

AI and Collaborative Learning in EFL Reading Instruction: A Classroom-Based Study with First-Year English Students at Batna 2 University

Hind Baadache*

Moustapha Benboulaïd –
Batna 2

h.baadache@univ-batna2.dz

Khedidja Latreche

Higher normal school of
Bouzareah

khadidja.latreche@ensb.dz

Date of submission: 15-09-2025

Date of acceptance: 03-12-2025

Abstract:

The present study delineates a classroom-based intervention that combined artificial intelligence (AI) tools with collaborative learning in a first-year 'Reading and Text Analysis' module at Batna 2 University, Algeria. The research aimed to boost students' academic reading skills, particularly comprehension, vocabulary use, and inference-making, by integrating peer learning with AI-assisted scaffolding. The group chosen purposefully contains fifty-eight undergraduate students who were engaged in group reading assignments over twelve weeks through twelve sessions. Throughout the sessions, students were supported by Voyant Tools, Grammarly, Hypothes.is, and ChatGPT. A mixed-methods design was employed to account for students' progress comprehensively, with pre- and post-tests administered to capture measurable gains in skill development. Simultaneously, weekly reflections, teacher observations, and focus group interviews were conducted to corroborate these outcomes and add richer, contextual insights. The data analysis revealed substantial effect sizes and statistically significant gains, indicating that the students made considerable progress. The findings demonstrate the efficacy of integrating collaborative learning with AI assistance to improve learners' reading ability in the EFL context. Students who acknowledged using AI technologies concurred that collaboration increased their likelihood of engaging with diverse texts and enhanced their confidence in reading assignments. However, there were some challenges, such as a lack of students' digital literacy and occasionally a remarkable over-reliance on content created by AI. Overall, the results suggest that combining collaborative and AI-based tools is a valuable and effective way to improve reading and text analysis in higher education institutions.

Keywords: AI Tools; Collaborative Learning; Reading; Text Analysis.

* - Corresponding author.

Introduction:

The ability to read and analyse academic texts is crucial for university outcomes. However, many first-year students arrive at higher education having been insufficiently exposed to texts, language, and cognitive demands they must negotiate to become academically literate. The latter is a problem especially in EFL (English as a Foreign Language) contexts, where students may have received little training in text analysis, annotation, inference-making, or academic vocabulary usage during their past learning experiences.

At Batna 2 University, Algeria, these discrepancies have been noticed in the Reading and Text Analysis course, the core first-year BA English Language course. While the course helps students develop vital reading skills like skimming, scanning, close reading, and deconstructing a text, they increasingly find themselves unable to transfer these strategies to their study situation. Teacher-centred, lecture-based traditional teaching methods may not encourage the levels of activeness and interactivity required for students to learn these strategies effectively.

Advances in educational technology, particularly artificial intelligence (AI) have provided new ways to support students' academic reading. On the other hand, cooperative learning is becoming increasingly recognised as a powerful approach to help students construct meaning through dialogue, peer feedback, and cooperative tasks. Although studies on AI tools and collaborative techniques have been conducted independently, their joint use in organised English for Academic Purposes (EAP) courses has been under-explored, particularly in insufficiently supported educational environments.

Despite the increasing evidence base, underlining the potential utility of AI technologies such as chatbots, grammar checkers, and text visualisers for language education (*Liu & Wang, 2024*), much of this research has been carried out in contexts of privilege. On the flip side, while collaborative learning can be effective in helping reading comprehension and vocabulary gains (*Wahyurianto & Sylvia, 2024*), few have investigated the possible interaction of AI and peer collaboration in the same instructional design.

There is also a lack of research based on the North African university context, endowed with diverse technological altruism, Academic Marksmanship, and Economism infrastructure, diversity of teacher-training, and students' preparedness that differ significantly from one country to another. Henceforth. The alignment of AI, collaborative learning and academic reading approaches in these learning environments deserves examination not only for its practical implications but also for the potential pedagogical lessons it could lend.

As the target of the course is to develop students' capacity to read critically and analyse texts efficiently, the study mainly aimed to investigate how AI tools can be applied in a collaborative learning setting to improve students' reading and text analysis skills. Its focus was supporting first-year English students at Batna 2 University as they navigated academic texts, developed vocabulary, and practiced analytical reasoning.

The specific objectives of the study were:

1. To implement AI tools as support mechanisms in collaborative reading tasks
2. To assess the impact of this integration on students' comprehension, vocabulary, and
3. inferencing skills
4. To explore students' perceptions of the AI tools and their usefulness in collaborative

group work

The following research questions guided this study:

1. To what extent does integrating AI tools within collaborative learning environments improve students' academic reading and text analysis skills?
2. How do students perceive the role of AI tools in supporting group-based reading activities?
3. Which reading-related skills benefit most from this blended approach, such as vocabulary acquisition, inference-making, or cohesion analysis?

This research contributes to the growing conversation around the role of AI in language education by offering an applied case study from a context where digital tools are still emerging in mainstream pedagogy. It also provides a practical model for instructors who combine collaborative learning principles with accessible AI tools to support reading instruction.

Notably, the study addresses questions of student agency, critical engagement, and ethical AI use, offering insight into how learners use and respond to these technologies in real academic settings. The findings inform curriculum design, teacher training, and institutional policies to support AI integration in EFL education, particularly in similar environments.

I. Literature Review

This section explores existing research on three interconnected areas: collaborative learning in language education, the role of artificial intelligence (AI) in EFL instruction, and the emerging integration of these two approaches in teaching academic reading and text analysis.

1. Collaborative Learning in Language Education Context:

Collaborative learning (CL), as defined by Smith & MacGregor (1992), is a broad term for educational approaches where students collaborate often in groups of two or more to pursue understanding or create products, wherein roles are shifted, so that instructors act more as designers of intellectual experiences rather than knowledge transmitters. It draws heavily on socio-constructivist theory, particularly the work of Vygotsky (1978), who argued that learners develop cognitively through interaction with others in the Zone of Proximal Development (ZPD). In language education, during collaborative problem solving, a dialogue enhances cognitive processes (Taguchi & Reover, 2017, as cited in Baadache, 2022). Besides, collaboration allows learners to co-construct meaning, clarify misunderstandings, and apply new knowledge through shared experience (Gokhale, 1995; Barkley et al., 2014).

Namaziandost (2020) and Pan (2014) confirmed that group-based tasks like jigsaw reading, reciprocal questioning, and peer feedback have immensely supported reading comprehension and vocabulary retention in EFL classrooms. According to Gillies (2016), structured group

interaction promotes deeper cognitive engagement, particularly when learners are held individually accountable for outcomes. Johnson, Johnson, and Smith (2014) also note that CL can increase motivation and reduce language anxiety, which are important factors in academic reading development.

Despite its proven effectiveness, CL remains underutilised in many EFL higher education contexts, especially in North Africa, where teacher-centred methods continue to dominate (Benmoussat & Benrabah, 2007). There is growing interest, however, in how collaborative strategies can be adapted to large classes and integrated with digital tools to enhance reading instruction

2. Academic Reading and Text Analysis in EFL Contexts

As by Maguire et al. (2020) defined, academic reading is "a focused, discipline-specific, and complex practice that enables learners to construct subject knowledge, critically evaluate texts, and develop disciplinary identities."

Academic reading is distinct from general reading in both purpose and complexity. It is an active process of engaging with scholarly or complex texts, where the reader not only decodes information but also analyses, interrogates, synthesises, and evaluates content to construct meaning and foster more profound understanding. The latter requires readers to extract meaning from dense texts, interpret implicit ideas, recognise structure, and engage with authorial intent. The previously stated skills are often underdeveloped among first-year EFL students, who certainly have had limited exposure to academic texts during secondary education, as affirmed by (Hyland, 2014; Grabe & Stoller, 2019).

Effective academic reading instruction, accordingly, includes training in skimming and scanning, close reading, inference-making, annotation, and identifying textual cohesion.

According to Afflerbach, Pearson, and Paris (2008), explicit instruction in reading strategies can help students move beyond surface comprehension toward deeper engagement with texts.

In Algerian universities, howbeit, many students report that reading tasks are presented without sufficient scaffolding, making it

challenging to develop higher-order comprehension skills. Collaborative reading strategies have been proposed to address this gap, especially when combined with reflective activities and teacher-guided support.

3. Artificial Intelligence in EFL and Reading Instruction

Undoubtedly, over the past five years, artificial intelligence has become increasingly visible in language classrooms through the use of chatbots, automated writing feedback tools, and text analysis platforms. These technologies offer many benefits, including personalised learning, real-time feedback, and accessibility beyond classroom hours (Luckin et al., 2016; Holmes, Bialik, & Fadel, 2019).

From their side, Følstad & Brandtzaeg (2017) characterised chatbots as "conversational agents that simulate human interaction through text or speech, relying on natural language processing to provide automated responses."

On top of that, AI tools such as ChatGPT, Grammarly, and Voyant Tools are commonly used in reading instruction to help: summarize texts, clarify word meanings, check grammar, and visualize word usage patterns. These tools promote students' understanding of sophisticated texts and support self-discovery of language patterns (Ranalli, 2018; Huang & Hew, 2022).

Zawacki-Richter et al. (2019) confirmed that while AI tools can enhance language learning, their effectiveness depends mainly on how they are embedded into instructional design. Tools used in isolation in a random and unaware manner may encourage passive use or lead to surface-level understanding. However, AI can scaffold more active and meaningful engagement when paired with teacher guidance or peer collaboration.

4. Combining AI and Collaborative Learning: An Emerging Model

The hallmark of the present time is the boundless use of AI chatbots. Thus, Recent research indicates that integrating collaborative learning with AI tools may produce superior educational outcomes compared to each method used in isolation. Notably, research by Wang

et al. (2025) revealed that students collaborating in small groups with an AI chatbot during reading assignments exhibited enhanced comprehension and increased motivation relative to those engaged in conventional teacher-led sessions.

This combination, therefore, helps with no doubt with several teaching goals, among them the following:

- Cognitive offloading: AI assists students with simpler activities like looking up words and summarising, and this helps them focus on more in-depth study, as affirmed by Holmes et al. (2019).
- Peer accountability: Students working in groups are more inclined to assess and question AI outcomes instead of merely receiving and accepting them (Kalir & Garcia, 2019).
- Scaffolded autonomy: students utilise AI to learn about things on their own, as is generally recognised, yet they still benefit from working together and making sense of things.

However, among the challenges that arise, some students may over-reliance on AI tools, reducing their engagement with the original text. Others may lack the digital literacy needed to use these tools effectively. Subsequently, these issues call for a structured implementation and explicit instruction in ethical and critical AI use (Zawacki-Richter et al., 2019).

While the separate benefits of collaborative learning and AI in language instruction are well documented, few studies have explored their combined use in teaching academic reading, particularly in under-resourced, non-Western university settings. There is a lack of research on how free, widely available AI tools can be integrated into a semester-long EAP module, with attention to cognitive outcomes and student perceptions.

This study addresses these gaps by implementing a 12-week intervention that blends collaborative learning with AI support across one semester's full Reading and Text Analysis syllabus. It offers new insights into how such a model can be deployed in an Algerian EFL context, with implications for pedagogy and curriculum design.

II. Methodology

1. Research Design

This intervention was fully implemented in a semester and included quantitative measures, with qualitative insights, for developed skills and students' perspectives. A quasi-experimental one-group pretest-posttest design was employed with pre-test, post-test, reflective journals, group projects, and focus group interviews.

This design was chosen to ensure the understanding of the combined effect of combining peer collaboration and AI tools on students' reading comprehension, development of academic vocabulary, and analytic engagement with academic texts

2. Study Context

The study was carried out in the second term of the 2023–2024 academic year at Batna 2 University (Algeria). The intervention was done as part of the first-year BA English studies compulsory model, Reading and Text Analysis in the Department of English Language and Literature. The instructor for this class is also the researcher.

This lecture-based module was redesigned as a student-centred activity combining face-to-face group work with a structured AI-supported reading activity. The objective of instruction was to shift from surface-level text engagement toward critical reading and analytical thinking, aligned with the academic demands of higher education in English.

3. Participants

A total of 58 students (36 female, 22 male), aged between 18 and 21, participated in the study. All were enrolled in the first year of the English degree program. Based on CEFR (Common European Framework of Reference for Languages) guidelines, most participants were at a B1–B2 proficiency level.

4. Course Redesign and Intervention Plan

The 12-week module was adapted to incorporate collaborative learning structures and AI tool integration across all core syllabus topics. Students were placed into small, stable groups (4–5 members) and completed weekly tasks combining reading strategies with digital tool

use. Each group shared responsibilities and engaged in peer feedback, while also receiving guidance on practical and ethical use of AI.

AI tools used included:

- ChatGPT (OpenAI): Summarization, inference support, question generation
- Grammarly: Real-time writing feedback and cohesion support
- Voyant Tools: Text mining, frequency analysis
- Hypothes.is: Collaborative annotation
- Quizlet & Rewordify – vocabulary training and simplification

Table 1

Weekly Integration of Collaborative Learning and AI Tools

Week	Topic	Collaborative Task	AI Tool(s)
1	Introduction & Pre-test	Group expectations + diagnostic quiz	
2	Critical Thinking in Reading	Text comparison in groups	ChatGPT
3	Skimming & Scanning	Timed group reading & fact-checking	Hypothes.is
4	Close Reading	Collaborative analysis of literary passage	Hypothes.is, Quizlet
5	Annotation Strategies	Joint digital annotation of academic texts	Hypothes.is
6	Inference-Making	Group-based prediction and gap-fill tasks	ChatGPT, Voyant Tools
7	Vocabulary in Context	Academic word map creation & usage quiz	Rewordify, Quizlet, ChatGPT
8	Digital Text Analysis	Keyword cloud, lexical variety comparison	Voyant Tools
9	Coherence & Cohesion	Group sentence rewriting and editing	Grammarly, QuillBot

10	Peer Review Practice	Group rubric development and mutual feedback	Google Forms, Grammarly
11	Final Project Development	Analysis of long-form academic text in groups	All of the above
12	Presentations + Post-test	Final project presentations & feedback exchange	—

The instructor acted as a **facilitator and mentor**, offering support during tool use, helping students interpret AI output critically, and guiding group dynamics.

5. Instruments and Data Collection

The following instruments were used to gather both quantitative and qualitative data:

Table2

Instruments used

Instrument	Purpose	Type
Pre-/Post-Tests	Assess reading comprehension, vocabulary, inference	Quantitative
Final Project Rubric	Evaluate group text analysis presentations	Quantitative
Student Reflections	Track weekly perceptions and tool interactions	Qualitative
Instructor Field Notes	Document student engagement and tool use	Qualitative
Focus Group Interviews	Gather in-depth student insights (n = 10)	Qualitative

Pre- and post-tests included short-answer questions, MCQs, and inference tasks based on academic texts. The project rubric was validated by two senior instructors and focused on analytical depth, vocabulary, and appropriate tool integration

6. Data Analysis

6.1 Quantitative Data

Pre- and post-test scores were analysed using paired sample t-tests in SPSS v27. Descriptive statistics (means, standard deviations) were calculated, and Cohen's d was used to assess effect sizes. A significance threshold of $p < .05$ was used.

6.2 Qualitative Data

Qualitative data (reflections, interviews, and observation notes) were analysed thematically using Braun and Clarke's (2006) six-step framework. Coding was conducted inductively using NVivo 12, with themes developed around perceived learning benefits, tool use, and collaboration dynamics.

7. Ethical Considerations

Though learners should learn the module reading and text analysis, they were provided informed consent and were assured that their information would be kept confidential and anonymous. In addition, students received guidance on the ethical use of AI, which included developing critical awareness of tool outputs, learning when and how to cite appropriately, and recognising the importance of avoiding over

III. Results

This section provides the study's qualitative and quantitative results. Quantitative results compare students' performance on pre- and post-intervention reading comprehension tests, vocabulary in context, and making inferences. Through student reflection, focus group interviews, and classroom observation, qualitative results are derived to understand how students experienced using AI tools and collaborative learning during the course.

1. Quantitative Findings

1.1 Pre- and Post-Test Performance

Descriptive and inferential statistics indicate statistically significant improvements across all three targeted reading skill areas after the 12-week intervention. Table 2 summarises the mean scores and standard deviations, along with t-values and effect sizes

Table 3

Comparison of Pre- and Post-Test Scores (n = 58)

Skill Area	Pre-Test Mean (%)	Post-Test Mean (%)	Mean Gain (%)	t-value	p-value	Cohen's d
Reading Comprehension	61.2	76.8	+15.6	6.47	< .001	0.92 (large)
Vocabulary in Context	58.1	74.1	+16.0	6.08	< .001	0.89 (large)
Inference-Making	55.3	72.5	+17.2	6.89	< .001	0.97 (large)

All results were significant at the $p < .001$ level, with **large effect sizes** (Cohen's $d > 0.8$) across all domains. Inference-making showed the largest mean improvement (+17.2%), followed closely by vocabulary use and comprehension.

Pre- and Post-Test Score Comparison by Skill Area

Table 4

Comparison of students' pre- and post-test scores in reading comprehension, vocabulary, and inference-making (n = 58).

Skill Area	Pre-Test Mean (%)	Post-Test Mean (%)
Reading Comprehension	61.2	76.8
Vocabulary in Context	58.1	74.1
Inference-Making	55.3	72.5

1.2 Final Project Evaluation

At the end of the course, student groups presented final projects analysing an academic text of their choice. Each group was assessed using a rubric focusing on analytical depth, vocabulary use, coherence, inference accuracy, and ethical AI use.

Table 5

Mean Scores on Final Group Project Rubric (n = 12 groups)

Rubric Category	Mean Score (out of 10)	Standard Deviation
Analytical Depth	8.4	0.7

Academic Vocabulary Use	8.1	0.9
Textual Cohesion	7.8	1.1
Inference Accuracy	8.5	0.6
Ethical AI Integration	9.2	0.5

Scores suggest that students not only acquired the target skills but also applied them effectively in group settings. Notably, the highest scores were in inference and ethical AI use, indicating that the instructional emphasis on reflective and critical tool engagement was well received.

2. Qualitative Findings

To better understand how students experienced the AI-integrated collaborative learning environment, thematic analysis was conducted on weekly reflections, interviews, and instructor field notes. Four dominant themes emerged, summarised in Table 6 and discussed below.

Table 6

Summary of Emergent Themes from Qualitative Analysis

Theme	Description
Increased Confidence	Students felt more capable in approaching academic texts
AI as Learning Scaffold	Tools supported vocabulary building, summarisation, and inference tasks
Peer Accountability	Group roles encouraged consistent contribution and mutual support
Digital Literacy Challenges	Some students struggled with tool navigation and ethical usage

Theme 1: Increased Confidence with Academic Texts

Many students confirmed their increased confidence with a remarkable reduction in anxiety when reading complex materials. In addition, the group members' contributions made the reading and analysis process more interactive, while AI tools helped clarify and explain difficult concepts.

"Reading academic texts used to be scary. But with my group and the tools, it felt easier and less stressful."

Theme 2: AI as a Useful Scaffolding Tool

Students consistently used AI to simplify challenging passages, paraphrase information, or generate comprehension questions. Most learners,² however, expressed an awareness that AI support had to be balanced with critical thinking.

Arabic: "فكرة، ولكن مع زملائي فهمت المعنى الأعمق ChatGPT في بعض الأحيان أعطاني"

Translation: "Sometimes ChatGPT gave me an idea, but my peers helped me understand it more deeply."

Theme 3: Peer Engagement and Accountability

Students appreciated having clear group roles and shared responsibility for learning outcomes. Many noted that they felt more committed to accomplish tasks because their peers were counting on them.

"We divided tasks one checked vocabulary, another used Voyant for keywords, and I focused on inference. We learned a lot together."

Theme 4: Challenges with Digital Literacy and Ethical AI Use

Most students have been reported to have used the tools effectively; a few of them struggled with navigation or misused AI by copying answers without sufficient reflection. In these cases, it is the teacher's reminders and peer support that helped correct the behaviour

"At first, I didn't know how to use Hypothes.is. But one of my group members showed me, and then it became easy."

Summary of Results

The results show that the amalgamation of CL and AI-supported reading training has significantly improved reading comprehension, vocabulary acquisition, and inference making. Using digital resources helped enhance students' academic knowledge and fostered their self-confidence and activeness in studying through text materials. Qualitative findings also emphasize the importance of judicious tool use and good class dynamics in achieving positive educational results.

IV. Discussion

The results highlight the pros and cons of combining peer-based learning and AI tools in the academic English context.

1. Improvement in Core Reading Skills

The first research question asked whether AI-supported collaborative learning could enhance students' academic reading and text analysis skills. The quantitative results provide strong support for this: students showed statistically significant improvements across all three skill areas, reading comprehension, vocabulary in context, and inference-making, with large effect sizes.

The most notable gain was inference-making, a higher-order skill that requires sustained practice and conceptual understanding. This suggests that the combined cognitive and social scaffolding provided by AI tools and peer interaction allowed students to engage more critically with text, not just at the literal level but also inferentially. This induction aligns with previous findings by Wang et al. (2025) who showed that collaborative learning environments supported by chatbots led to measurable gains in student reasoning and interpretation.

The substantial vocabulary gains are also significant. Tools like Rewordify, Quizlet, and ChatGPT allowed students to interact with academic terms in context and discuss unfamiliar vocabulary in peer settings—an approach supported by Grabe and Stoller (2013) as essential for long-term retention.

2. The Role of AI as a Cognitive Scaffold

The second research question focused on how students perceived the integration of AI tools into collaborative reading tasks. Thematic analysis revealed that students viewed AI as a valuable learning aid, particularly in the early stages of understanding a complex text. ChatGPT, for example, was commonly used to paraphrase difficult paragraphs, while Voyant Tools helped identify key terms and patterns in readings.

These tools functioned as cognitive offloading mechanisms (Holmes et al., 2019), allowing students to manage surface-level challenges (e.g., grammar, terminology) so they could focus on deeper analysis during group discussions. However, students did not rely solely

on AI. Most described a two-step process in which they used a tool to clarify an issue, then discussed or verified it with peers. It means that students were not simply consumers of AI-generated output but active participants in meaning-making.

These findings resonate with Kalir and Garcia (2019), who argue that collaborative digital annotation and tool-mediated learning can deepen textual engagement and support academic identity formation.

3. Peer Collaboration and Shared Responsibility

The third research question explored which reading-related skills benefited most from the blended model. While all areas improved, inference-making and group-based text analysis benefited the most, possibly because they required students to synthesise tool input, peer feedback, and textual evidence.

Group structure played a critical role. Students reported that assigned roles (e.g., summariser, vocabulary checker, AI operator) helped maintain accountability and participation equity. This is consistent with Barkley, Cross, and Major (2014), who emphasise role distribution in successful collaborative learning models.

Interestingly, some students developed critical AI literacy organically through these roles. For example, when an AI-generated summary seemed too vague or overly confident, group members often questioned or corrected it. These moments became teachable opportunities, reinforcing the importance of sceptical, critical engagement with AI tools.

4. Ethical Use, Digital Access, and Challenges

While the overall outcomes were positive, the study also revealed several important challenges. First, not all students possessed the same level of digital literacy, and a few required ongoing support to use tools like Hypothes.is or Voyant Tools effectively. Second, a few students showed signs of over-reliance on AI, particularly during writing tasks, where copying output without modification was occasionally observed.

These issues underscore the need for explicit instruction in ethical AI use, including guidance on when and how to integrate AI output, check for accuracy, and maintain authorial Responsibility. These

concerns mirror those raised in Zawacki-Richter et al. (2019), who caution against the assumption that students inherently understand how to use AI tools critically and ethically.

Despite these challenges, the overall student response was positive, and issues were often mitigated through peer support and teacher facilitation.

5. Pedagogical Implications

The findings of this research point to several valuable pedagogical takeaways for educators and curriculum developers seeking to integrate artificial intelligence (AI) into language education in meaningful and sustainable ways.

To begin with, the study underscores with no doubt the need for a purposefully designed learning environment in which AI tools are not used in isolation, but thoughtfully embedded within collaborative, student-led tasks. When students are encouraged to work in small groups, share responsibilities, and use AI as a supplementary aid rather than a replacement for human reasoning, they engage more deeply with reading strategies and develop stronger critical thinking habits. Therefore, the instructor's role shifts from merely content delivery to facilitative guidance, helping students navigate both peer dynamics and technology use. This goes with earlier pedagogical research highlighting the importance of scaffolding in blended learning models (Barkley et al., 2014; Johnson et al., 2014).

Furthermore, the study demonstrates that accessible and low-cost AI tools like ChatGPT, Grammarly, and Voyant Tools can effectively support academic reading when aligned with clearly defined learning outcomes. However, their integration must go beyond simply assigning tools to tasks. For example, asking students to use Voyant Tools to explore lexical patterns becomes educationally valuable when the activity is linked to larger discussions about authorial voice, discourse features, or argument structure. When integrated in this way, AI becomes a means to enhance, not bypass, cognitive effort and analytical reasoning.

Regarding assessment practices, the findings suggest a shift in focus may be required. Traditional assessments, which emphasise individual outcomes or final products, may not capture the complexity

of how students engage with AI in collaborative contexts. Instead, instructors might consider evaluating processes and products, paying attention to how learners use digital tools during group discussions, how they critique or adapt AI-generated output, and how these interactions shape their understanding of a given text. This approach aligns with recent calls for more formative, participatory, and reflective assessment in digitally mediated learning environments (Kalir & Garcia, 2019).

Another key implication concerns AI literacy and digital ethics. While many students demonstrated curiosity and adaptability in using new tools, not all approached the technology with critical awareness. A few misused AI features like copying AI-generated content directly into assignments highlight a need for explicit instruction on ethical engagement with generative tools. Topics such as authorship, attribution, overreliance, and bias should be incorporated into the curriculum, particularly as AI becomes more pervasive in both academic and everyday contexts. These conversations should not be left to chance or limited to IT courses; instead, they should be embedded in disciplinary learning to foster critical digital citizenship.

Perhaps most significantly, this study contributes to a broader reframing of AI's role in the language classroom. Rather than treating AI as a "black box" solution that delivers answers, the evidence here supports a view of AI as a pedagogical partner; a flexible, responsive tool that enhances human interaction rather than replacing it. When used alongside collaborative learning strategies, AI catalyzes peer dialogue, co-construction of meaning, and deeper reflection on language. This model supports a shift from passive reception to active, socially mediated learning, where students are empowered to question, adapt, and co-create knowledge.

In summary, integrating AI into reading instruction is most effective when guided by clear pedagogical intentions, ethical considerations, and a commitment to maintaining human agency. As institutions explore how best to prepare students for digitally mediated futures, this study offers a model for how technology can foster deeper engagement with texts and support the development of core academic literacies when paired with collaboration and guided reflection.

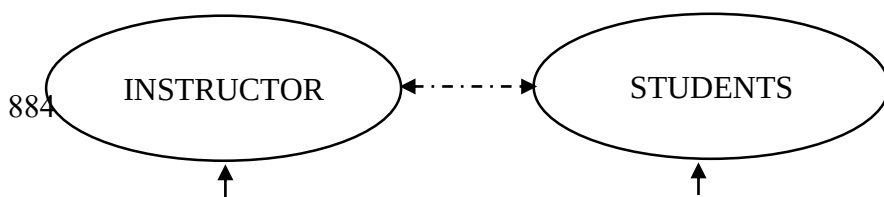


Figure 1. A conceptual model showing the integration of collaborative learning and AI tools in a structured reading course

Conclusion

This research looked into how integrating collaborative learning and artificial intelligence (AI) tools could enhance the academic reading skills of first-year EFL students at Batna 2 University. Students participated in peer-mediated reading activities for 12 weeks using AI applications such as ChatGPT, Grammarly, and Voyant Tools. The evidence that this supported the generation of meaning in reading through an intermediate factor that mediates the generation and learning of meaning in general is strong.

Not only did students express improved learning gains, but they also reflected on the confidence they had in reading and felt more engaged in the reading process.

The course structure encouraged peer interaction and accountability, while AI tools provided immediate scaffolding for students to overcome language and conceptual barriers. Inference-making, a particularly challenging skill in academic reading, showed the most significant improvement, highlighting the value of combining cognitive, social, and technological support.

Despite the overall findings being positive, the study also shed light on some areas for caution. Firstly, not all students were equally prepared to use AI tools effectively; some required training in digital literacy and ethical tool use. Still, most students adapted quickly and

used AI in ways that deepened their engagement with texts rather than replacing genuine learning effort.

In sum, this study demonstrates that structured AI-enhanced collaborative learning serves as a practical, scalable model for improving academic reading instruction in EFL higher education settings, particularly in offering a proof of concept and a framework for future implementation and research.

Limitations and Future Work

Despite the promising results, several limitations have to be raised.

The first point to be mentioned is that the research was conducted at a single cohort in one institute, so the results might not be generalizable. While the findings are statistically and educationally significant, replication across multiple sites and student groups is warranted.

Second, students' engagement with AI tools was not passively captured; data came from self-reports and observations in the classroom, possibly leading to bias. However, future studies could integrate digital usage logs or analytics to help us better map how students use AI tools and when.

Third, although the intervention was highly appreciated by the participants, a limitation is that the staff members did not have a background in health education

Looking ahead, future research could explore:

- Longitudinal effects of AI-assisted reading instruction on writing and critical thinking
- The development of ethical AI use guidelines tailored to language education
- The role of teachers in facilitating responsible and reflective AI engagement

As educational technology continues to evolve

Reference:

- 1- Afflerbach, P., Pearson, P. D., & Paris, S. G. (2008). Clarifying differences between reading skills and reading strategies. *The reading teacher*, 61(5), 364-373.
- 2- Baadache, H. (2022). *Integrating the Pragmatic Dimension in English as a Foreign Language Classroom to Improve Learners' Polite Requests Production The Case of Third-Year Students of English at Biskra University* (Doctoral dissertation, Faculty of Letters and Languages).
- 3- Barkley, E. F., Major, C. H., & Cross, K. P. (2014). *Collaborative learning techniques: A handbook for college faculty*. John Wiley & Sons.
- 4- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative research in psychology*, 3(2), 77-101.
- 5- Benrabah, M. (2007). Language-in-education planning in Algeria: Historical development and current issues. *Language policy*, 6(2), 225-252.
- 6- Følstad, A., & Brandtzæg, P. B. (2017). Chatbots and the new world of HCI. *interactions*, 24(4), 38-42.
- 7- Gillies, R. M. (2016). Cooperative learning: Review of research and practice. *Australian Journal of Teacher Education (Online)*, 41(3), 39-54.
- 8- Gokhale, A. A. (1995). Collaborative Learning Enhances Critical Thinking [http://scholar.lib.vt.edu/ejournals.JTE/jte-v7n1/gokhale.jte-v7n1.html](http://scholar.lib.vt.edu/ejournals/JTE/jte-v7n1/gokhale.jte-v7n1.html).
- 9- Grabe, W., & Stoller, F. L. (2019). *Teaching and researching reading*. Routledge.be
- 10- Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education promises and implications for teaching and learning*. Center for Curriculum Redesign.
- 11- Bai, S., Hew, K. F., Gonda, D. E., Huang, B., & Liang, X. (2022). Incorporating fantasy into gamification promotes student learning

- and quality of online interaction. *International Journal of Educational Technology in Higher Education*, 19(1), 29.
- 12- Hyland, K. (2014). English for academic purposes. In *The Routledge companion to English studies* (pp. 392-404). Routledge.
 - 13- Johnson, D. W., Johnson, R. T., & Smith, K. A. (2014). Cooperative learning: Improving university instruction by basing practice on validated theory. *Journal on excellence in college teaching*, 25(3&4).
 - 14- Kalir, J. H., & Garcia, A. (2019). Civic writing on digital walls. *Journal of Literacy Research*, 51(4), 420-443.
 - 15- Luckin, R., & Holmes, W. (2016). Intelligence unleashed: An argument for AI in education.
 - 16- Maguire, M., & Reynolds, A. E. E, R., & Delahunt, B.(2020). Reading to be: The role of academic reading in emergent academic and professional student identities. *Journal of University Teaching & Learning Practice*, 17(2).
 - 17- Namaziandost, E., Gilakjani, A. P., & Hidayatullah. (2020). Enhancing pre-intermediate EFL learners' reading comprehension through the use of Jigsaw technique. *Cogent Arts & Humanities*, 7(1), 1738833.
 - 18- Pan, C. Y. (2014). Effects of reciprocal peer-questioning instruction on EFL college students English reading comprehension. *International Journal of English Language and Literature Studies*, 3(3), 190-209.
 - 19- Ranalli, J. (2018). Automated written corrective feedback: How well can students make use of it?. *Computer Assisted Language Learning*, 31(7), 653-674.
 - 20- Smith, B. L., & MacGregor, J. T. (1992). *What is collaborative learning*. In A. S. Goodsell, M. R. Maher, & V. Tinto (Eds.), *Collaborative learning: A sourcebook for higher education* (pp. 10–30). University Park, PA: National Center on Postsecondary Teaching, Learning, and Assessment.
 - 21- Taguchi, N., & Roever, C. (2017). *Second language pragmatics*. Oxford: Oxford University Press.

- 22- Vygotsky, L. S. (1978). *Mind in society: The development of higher psychological processes* (Vol. 86). Harvard university press.
- 23- Wahyurianto, I., & Sylvia, S. (2024). Collaborative Learning Strategy for Better Reading Comprehension in EFL University Courses. *Journal of English for Academic and Specific Purposes (JEASP)*, 7(2).
- 24- Wang, H., Wang, C., Chen, Z., Liu, F., Bao, C., & Xu, X. (2025). Impact of AI-agent-supported collaborative learning on the learning outcomes of University programming courses. *Education and Information Technologies*, 1-33.
- 25- Zawacki-Richter, O., Marín, V. I., Bond, M., & Gouverneur, F. (2019). Systematic review of research on artificial intelligence applications in higher education—where are the educators?. *International journal of educational technology in higher education*, 16(1), 1-27.
- 26- Liu, W., & Wang, Y. (2024). The effects of using AI tools on critical thinking in English literature classes among EFL learners: An intervention study. *European Journal of Education*, 59(4), e12804.

