review provides important insights into the role of ChatGPT in enhancing reading comprehension and analytical skills among primary school pupils. The findings are valuable for several groups. For pupils, the review highlights how AI-assisted tools can provide personalized feedback, adaptive questioning, and interactive support that strengthen comprehension and critical thinking. For teachers, the study offers evidence on how ChatGPT can complement classroom instruction by reducing workload, supporting differentiated learning, and providing real-time formative assessment.

The review is also significant for curriculum designers and policymakers, as it synthesizes recent empirical findings to inform the development of AI-integrated literacy frameworks. By identifying the benefits, limitations, and emerging challenges of ChatGPT use in primary education, this study contributes to the growing body of research on AI-assisted learning and supports informed decision-making regarding its implementation. Overall, the review expands current understanding of how ChatGPT can be used responsibly and effectively to enhance literacy outcomes in primary school contexts.

METHODOLOGY

This systematic literature review followed the PRISMA 2020 guidelines to ensure a transparent and rigorous selection of studies. The review focused on empirical research examining the use of ChatGPT or similar AI-assisted tools to support reading comprehension and analytical skills among primary school pupils.

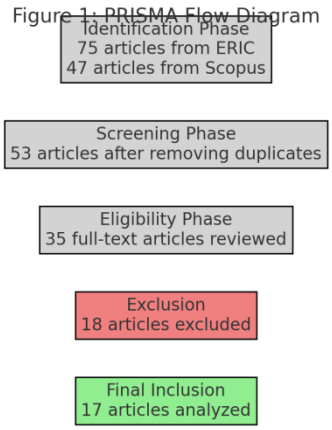

Figure 1: PRISMA Flow Diagram

Data Sources and Search Strategy

A comprehensive search was conducted across three major databases: Scopus, ERIC, and Google Scholar. These databases were selected because they index high-quality research in education, technology-enhanced learning, and literacy development. The search included publications from 2020 to 2025 to capture recent evidence on AI-assisted reading instruction.

A keyword-based strategy was used, combining terms with Boolean operators (AND, OR). The primary search strings included:

- "ChatGPT" AND "reading comprehension"
- "artificial intelligence" AND "reading skills" AND "primary education"

- "AI-assisted learning" AND "literacy development"
- "AI-based feedback" AND "analytical reading"

Additional filters were applied to restrict results to peer-reviewed empirical studies written in English. Reference lists of relevant articles were also examined to identify additional eligible studies.

Inclusion and Exclusion Criteria

Studies were screened according to predefined criteria to ensure relevance and quality. Only empirical studies involving AI-assisted interventions related to reading comprehension or analytical skills in primary education settings were included. Table 1 summarizes the criteria.

The study selection process was guided by the following criteria:

Table 1. Inclusion and Exclusion Criteria

Criteria	**Inclusion**	**Exclusion**
Publication Date	2020–2025	Before 2020
Study Type	Empirical (qualitative, quantitative, or mixed-methods)	Theoretical or conceptual papers
Context	Primary school reading comprehension	Secondary, tertiary, or adult education
Participants	Primary pupils or teachers	University students or general population
Focus	AI or ChatGPT in reading instruction	AI use unrelated to reading

C. Study Selection Process

The study selection followed the four PRISMA stages:

1. **Identification**:

   All records retrieved from Scopus, ERIC, and Google Scholar were imported into a database. Duplicate records were removed.

2. **Screening**:

   Titles and abstracts were reviewed to exclude studies not related to AI-assisted reading comprehension or those outside primary education contexts.

3. **Eligibility**:

   Full texts of the remaining studies were assessed against the inclusion criteria. Studies lacking empirical data, using AI unrelated to reading outcomes, or focusing on older learners were excluded.

4. **Inclusion**:

   The final set of studies meeting all criteria was included in the synthesis.

A PRISMA flow diagram was used to illustrate the number of studies at each stage of the selection process.

Data Extraction and Analysis

Data from the included studies were extracted using a structured matrix. Key information gathered included research design, sample characteristics, AI tools used, intervention features, and findings related to reading comprehension or analytical skills. The studies were then categorized into qualitative, quantitative, and mixed-method designs to enable thematic comparison and synthesis.

RESULTS AND FINDINGS

A total of empirical studies that met the inclusion criteria were synthesized to address the research objectives. The findings are presented according to the major themes identified across the studies: overall research trends, geographic distribution, research designs, and key outcomes related to reading comprehension and analytical skills.

Trends in AI-Assisted Reading Comprehension Research

Studies published between 2020 and 2025 demonstrate growing interest in the use of AI—particularly ChatGPT—to support reading comprehension and literacy development in primary education. Several researchers highlighted the potential of AI tools to provide adaptive questioning, real-time feedback, and individualized support for young learners.

Table 2. Summary of Key Studies on AI-Assisted Reading (2020–2025)

Researcher(s)	Focus of Study	No.of Studies Reviewed	Years Covered
Aljohani (2024)	AI use in EFL reading	12	2020–2024
Asadi et al. (2025)	AI-assisted writing & feedback	8	2020–2025
Yasin et al. (2023)	AI-supported reading strategies	10	2021–2023
Boudouaia et al. (2024)	ChatGPT in language learning	9	2020–2024
Hu & Škultéty (2024)	AI as virtual learning support	11	2022–2024

Geographic Distribution of Studies

The studies included in the review originated primarily from **Asia and Europe**, with a smaller number from North America. Countries such as China, Japan, South Korea, and the United Kingdom contributed significantly to recent research on AI-assisted literacy instruction. Regions such as South America and Africa were underrepresented, reflecting limited access to AI-based educational technologies. Overall, geographic trends indicate that AI-driven reading interventions are more commonly explored in technologically progressive educational systems.

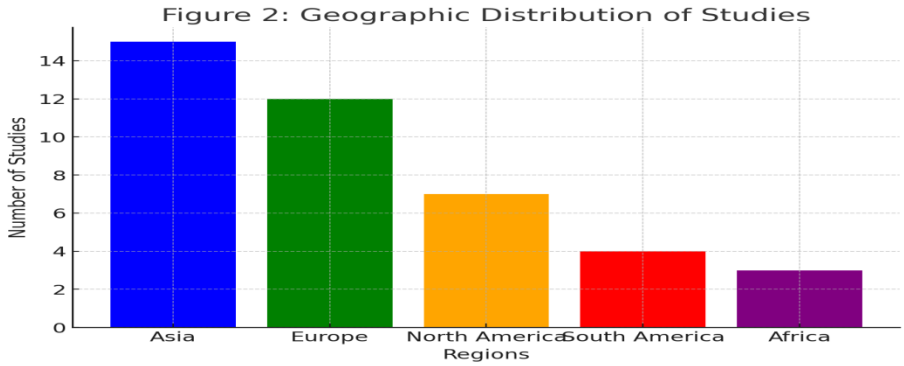

Figure 2: Geographic Distribution of Studies

Research Designs and Sample Distribution

Three main research designs were used across the included studies:

- **Qualitative studies** (e.g., interviews, case studies)

  Focused on pupils' and teachers' perceptions, experiences, and engagement with AI-assisted reading tools.

- **Quantitative studies** (e.g., pre-tests and post-tests, experimental designs)

  Measured the impact of AI tools on reading comprehension performance, vocabulary development, and analytical reasoning.

- **Mixed-method studies**

  Combined test scores, surveys, classroom observations, and interviews to provide comprehensive insights into AI-assisted instruction.

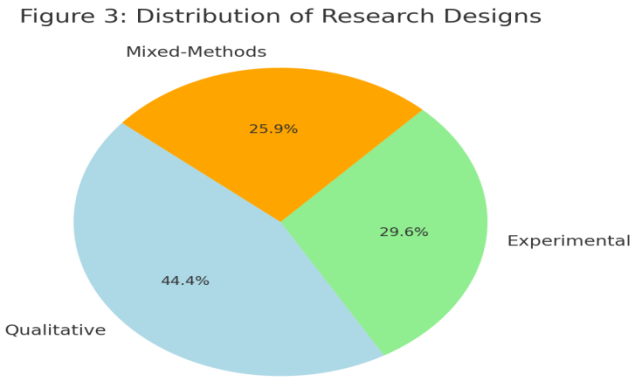

Figure 3: Distribution of Research Designs

Samples primarily involved primary school pupils aged 8–12 years. Several studies also included teachers to understand how AI tools support instruction, assessment, and lesson planning.

Key Findings on Reading Comprehension and Analytical Skills

Four major themes emerged across the studies:

1. **Improved Reading Comprehension**

   Many studies reported significant gains in pupils' comprehension scores after using AI-assisted tools. ChatGPT's ability to simplify text, ask follow-up questions, and provide scaffolded explanations contributed to improved understanding of main ideas and details.

2. **Enhanced Analytical and Inferential Thinking**

   Several studies demonstrated that ChatGPT encourages deeper engagement with text by prompting pupils to justify answers, make inferences, and evaluate information—skills often challenging for primary learners.

3. **Increased Engagement and Motivation**

   Interactive features such as conversational responses, instant feedback, and gamified questioning increased pupils' motivation and participation during reading activities.

4. **Support for Differentiated Instruction**

AI tools allowed teachers to personalize reading tasks based on pupils' proficiency levels. This helped accommodate diverse learners and reduce classroom workload.

Table 3. Key Benefits of ChatGPT for Primary Pupils

Benefit Identified	**Frequency**	**Supporting Studies**
Increased engagement	6	Aljohani (2024), Hu & Škultéty (2024)
Improved analytical skills	5	Yasin et al. (2023), Asadi et al. (2025)
Personalized feedback	4	Boudouaia et al. (2024)
Enhanced vocabulary development	3	Amjadi & Talebi (2021)

Challenges Identified in the Studies

Despite positive outcomes, several limitations were noted:

- Short intervention periods, limiting understanding of long-term impact
- Overreliance on AI, risking reduced critical independence
- Concerns about data privacy and content accuracy
- Limited teacher training on AI integration

These challenges indicate the need for sustained support and ethical guidelines when implementing AI-assisted reading instruction.

DISCUSSION

The findings of this review indicate that ChatGPT and other AI-assisted tools play a meaningful role in supporting primary school pupils' reading comprehension and analytical skills. The studies consistently showed that AI tools enhance pupils' understanding of texts through automated questioning, scaffolded explanations, and real-time feedback. These features help learners break down complex information, make inferences, and engage more actively with reading tasks.

A common theme across the studies was the significant increase in learner engagement. Interactive elements such as conversational responses and adaptive prompts made reading activities more stimulating, especially for pupils with lower motivation or limited reading confidence. This aligns with existing literature suggesting that digital learning tools can boost motivation through personalization and immediacy of feedback.

Teachers benefited from AI integration through improved efficiency in lesson delivery and learner assessment. ChatGPT supported differentiated instruction by generating leveled texts, tailoring questions based on learners' proficiency, and providing real-time diagnostic insights. These features reduced the time teachers spent preparing materials and enabled them to focus on higher-level pedagogical tasks.

Despite the positive outcomes, several challenges were highlighted. The majority of interventions were short-term, limiting the understanding of ChatGPT's long-term impact on literacy development. Concerns about data privacy, misinformation, and overreliance on AI remained present across studies. Additionally, teachers' readiness to use AI tools varied, indicating the need for sustained training and institutional support.

Overall, the discussion suggests that while ChatGPT has the potential to transform reading instruction, its effectiveness depends on responsible integration, adequate teacher training, and robust classroom strategies that position AI as a complement—not a replacement—to human instruction.

CONCLUSION

This systematic literature review synthesized empirical evidence on the use of ChatGPT to enhance reading comprehension and analytical skills among primary school pupils. The reviewed studies demonstrated that AI-assisted tools support literacy development by providing personalized guidance, interactive questioning, and immediate feedback. These features help pupils understand texts more deeply, improve inferential reasoning, and engage more actively during reading activities.

Teachers also benefit from AI integration, particularly in areas such as differentiated instruction, progress monitoring, and resource generation. However, challenges such as data privacy concerns, limited long-term research, and insufficient teacher training highlight the need for careful and ethical implementation of AI in classrooms.

Overall, ChatGPT holds considerable potential to complement traditional reading instruction. Future research should focus on long-term interventions, robust ethical frameworks, and scalable teacher training programs to ensure that AI is used responsibly and effectively in primary literacy education.

RECOMMENDATIONS

As a population, people need to get over using AI based reading tools: I've got no problems with people using books, but it's the millions of students who buy reader devices rather than reading materials, and then they get surprised when they open them, that I find surprising. Among other things, AI empowered platforms like ChatGPT need to be integrated into schools' literacy instruction so that students are receiving real time instructions, personalized learning as well as interacting with comprehension exercises. But AI should not take the place of human instruction, and rather teachers will see their role as assisting learning that is critically reflective and linked to discussion.

Second, specialized training of teachers on AI-assisted instruction should take place to provide them with the necessary skills on how to effectively use AI tools in the learning and teaching processes. AI literacy, data interpretation, AI reading comprehension best practices are the training the professional development programs should offer in practice. Provision of AI related pedagogical knowledge to the teachers will facilitate the use of AI as classroom resource without creating dependency on the technology and also avoiding the misuse of AI content.

Third, AI literacy programs should be developed on AI for different learning contexts such that students of different backgrounds as well as different reading levels benefit from AI literature instruction. Inclusive AI driven platforms should be created both by governments and educational institutions along with edtech developers which can capture the students having learning disability, having languages barriers or facing with others socio-economic problems. Stakeholders can embrace equitable learning opportunities across a population of diverse students by creating AI programs which are accessible, apply to the specific cultures, and adjust to the particular educational systems.

However, in general, AI holds the promise to change the game in reading comprehension, to increase the interactivity, personalization and adaptivity of the learning to each student's needs. While the integration of AI into classrooms is possible, it is done in a careful manner where AI is harnessed as 'a tool that facilitates human led instruction' instead of serving as a replacement for time tested pedagogical methods. Adopting AI based reading interventions, training of teachers in AI integration, as well as inclusive AI driven literacy programs can help education systems leverage the power of AI onto the students strengthening their analytical reading skills so that they can handle the fast-changing world of digital and information rich systems.

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