Journal of Pedagogy and Education Science (JPES)
Vol. 4, No. 03, pp. 448-465
journal.iistr.org/index.php/JPES
DOI: 10.56741/IISTR.jpes.001082

The Role of Generative AI Companions in Promoting Reading Engagement and Self-Regulation in EFL Contexts

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ARTICLE INFO

Article history
Received 5 June 2025
Revised 20 July 2025
Accepted 31 July 2025

ABSTRACT

Reading ability is a basic requirement for academic achievements and ongoing learning processes, specifically among English as a Foreign Language (EFL) students who must handle progressively challenging linguistic and intellectual demands in modern global educational frameworks. The current approaches for teaching self-regulated learning (SRL) through training programs face a significant drawback because they do not provide enough interactivity and personalized assistance that addresses individual student requirements. Advances in generative artificial intelligence (GenAI) offer a potential solution to this challenge by delivering dynamic, adaptive guidance that enhances self-regulation in reading. This study examines the impact of GenAI-enabled SRL assistance for self-regulated reading strategies and engagement of university-level EFL students, employing a quasi-experimental design with 62 Indonesian learners from two classrooms. Following a 45-minute instructional session on SRL in reading, participants engaged in a 12-week autonomous reading program using a digital platform, with the experimental group (N= 32) receiving chatbot-based SRL assistance and the control group (N= 30) engaging in independent reading without additional support. Data from pre- and post-questionnaires, platform log analyses, and semi-structured interviews indicate that the intervention significantly enhanced students' application of self-regulated learning strategies and their level of engagement in reading activities. The findings stress the effectiveness of interactive, GenAI-assisted SRL support in fostering sustained engagement and strategic reading behaviours, accentuating its potential to address longstanding gaps in EFL reading instruction.

Keywords
Artificial Intelligence
Generative AI
EFL Learner
Reading Engagement
Self-Regulated Learning

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Introduction

Proficiency in reading is essential for academic success and lifelong education within a knowledge-driven global landscape, necessitating an active and strategic approach to text engagement before, during, and after reading [1]. Effective readers regulate their learning by setting attainable goals, employing appropriate comprehension strategies, assessing their understanding, and monitoring their progress [2]. Engaging with textual content to derive meaning and resolve comprehension difficulties fosters deeper learning and cognitive development [3]. Students engage in self-regulated learning (SRL) through a purposeful, constant effort, which helps them define targets while they actively direct mental operations and modify their behaviors according to their explicit targets, along with environmental elements [4]. Research findings repeatedly show that using SRL strategies strengthens reading engagement because students who practice self-regulation strategies perform better regarding persistence, comprehension, and academic results [5]. Integrating SRL into reading instruction has been shown to yield significant benefits, including improved metacognitive awareness, enhanced reading comprehension, and sustained engagement with texts, reinforcing its essential role in fostering independent and proficient readers [6][7].

The growing recognition of SRL as a key factor in reading instruction has prompted educators and researchers to integrate it into pedagogical practices. Nonetheless, fostering SRL is inherently complex and highly context-dependent, requiring the orchestration of metacognitive processes such as goal setting, strategic planning, and progress monitoring, alongside cognitive strategy application, motivational regulation, and behavioural management [8][9]. Tailored SRL training, which adapts learning experiences and strategies to individual needs, has proven more effective than standardized approaches [10]. Despite its advantages, large class sizes, constrained instructional time, and insufficient teacher preparation present significant barriers to its implementation in traditional classrooms [11].

Digital online training offers a viable solution to challenges in SRL instruction by providing flexible, adaptive, and accessible learning environments unconstrained by time or location [12]. Technological advancements enable the creation of personalized educational settings that support language instructors in delivering SRL guidance and tailored assistance

[13]. Adaptive SRL training, enhanced through technology, has improved reading proficiency, engagement, and metacognitive strategy use, facilitating deeper comprehension and autonomous learning [14][15]. Although contemporary digital reading platforms offer individualized prompts, visual aids, and feedback, their predominantly unidirectional design limits interactive engagement, preventing learners from seeking clarification or receiving customized responses [16]. Existing SRL reading support systems lack reciprocal interaction, restricting opportunities for learners to refine their strategies or address comprehension difficulties actively. Despite the increasing integration of artificial intelligence (AI) in education, research on the role of generative AI (GenAI) in English language acquisition, particularly at the tertiary level, remains limited, necessitating further investigation into its potential to enhance SRL and reading development [17].

AI-powered chatbots, which integrate AI with large language models (LLMs), have the potential to address persistent challenges in SRL instruction by providing interactive and adaptive support [18] [19]. The rapid advancement of GenAI, particularly through models such as OpenAI's ChatGPT, has prompted scholars to advocate for its incorporation into SRL training. Lin and Chang [20] proposed leveraging GenAI-driven chatbots to deliver personalized, real-time SRL assistance, foster collaborative learning, and scaffold key regulatory processes, including goal setting, self-monitoring, and self-reflection. Despite the promise of AI chatbots in enhancing SRL, their application remains relatively new, and empirical research examining their effectiveness in facilitating self-regulation in reading contexts remains scarce [18]. Limited studies have specifically investigated the impact of AI-assisted SRL training on reading comprehension, engagement, and strategic learning behaviours, indicating the need for further empirical exploration.

Weighing upon these limitations, this study investigates the impact of AI chatbots on applying SRL strategies and reading engagement among EFL students to address existing research gaps. Effective SRL requires the systematic and consistent use of metacognitive, cognitive, motivational, and behavioural strategies that enable learners to manage their reading processes autonomously [21]. The behavioural, cognitive, and emotional aspects of reading form an integrated system that impacts students' academic performance during reading activities [22]. Students who demonstrate behavioural engagement complete their reading tasks by making steady progress and putting effort into their work while maintaining dedication throughout their reading period [23][24]. At the same time, behavioural engagement focuses on cognitive elements that require students to comprehend challenging texts and develop effective reading strategies. Students' reading motivation for assignments depends on their emotional state, including their degree of interest, boredom levels, and

frustration experiences [24]. This study pursues two research questions through the theoretical understanding of SRL, along with acknowledged voids in AI-assisted SRL research :

1. How do the effects of GenAI-powered interactive SRL facilitate self-regulated reading among EFL students?
2. How does GenAI-enabled interactive SRL influence the reading engagement of EFL students?

Literature Review

A. Reading Engagement with SRL

Metacognitive knowledge, cognitive capacities, motivation, and behavioural control are developed via self-regulated learning strategies, which improve reading language competence. Metacognitive thinking helps adept self-regulated readers organise, monitor, and evaluate their reading processes while setting realistic objectives that fit time limits and instructional material. Cognitive techniques organise learning as students complete reading assignments and assess their knowledge. Autonomous readers control their emotions by increasing interest, task value, and reading motivation beyond cognitive management. To improve understanding and engagement, they design, organise, and improve their reading environments [2]. SRL tactics promote reading comprehension, critical thinking, and motivation among EFL students, highlighting the necessity for specific SRL training in language teaching [6][7]. Studies suggest that purposeful training in SRL development improves student reading ability. Morshedian et al. [25] taught EFL students Zimmerman's cyclical learning model, goal setting, task-specific tactics, self-monitoring, and self-evaluation. According to research, SRL instructional training helped students prefer SRL tactics and perform better. After nine hours of explicit metacognitive strategy training, Teng [14] found that university-level English reading students used these techniques well. Both studies found that incorporating SRL teaching within reading pedagogy promotes strategic learning and autonomous reading regulation. SRL tactics keep readers engaged, especially when incorporated into digital reading platforms that facilitate goal setting, progress monitoring, and reflection [1][5][26]. A computerised annotation system by Chen et al. [1] students can set goals, monitor progress, and evaluate their reading processes using a self-monitoring table menu and self-regulated radar. Students using SRL techniques created extensive annotations with increased quality and behavioural engagement. Researchers have confirmed SRL's reading advantages, although they have focused on behavioural impacts rather than cognitive-emotional components, which need further study on SRL tactics for reading participation.

B. Challenges in SRL Reading Training

SRL training improves students' reading regulation, strategy use, and text engagement, but it faces various problems in education. Many instructors avoid intensive SRL training due to the time commitment [27]. Most instructors lack the time and knowledge to provide complete SRL training materials, teach regulatory techniques, and give individualised student assistance [11]. Integrating SRL into classroom practice is complicated by the difficulties of personalising education and providing timely feedback. Some educators lack the mindset or competencies for SRL instruction, such as subject-specific knowledge, pedagogical expertise, and a deep understanding of SRL processes, which limits their ability to help students regulate their reading [11].

Technology helps implement SRL teaching. SRL cues and feedback systems in digital reading platforms have been shown to help build and use self-regulated reading techniques. Zheng et al. [28] created a mobile reading system with SRL ideas to help students with issue assessment, goal articulation, strategic planning, method selection, self-evaluation, and reflection. Qiao et al. [29] designed an SRL training system combining gamification, prompts, and real-time feedback to improve cognitive engagement, reading performance, and reflective learning. Through guided paths, digital resources help students apply SRL tactics and become more self-aware of their thinking process, increasing reading engagement and independence.

Technology-augmented SRL platforms employ forced prompts and preset feedback systems, limiting their potential to provide personalised SRL assistance [30][31][32]. Non-interactive SRL systems provide preset responses and limited negotiating options, limiting learners' ability to ask questions or explore SRL tactics. Limitations restrict students from discussing their regulatory processes, which hinders active learning. Researchers have found that interactive SRL support improves SRL development [32], so scholars recommend it to help students understand and use self-regulation strategies. Dynamic and personalised SRL support, which provides tailored guidance, sequential problem-solving approaches, and immediate responses to learners' enquiries, accelerates conceptual understanding and strategic application by enabling mutually adaptive interactions between learners and technology [18][32].

C. SRL Training with AI Chatbots

Due to improved involvement, chatbots are employed in personalised learning, conceptual understanding, collaborative activities, exam preparation, and mental health aid [33]. Chatbots increase academic success, curiosity, and student participation, especially in reading engagement [34][35]. Liu et al. [36] designed Sister Fish, a book conversation chatbot, significantly increased students' reading engagement over six weeks. Students' situational interest in reading and social connection with the chatbot were substantially associated,

highlighting its long-term usefulness. Lee et al. [24] used ChatGPT-powered CopyAI to create genre-, keyword-, and tone-specific EFL reading texts. ChatGPT-generated materials increased student reading, showing that AI-driven chatbots can build personalised reading environments.

Chatbots have improved self-regulated learning support by adding flexibility to student interactions. Sáiz-Manzanares et al. [37] created a Moodle-based inquiry-response chatbot for learning planning, comprehension testing, and educational outcomes assessment. Beyond immediate response, the chatbot's metacognitive abilities helped students understand course content. The SRL chat assistant by Hew et al. [38] helped students set online learning objectives. SMART goals were created using structured chatbot questions, improving goal-setting and achievement. Chatbot participation boosted self-regulated learning and online study, according to researchers.

Although SRL findings are promising, little research has explored AI chatbots in reading settings. We investigate how GenAI chatbot-assisted SRL education influences EFL students' self-regulation and reading engagement to advance AI-driven SRL research.

Materials and Methods

This study employed a quasi-experimental design involving two intact classes of first-year university EFL students in Aceh, Indonesia, participating in a 14-week reading course focused on self-regulated learning (SRL). Sixty-two students were randomly assigned to an experimental group (EG, n = 32) or a control group (CG, n = 30), balanced by gender. All participants practiced cognitive reading strategies and received instruction from the same lecturer (first author) to ensure consistency. While both groups used the Read.Ai platform, only the EG accessed its GenAI-powered interactive SRL chatbot (Reade), offering personalized feedback, planning tools, and strategy guidance. Baseline reading proficiency was measured using the TOEFL International Placement Test, with students averaging low-intermediate levels.

The intervention began with a 45-minute training session on Read.Ai's SRL features, followed by a 12-week reading program in which students were expected to read one text per week. The EG received real-time SRL support through Reade, while the CG used the same materials without interactive assistance. Data collection included pre- and post-tests, self-report questionnaires on SRL strategy use (Table 1) and reading engagement (Table 2), system log data on reading behavior and SRL interaction (e.g., strategy planning and self-checklists), and semi-structured interviews with 18 students. The questionnaire instruments, adapted from validated SRL and engagement measures, were confirmed through confirmatory factor analysis (CFA), demonstrating high reliability and construct validity.

Table 1. Questionnaire Blueprint for SRL Strategies

Construct	Number of Items	Item Numbers	Description
Metacognitive Strategies	7	1–7	Planning, monitoring, and evaluating one's reading process (e.g., setting goals, checking comprehension)
Cognitive Strategies	14	8–21	Mental operations used to process texts (e.g., summarizing, using context clues, rereading)
Motivational Regulation	6	22-27	Regulating effort, interest, and persistence in reading tasks
Behavioral Engagement	3	28-30	Observable participation, such as maintaining consistent reading and managing distractions

Table 2. Questionnaire Blueprint for Reading Engagement

Construct	Number of Items	Item Numbers	Description
Behavioral Engagement	7	1-7	Frequency and effort in completing reading tasks (e.g., consistency, diligence)
Cognitive Engagement	10	8-17	Use of deep-processing and elaboration strategies while reading
Emotional Engagement	8	18-25	Affective responses to reading activities, including enjoyment, interest, or boredom

Quantitative data were analyzed using one-way ANCOVA (with pre-tests as covariates), Mann-Whitney U tests, and Quade's non-parametric ANCOVA for non-normally distributed log data. Qualitative data from interviews were subjected to thematic analysis, identifying patterns in students' SRL experiences and perceptions of GenAI chatbot support. The research maintained ethical integrity through informed consent and participant anonymity. This mixed-methods approach provided robust triangulation to evaluate the impact of GenAI-enabled SRL support on EFL students' strategic reading development and engagement in a digital learning context.

Results

A. Research Question 1: How do the effects of GenAI-powered interactive SRL facilitate self-regulated reading among EFL students?

The EG students who participated in the study demonstrated superior self-regulated reading strategy utilization compared to control group (CG) students according to the one-way ANCOVA results reported in Table 3 ($F(1, 59) = 9.658$, $p = 0.003$, partial $\eta^2 = 0.143$). Students in the experimental group used metacognitive, cognitive, motivational, and behavioural self-regulation techniques with greater effect than the control group, as shown in ANCOVA analysis ($F(1, 59) = 7.796$, $p = 0.007$, partial $\eta^2 = 0.118$; $F(1, 59) = 7.809$, $p = 0.007$, partial $\eta^2 = 0.119$). Nonetheless, an analysis of cognitive approaches demonstrated no significant difference ($F(1, 59) = 3.770$, $p = 0.057$).

Table 3. Differences in Self-Regulated Reading Strategy Usage between Groups

Dimension	Group	Pretest		Posttest		F	η_P^2
		M	SD	M	SD		
Metacognition	EG	2.530	0.658	3.217	0.723	7.796**	0.118
	CG	2.714	0.799	2.843	0.623		
Cognition	EG	3.359	0.650	3.657	0.614	3.770	0.061
	CG	3.331	0.589	3.414	0.517		
Motivation	EG	3.398	0.747	3.710	0.596	7.809**	0.119
	CG	3.333	0.967	3.272	0.817		
Behaviour	EG	2.366	0.717	2.946	0.821	4.719*	0.075
	CG	2.567	0.840	2.633	0.911		
Total Score	EG	3.074	0.498	3.494	0.557	9.658**	0.143
	CG	3.111	0.594	3.174	0.507		

The research data demonstrates the effectiveness of this intervention by achieving better metacognitive abilities, motivational outcomes, and behavioral regulation skills in reading among EFL students. The results from the Mann-Whitney U test demonstrated a significant difference between groups based on their use of the Planning Strategies and Self-Checklist panels (z = 2.943, p = 0.003, r = 0.377) as shown in Table 4 to support the intervention's effect on reading self-regulation (Table 3).

Table 4. Different Logged SRL Technique Utilisation among Groups

	Group	Mean	SD	z	r
SRL behavioural	EG	214.194	247.720	2.943**	0.377
	CG	147.500	213.819		

Data shows that all nine students from the experimental group (100% of participants) mentioned that Read.Ai helped them become more motivated readers who received personalized guidance and mastered reading strategies effectively. Students identified the platform for developing sustainable reading routines and enabling them to improve their reading results. The participants praised the platform because it offered customized planning and personalized assistance that allowed them to address individual reading difficulties as they enhanced their understanding of self-regulatory reading practices. Students sometimes choose their regular reading techniques instead of the system-provided cognitive strategies. One student noted that when encountering numerous unfamiliar words, they preferred using a dictionary rather than applying context clues, as mastering such techniques was perceived as challenging.

Responses reveal that all EG participants (N = 9, 100%) reported increased motivation, personalized guidance, and improved strategy implementation through Read.Ai. Users of the platform noted that it helped them develop steady reading practices and increased their total reading satisfaction. The system demonstrates successful customized strategy development alongside personal support, which allows users to resolve individual reading issues, according

to one student who reported that Read.Ai provided "a customized strategy selection combined with personalized guidance for targeting my individual reading problems." The students expressed how Read.Ai bettered their understanding of self-regulated reading methods and their expertise in putting them into practice effectively." Nonetheless, some participants preferred their own reading routines over system-recommended cognitive methods. One student explained, "When confronted with an excessive number of unfamiliar terms when reading, I prefer using dictionaries instead of tactics such as context clues, since learning these techniques proves difficult."

Among CG participants, five respondents (56%) reported that Read.Ai encouraged them to read, attributing their motivation to Reade's ability to provide texts aligned with their interests. Nevertheless, only one participant (11%) acknowledged improving strategy awareness, and none reported receiving individualized support. In contrast, all experimental group (EG) participants (N = 9, 100%) indicated that Reade's interactive SRL support helped them develop self-regulated reading strategies by offering dialogic feedback on strategy implementation, assisting in problem resolution (N = 9, 100%), and providing realistic, situational examples (N = 8, 89%). The interactive nature of Reade transformed students from passive recipients of knowledge into active learners, as one interviewee noted that it "encouraged me to enquire, assess the tactics, and request clarification till I understood completely." At the same time, another stated that it "encouraged me to actively initiate and repeat, consistently evaluating and contemplating my strategic application." Furthermore, participants found Reade's step-by-step, valuable guidance for overcoming challenges and understanding SRL techniques. One student highlighted that "the systematic instruction enabled me to address issues efficiently and enhance my comprehension of techniques." Several respondents also noted that Reade clarified SRL strategies by incorporating examples from reading novels, making abstract concepts more tangible. A participant explained, "These examples helped me understand and use concepts like goal setting and context clues."

B. Research Question 2: How does GenAI-enabled interactive SRL influence the reading engagement of EFL students?

According to the one-way ANCOVA in Table 5, reading engagement displayed statistically significant differences between the EG and CG groups with $F(1,59) = 18.833$ ($p < 0.001$, partial $\eta^2 = 0.245$). The students in the experimental condition showed better behavioral and emotional and cognitive engagement than the participants in the control group according to the analysis of variance ($F(1,59) = 9.972$, $p = 0.003$, partial $\eta^2 = 0.147$; $F(1,59) = 7.015$, $p = 0.010$, partial $\eta^2 = 0.108$; $F(1,59) = 24.802$, $p < 0.001$, partial $\eta^2 = 0.300$). The research data shows that the intervention solution successfully increased the reading engagement of participants. Additionally, Quade's non-parametric test of recorded reading quantity data

(Table 6) confirmed significant differences in behavioral engagement across groups (F (1,59) = 10.308, p = 0.002).

Table 5. Different Reading Engagement with Self-Regulated Learning was Reported across Groups

Dimension	Group	Pretest		Posttest		F	η_P^2
		M	SD	M	SD		
Behaviour	EG	3.355	0.336	3.751	0.311	9.972**	0.147
	CG	3.500	0.502	3.529	0.449		
Cognition	EG	3.642	0.391	3.881	0.372	7.015*	0.108
	CG	3.780	0.505	3.670	0.353		
Emotion	EG	3.078	0.471	3.601	0.351	24.802**	0.300
	CG	3.367	0.589	3.279	0.501		
Total Score	EG	3.381	0.316	3.755	0.292	18.833**	0.245
	CG	3.569	0.467	3.505	0.363		

Table 6. Differences in the quantity of report data on reading amount across groups

Dimension	Group	Pretest		Posttest		*F*
		M	SD	M	SD	
Behavioural Engagement	EG	6.670	5.548	10.997	16.996	10.298**
	CG	5.240	5.778	3.610	4.398	

Table 7. Interview Result Summary

Theme	Sub-theme	Description	Example of quotation	Counts (N; %)	
				EG	CG
Self-regulated reading via Read.ai	Enhanced motivation	Students found Read.ai inspired them to participate in reading and appreciate the reading experience.	Read.ai helped me choose the literature I was interested in. This made reading pleasurable and pushed me to read regularly.	9; 100%	5; 56%
	Personalised Guidance	Students felt that Read.ai provided tailored help to suit their reading issues.	Read.ai explanations helped me address my specific challenges.	9; 100%	0; 0%
	Improved application of strategies	Students reported better awareness and constructive application of methods.	Read.ai facilitated my comprehension and use of these tactics.	7; 78%	1; 11%
Reade support	Dialogic feedback	The provision of interactive and personalised feedback engages students in regulating their reading process and continuously improving their metacognitive reflection.	The dialogic contact with Reade prompted me to actively initiate, repeat, regularly assess, and reflect on my strategic approaches. This iterative process continued until I had an acceptable solution that met my personalised requirements.	9; 100%	n.a

Theme	Sub-theme	Description	Example of quotation	Counts (N; %)	
				EG	CG
	Problem-solving guidance	The delivery of sequential answers assists students in resolving specific challenges faced throughout their reading process.	When confronted with reading obstacles, such as unfamiliar terms, Reade effectively assisted me by providing systematic assistance accompanied by examples.	9;100%	n.a
	Authentic resources	Provide real, contextual resources that demonstrate strategy use.	Reade's article provided extensive examples, enhancing my understanding and application of techniques.	8; 89%	n.a
Cognitive reading engagement	Constructive engagement	The inferring process involves integrating prior knowledge using higher-order processing strategies to create new knowledge.	Learning about the author's objective and tone technique from Reade, I use it when I fail to comprehend a piece.	7; 78%	1; 11%
	Interactive engagement	Co-inferential learning involves students collaborating to share ideas and construct knowledge.	I appreciate addressing text-related issues with Reade, which gives immediate feedback and investigation for better comprehension.	9; 100%	0; 0%
Emotional engagement	Positive	Positive feelings such as pleasure, interest, and confidence.	Reading intriguing literature makes me joyful. Discussing with Reade enhances my comprehension of materials and boosts my confidence.	9; 100%	5; 56%
	Negative	Negative feelings such as anxiety and boredom.	I feel bored because the texts are being presented only in written form	0; 0%	4; 44%

Interview data further supported these results (Table 7), with participants in the EG reporting greater cognitive and emotional involvement due to GenAI-enabled SRL interaction. Seven EG students (78%) stated that the AI-driven engagement encouraged them to persist in reading or tackle challenging tasks. One respondent explained,

> "*Upon acquiring knowledge of the author's intent and tonal technique from Reade, I use this method when I have difficulties comprehending a work*."

This can show the Metacognitive Strategy Use based on students' responses.

> *"The systematic instruction enabled me to address issues efficiently and enhance my comprehension of techniques." — Student A (EG)*

> *"I appreciate addressing text-related issues with Reade, which gives immediate feedback and helps me better understand what I read." — Student B (EG)*

These quotes highlight students' enhanced awareness of their learning process, including planning and monitoring strategies during reading, showing effective metacognitive regulation.

All EG participants (100%) noted that GenAI-assisted SRL encouraged them to ask questions and deepen their understanding, as one student shared,

> "*I enjoy discussing text-related questions using Reade, which offers immediate feedback and facilitates my understanding of the material*."

In contrast, only one CG participant reported increased productive engagement, mentioning using context clues to deduce unfamiliar words when a dictionary was unavailable. No CG respondents indicated a notable increase in interactive engagement.

1. Motivational Regulation

> *"Read.Ai helped me to choose the literature I was interested in. This made reading pleasurable and pushed me to read regularly." — Student C (EG)*

> *"Discussing with Reade enhances my comprehension of materials and boosts my confidence." — Student D (EG)*

These quotes show how personalized feedback and choice increased intrinsic motivation and positive emotional responses toward reading.

2. Behavioral Engagement

> *"The dialogic contact with Reade prompted me to actively initiate, repeat, regularly assess, and reflect on my strategic approaches." — Student E (EG)*

> *"Reading intriguing literature makes me joyful. I kept returning to read more because it felt satisfying to solve reading problems." — Student F (EG)*

These remarks demonstrate students' consistent and goal-oriented reading behavior, indicating higher behavioral engagement.

3. Cognitive Engagement

> *"Learning about the author's objective and tone technique from Reade, I use it when I fail to comprehend a piece." — Student G (EG)*

> *"These examples helped me understand and use concepts like goal setting and context clues." — Student H (EG)*

These statements affirm the construction of new knowledge and application of higher-order thinking strategies, which are signs of constructive cognitive engagement.

4. Emotional Engagement

> *"I feel confident now when reading English articles. Reade's feedback feels like someone guiding me, not just a machine." — Student I (EG)*

> *"I enjoy using Reade to explore texts. The humor and the tone it uses made me want to keep going." — Student J (EG)*

These quotes reflect positive affective responses, such as enjoyment and reduced anxiety, illustrating meaningful emotional engagement.

Reading on the platform, all nine EG respondents (100%) expressed good feelings, including concentration, pleasure, and confidence. They attributed their engagement to "*engaging in conversation with Reade*," "possessing the autonomy to choose suitable literature with Reade's guidance," and "reading texts with engaging subjects." In contrast, the control group (CG) interviewees expressed mixed emotions. Four participants (44%) reported experiencing boredom, primarily due to the absence of visual and interactive elements, which made reading monotonous. However, the remaining five respondents (56%) found enjoyment in preference-based text selection, which contributed to a more engaging reading experience.

Discussion

A. Effect on Reading with SRL Strategy Use

The study investigated the impact of GenAI-supported SRL on EFL students' use of self-regulated reading strategies. Findings revealed that students in the EG demonstrated significant improvements in strategy application when the GenAI chatbot provided interactive SRL support, emphasizing the need for personalized and adaptive SRL training that aligns with students' learning needs and reading challenges [32]. These results align with prior calls for leveraging GenAI's potential in interactive, tailored SRL instruction [10][18].

In metacognitive, motivational, and behavioural self-report measures, EG students outperformed the CG, demonstrating a more systematic and frequent application of reading regulation strategies under the guidance of the GenAI chatbot. Log data from Strategic Planning and Self-Assessment Checklist panel interactions reinforced these findings, indicating greater engagement in structured SRL practices. Interviews further confirmed that interactive SRL support facilitated the contextualized and individualized application of reading strategies, making SRL training more engaging and effective. These findings support the argument that GenAI enhances SRL by offering dynamic, student-centered assistance that fosters deeper engagement and strategic reading development [32][49].

The findings indicate that self-regulated reading did not lead to significant cognitive development among students in the EG, signifying that mastering cognitive reading strategies may be particularly challenging. Some participants hesitated to adopt the system's recommended cognitive strategy due to their perceived difficulty, which may have limited their effectiveness. Cognitive regulation requires advanced cognitive processing and metacognitive awareness, which demand sustained effort and practice over time [3]. Results demonstrate that individual usage of an interactive chatbot for learning SRL strategies is insufficient for effectively mastering these techniques in digital learning environments. Therefore, extended practice methods with additional scaffold support are necessary. Understanding these results requires caution because educational settings create variables that affect the research results. However, the study underlines the broader potential of

interactive SRL assistance in enhancing multiple dimensions of self-regulated reading. Future research could explore the differential effects of interactive SRL support on various aspects of self-regulated reading and investigate the underlying mechanisms that contribute to its effectiveness.

B. Effect on Reading Engagement

The study examined the impact of interactive SRL assistance provided by a GenAI chatbot on the reading engagement of EFL students. Self-report data indicated that students in EG showed greater cognitive, emotional, and behavioral engagement improvements compared to those in the CG. Log data further demonstrated that increased interaction with Reade motivated EG students to read more on the platform, aligning with previous research on chatbots' role in enhancing behavioural engagement [38]. Findings also confirmed that GenAI-assisted SRL strengthened cognitive and emotional engagement, reinforcing existing evidence on SRL training's reading behaviour benefits [1][26].

Interview responses highlighted that interactive SRL support fostered deeper constructive and interactive involvement instead of non-interactive support. Reade's detailed, conversational guidance helped students apply higher-order reading strategies, enhancing their comprehension through chatbot-mediated dialogue. Regarding emotional engagement, all EG interviewees reported positive experiences with self-regulated reading using Read.Ai, with Reade actively encouraging participation and sustained engagement. These findings indicate that chatbot-facilitated social interaction is key in fostering student interest in reading [36]. Overall, the results indicate that GenAI-enabled interactive SRL assistance has the potential to enhance cognitive, emotional, and behavioural engagement in reading

Conclusion

This study confirmed that GenAI-enabled interactive support significantly improved EFL students' use of self-regulated learning (SRL) strategies and engagement in reading. Integrating chatbot-based assistance through the Read.Ai platform gave learners dynamic, personalized guidance that enhanced SRL's metacognitive, motivational, and behavioral aspects. While improvements in cognitive regulation were not statistically significant, likely due to the complexity of mastering such strategies, the intervention successfully fostered students' planning, monitoring, and emotional regulation in reading activities. Students reported that the chatbot Reade facilitated better understanding through dialogic interaction and scaffolded instruction, highlighting the importance of interactive tools in personalized learning environments. These findings strengthen the argument that generative AI technologies can effectively support SRL by adapting feedback and strategic coaching in real-

time to learners' needs, making AI a viable tool in addressing persistent challenges in traditional reading instruction.

Furthermore, the results revealed that GenAI-supported SRL enhanced students' behavioral, cognitive, and emotional engagement, as demonstrated through self-reported data and log analysis. Students in the experimental group engaged more actively and reported higher levels of interest, confidence, and enjoyment, attributing this to the chatbot's personalized interaction, relevant content selection, and continuous support. The study contributes meaningful insight into how generative AI can promote deeper learning engagement, suggesting that chatbot-facilitated SRL may help learners become more autonomous, reflective, and motivated readers. However, to ensure the sustainability of such gains, future research should explore longitudinal effects, broader participant diversity, and richer data collection methods such as screen recordings and think-aloud protocols. By addressing these limitations, educators and researchers can better optimize AI-supported SRL tools and maximize their impact across varied learning contexts.

Conflict of Interest

The authors declare that there is no conflict of interest.

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