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Gamified Collaborative Writing: Fostering Iranian EFL Learners' Writing Development Using Classcraft

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Abstract

The growth of using Artificial intelligence (AI) programs in learning languages is undeniable, but the question is if all learners with wide range of individual differences can benefit these tools. This study aims to explore the effect of Artificial intelligence-assisted collaborative tasks on Iranian EFL learners' communicative proficiency, with specific focus on how different levels of critical thinking moderates this effect. The present study employs a quai-experimental design with pre-test and post-test structure. 80 female learners of the age of 13 - 17 who processed intermediate level of English were selected out of 150 learners in Top Notch classes of a private language institute through an English proficiency test (PET) in advance, were divided based on their different level of critical thinking via Facione 2011 critical thinking skills test to low, moderate and high. Learners of every level of critical thinking were randomly divided into an experimental and a control group, thus six groups were formed. The participants in the experimental groups were given AI-mediated collaborative tasks but the participants in the control groups were given regular traditional tasks. After comparing the results of the pre-tests to the post-tests the results support the fact that the use of AI-assisted collaborative tasks had positive impact on communicative proficiency of learners in all levels of critical thinking also established the higher the level of the critical thinking, the bigger the improvement of communicative proficiency. This paper is useful for teachers, professors, syllabus designers and even parents in schools, institutes and universities.

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Introduction

The incorporation of Artificial Intelligence (AI) into educational settings has revolutionized the way languages are taught and acquired, especially for learners who are learning English as a Foreign Language (EFL). To specifically elaborate this effect, try to consider or at least overview the ways that English learners undertake to improve their language skills. Nowadays, English learners tend to use different kinds of applications and software to practice their English and learn more beside institute classes. These ways are usually cheaper and more available to learners. They also have other benefits; going through details, AI-powered resources, including chatbots, intelligent writing assistants, and digital language learning platforms, deliver customized, engaging, and instant feedback that strengthens learners' ability to communicate effectively (Luxton, 2020). These technologies can replicate real-world communication scenarios and offer tailored assistance based on individual learners' language requirements, encouraging more thorough language comprehension and richer interactive experiences (Godwin-Jones, 2018). Additionally, AI features like voice recognition and automated language production expose students to diverse linguistic examples for both understanding and producing language, supporting the development of comprehension and expression skills (Chou, 2021). When embedded within collaborative activities, these technologies have the capacity to replicate authentic communication patterns, support learner participation, and promote purposeful language application (Ellis, 2003; Chou, 2021).

Furthermore, with EFL teaching progressively adopting communicative and task-oriented methodologies, educators are increasingly exploring ways to use AI in fostering cooperative learning settings. Task-oriented learning prioritizes authentic communication, meaning negotiation, and collaborative problem-solving activities (Ellis, 2003). By incorporating AI into these contexts, learners can engage with virtual agents as collaborative partners, which expands their developmental potential through immediate, scaffolded guidance (Vygotsky, 1978; Simatupang & Heryono, 2026). Moreover, in environments like Iran—where EFL learners often experience limited access to authentic communicative practice—AI-supported collaborative activities may help reduce interactional barriers and enhance learner independence (Hassan et al., 2021). However, the effectiveness of these interventions likely hinges not solely on the technology itself but also on learners' preparedness and capacity to utilize these resources meaningfully; this let’s say capacity, is usually explained under the domain of critical thinking. Learners lacking adequate critical thinking skills may find it challenging to interpret AI-generated feedback or participate constructively in collaborative exchanges, leading to minimal improvement in communicative proficiency (Zarei, 2018; Rezaei et al., 2011).

Learners' cognitive abilities—particularly their capacity for critical thinking—may play a crucial role in determining how effectively they can utilize such technology-enhanced activities (Feng, 2025). Critical thinking empowers students to assess AI-generated feedback, make sound judgments during group interactions, and participate in meaningful language practice (Bakhshayesh et al., 2026). Students with stronger critical thinking skills tend to challenge underlying assumptions, view mistakes as opportunities for growth, and purposefully implement AI recommendations, thereby advancing both their linguistic competence and

independence as learners (Saiz & Rivas, 2010). Evidence also suggests that learners with stronger critical thinking skills are more capable of processing feedback, evaluating their language performance, and pursuing autonomous learning strategies (Saiz & Rivas, 2010; Facione, 2011). Such learners may derive greater benefit from AI applications that require metacognitive engagement, including evaluating alternative language options, interpreting implicit feedback, or co-constructing meaning through dialogue (Avsheniuk, 2024).

Considering all the information above, there is a notable research gap concerning how critical thinking moderates the outcomes of AI-enhanced EFL teaching. Most existing studies have concentrated on educators' attitudes (Luckin et al., 2016), general learner perspectives (Wang, 2012), or the isolated efficacy of AI tools rather than their integration into collaborative task frameworks. Consequently, there is a pressing need for research that investigates how individual differences—particularly critical thinking ability—interact with AI-mediated task-based instruction to shape language learning outcomes. However, despite their theoretical promise, empirical evidence examining how AI-facilitated collaborative tasks influence learners' communicative abilities remains scarce, especially concerning individual differences such as critical thinking capacity. This study seeks to fill this research void by investigating how AI-supported collaborative tasks affect the communicative competence of Iranian EFL learners, while simultaneously examining whether and how different levels of critical thinking moderate these effects. So, more specifically the present study seeks to know whether there is any significant effect of AI-assisted collaborative tasks on the communicative proficiency of Iranian EFL learners with low, moderate and high critical thinking skills or not. So, we have investigated three research questions in this article:

1. Is there any significant effect of AI-assisted collaborative tasks on the communicative proficiency of Iranian EFL learners with high critical thinking skills?
2. Is there any significant effect of AI-assisted collaborative tasks on the communicative proficiency of Iranian EFL learners with moderate critical thinking skills?
3. Is there any significant effect of AI-assisted collaborative tasks on the communicative proficiency of Iranian EFL learners with low critical thinking skills?

Answering these questions will be very useful to foreign language teachers, syllabus designers, foreign language learners and also institute managers who want to be more careful and up to date with teaching methods, designs, learning methods and management issues.

Literature Review

Before advancing any longer and even to be more specific, more explanations of the variables and mostly used phrases in this article are provided as follow:

Artificial Intelligence (AI): Artificial Intelligence in education refers to the use of computational technologies that simulate human-like cognitive functions—such as reasoning, learning, and decision-making—to support and enhance teaching and learning (Luckin et al., 2016).

Collaborative Tasks: Collaborative tasks are goal-oriented activities that require learners to use the target language to complete a task through negotiation, problem-solving, and information exchange with others (Ellis, 2003; Long, 1996).

Communicative Proficiency: Communicative proficiency refers to a learner's ability to use the target language accurately and appropriately in real-life communication, encompassing fluency, coherence, interactional competence, and pragmatic skills (Canale & Swain, 1980; Bachman, 1990).

Critical Thinking: Critical thinking is defined as the ability to purposefully and logically analyze, synthesize, evaluate, and reflect on information to make informed decisions or solve problems (Facione, 2011).

AI in second language learning

One of AI's most valuable contributions to EFL education is its ability to simulate authentic communicative situations. Through the use of conversational agents, scenario-based learning environments, and intelligent dialogue systems, learners can engage in simulated real-world tasks that mimic the demands of daily communication, such as negotiating, persuading, or making requests. Among the most widely used AI technologies in EFL education are chatbots, intelligent tutoring systems, speech recognition technologies, and automated feedback platforms (Son et al, 2025).

Chatbots are AI-driven conversational agents that can simulate human-like dialogue in real-time. These tools enable learners to practice conversational English in a safe and non-judgmental environment. Chatbots are particularly beneficial for practicing functional language and engaging in contextualized communication tasks, as they can mimic realistic scenarios such as ordering food, booking travel, or participating in interviews. Their capacity for repetitive interaction and immediate response makes them ideal for oral language practice and vocabulary reinforcement (Fryer & Carpenter, 2006).

Intelligent Tutoring Systems (ITSs), another significant AI tool, function as adaptive learning platforms that tailor content delivery, difficulty levels, and instructional feedback based on individual learner profiles. These systems utilize data-driven algorithms to monitor learner progress, detect patterns of errors, and adjust instruction according (Torres & Kahveci, 2025). In the context of EFL, ITSs can scaffold grammar explanations, suggest vocabulary alternatives, and provide error-specific corrective feedback, thereby supporting self-paced and differentiated learning (Woolf, 2010).

As Luxton (2020) emphasizes, the integration of AI into language learning environments fosters both cognitive engagement and motivational autonomy, creating conditions for deeper learning and long-term retention regarding that AI tools are available on demand and across various platforms, enabling learners to engage in flexible and continuous learning that aligns with their schedules and preferences. This flexibility reduces dependency on classroom instruction and enables more frequent, consistent engagement with the target language.

Chou (2021) has investigated the effect of two important different components of AI systems that engage with human language; Natural Language Processing (NLP) and Natural Language Generation (NLG). The first one allows AI tools to understand and interpret user

input. NLP algorithms are utilized to analyze learners' speech or writing, detect errors, assess coherence, and tailor feedback to the learner's proficiency level. On the other hand, NLG enables AI systems to generate contextually appropriate and grammatically correct sentences, thereby producing high-quality language output for learners. Chou (2021) highlights the role of NLP in enhancing both linguistic accuracy and discourse coherence, as AI systems can detect nuanced issues in learner output that would traditionally require teacher intervention. In his point of view, Together, NLP and NLG form the foundation of adaptive and context-aware language learning experiences.

Collaborative tasks in second language acquisition

There are various approaches and methods of teaching English as a second language. Generally speaking, some research has shown development of language skills in the result of using tasks specially AI-mediated ones (Azamatova et al., 2023). One of the approaches that emphasizes on the usage of collaborative tasks is known to be task-based language teaching which is simply reputed as TBLT which has been proven to have positive and reenforcing effect on improving communicative proficiency of learners (Ghufran et al., 2026). In this article the effect of AI-mediated collaborative tasks on learners' level of proficiency (with low level of critical thinking) is investigated, so at the first step it is necessary to realize what a task is. According to Ellis (2003), a task in the TBLT framework is an activity that requires learners to use the target language, with a primary focus on meaning rather than form manipulation. As Ellis (2003) claims TBLT is distinct from more form-focused instructional models since it prioritizes meaningful interaction, encourages risk-taking, and situates language learning within socially contextualized activities because as obvious as it is, this approach employs a wide range of communicative tasks designed to reflect authentic social and professional interactions.

There are two key components in TBLT that influence and enhance learners' level of proficiency quite well; providing learners with authentic and meaningful pieces of language and negotiation of meaning.

A defining characteristic of TBLT is its reliance on authentic, meaningful tasks to promote language development. These tasks often resemble real-life communicative events, serving as a bridge between classroom learning and practical language use in everyday life. As Ellis (2003) argues such tasks activate a range of linguistic, cognitive, and social resources that enable learners to draw on prior knowledge, process new input, and negotiate meaning. This process fosters fluency, proficiency and complexity in language use, as learners are required to integrate vocabulary, grammar, and discourse strategies to achieve a communicative goal (Ellis, 2003).

The other key feature of TBLT is negotiation of meaning which occurs when learners work together to resolve misunderstandings, clarify intentions, or provide feedback during interaction. According to Long (1996) these moments of negotiation serve as powerful learning opportunities, allowing learners to notice gaps in their linguistic knowledge and acquire new language forms in a meaningful context. Long (1996) has demonstrated that such interactional modifications can facilitate deeper language processing and enhance retention. As it is expected the cognitive demands of these activities support not only linguistic development but also

critical thinking and social interaction skills, further enriching the language learning experience.

The most commonly used type of collaborative tasks in TBLT are known to be different types of discussions. As Willis and Willis (2007) express, discussions are usually structured or open-ended that enable learners to express their opinions, argue viewpoints, and engage in the negotiation of meaning and both of these tasks require learners to practice turn-taking, coherence, and clarification, thereby reinforcing both fluency and strategic competence of learners.

Simulations and role-plays are another commonly used collaborative tasks in TBLT. Based on Nunan (2004) simulated scenarios place learners in realistic communicative situations, such as job interviews, customer service dialogues, or travel-related interactions which promote pragmatic awareness and contextualized language use, helping learners to adjust their speech according to social settings, the kind of role they have, and their intended purpose (Van Gorp, 2026).

Some of the important types of tasks in TBLT are collaborative problem-solving in nature. These types of tasks involve learners working in groups to solve practical challenges such as planning an event, designing a project, or addressing a community issue. Samuda and Bygate (2008) believe such tasks emphasize teamwork, idea exchange, and consensus-building, which are vital components of real-world communication and regardless to say that each of these types of tasks fosters meaning negotiation, encourages learner interaction, and requires the integration of multiple language skills (speaking, listening, reading, and sometimes writing) which are quite effective and useful on learners' level of language proficiency.

Critical thinking in second language learning

In recent years, critical thinking has emerged as a central construct in second language acquisition. It is increasingly acknowledged that language learning extends beyond grammar and vocabulary acquisition to encompass higher-order thinking skills, enabling learners to evaluate information, reflect on their language use, and solve complex communication problems (Facione, 2011; Saiz & Rivas, 2010). As a higher-order cognitive skill, it involves the ability to question assumptions, assess arguments, and draw conclusions based on logical reasoning rather than memorization or rote learning (Darwin, 2024). In EFL contexts, this kind of cognitive engagement can enhance learners' ability not only to acquire but also to use language meaningfully (Facione, 2011).

Saiz and Rivas (2010) demonstrated that the integration of critical thinking in EFL learning fosters not just linguistic proficiency but also the development of cognitive and metacognitive abilities necessary for lifelong learning. As English becomes a medium of instruction and communication in globalized educational and professional settings, the ability to think critically about language use is increasingly vital. Ennis (2011) explained critical thinking enables learners to make reasoned decisions about language choices, assess the reliability of sources, and engage in meaningful communication across diverse contexts.

One of the most significant outcomes of fostering critical thinking in second language learning is the cultivation of learner autonomy. Little (2007) assumes critical thinkers are not

passive recipients of information but active participants who question, assess, and regulate their own learning processes which aligns with modern pedagogical priorities that emphasize self-directed learning and metacognitive awareness, particularly in environments where technological tools, such as AI, require learners to evaluate and respond to suggestions independently.

Theoretical framework

The convergence of Artificial Intelligence (AI), Task-Based Language Teaching (TBLT), and critical thinking in English forms multiple interrelated theoretical frameworks that underpin foreign language education. These theories explain how language is acquired through social interaction, cognitive engagement, and learner-centered instructional practices.

Vygotsky's Sociocultural Theory

Vygotsky's (1978) sociocultural theory emphasizes that learning and development are fundamentally social and cultural processes; in fact, rather than viewing cognitive development as an isolated internal function, Vygotsky (1978) argued that it is mediated through interaction with more knowledgeable others, including teachers, peers, and increasingly, intelligent technologies. The central tenet of this theory is the Zone of Proximal Development (ZPD), which represents the gap between what a learner can do independently and what they can accomplish with guided support. Language acquisition, in this view, occurs most effectively when learners are scaffolded within their ZPD—progressing from reliance on external guidance to internal regulation and independence (Lantolf & Thorne, 2006).

In relation to AI technologies, such as intelligent tutoring systems, virtual agents, or adaptive chatbots, Donato (2000) declared that they can serve as knowledgeable mentor in Vygotsky's sociocultural theory offering timely feedback and models of language use. For instance, an AI writing assistant might highlight grammatical inconsistencies, suggest more precise vocabulary, or provoke the learner to reflect on the clarity and cohesion of their writing. Warschauer and Liaw (2010) believed such tools scaffold the learner's cognitive load, helping them stay within an optimal learning zone without becoming overwhelmed.

Interactionist Views on Second Language Acquisition

The interaction hypothesis asserts that comprehensible input alone is insufficient for acquisition; it must be accompanied by meaning negotiation, feedback, and output modification processes that enable learners to notice linguistic gaps and adjust their interlanguage accordingly (Long, 1996). AI tools are increasingly capable of facilitating this kind of interactive engagement; for example, AI-powered conversation partners (e.g., chatbots or speech-recognition-based tutors) can simulate real-life dialogue, prompting learners to interpret, respond, and reformulate language in communicative contexts (Chapelle, 2003).

Cognitive and Constructivist Theories Supporting TBLT and Critical Thinking

Cognitive and constructivist learning theories assert that learning is an active, constructive process, where learners build new knowledge upon prior experiences through interaction with their environment (Piaget, 1970; Bruner, 1990). Task-Based Language Teaching (TBLT) is inherently grounded in the constructivist principles. It views language not as a set of rules to

be memorized but as a tool for accomplishing meaningful goals. In a TBLT environment, learners solve authentic problems, collaborate with peers, and engage in goal-oriented communication, all of which require cognitive engagement and decision-making (Ellis, 2003).

Critical thinking aligns seamlessly with constructivist models because it involves evaluating evidence, questioning assumptions, and making informed decisions. When students critically engage with AI-generated feedback, collaborate on complex tasks, or justify their language choices, they are not only acquiring language but also developing the cognitive dispositions necessary for academic and professional success (Willis & Willis, 2007).

Empirical studies

Some empirical studies have been done by many knowledgeable and respected researchers about the influence of using AI tools in second language learning classes. For instance, Godwin-Jones (2018) examined the use of AI chatbots for developing speaking skills. This research took place in an English language institute in Japan, involving 40 adult learners (20 males and 20 females, ages 20–30). The study aimed to explore how AI-supported interaction affected learners' oral proficiency and applied a mixed-methods approach, combining observation, performance tests, and learner interviews. Godwin-Jones (2018) reported that AI chatbots that provided learners with authentic interaction opportunities, contributed to their speaking proficiency.

Similar to Godwin-Jones, Chou (2021) explored the effect of AI tools on speaking skill but to be more specific Chou (2021) investigated the effect of AI-enhanced task-based instruction in a collaborative learning setting. The study was conducted in a high school in Taiwan with 60 students (30 males and 30 females, ages 16–18). The research question focused on whether AI-supported tasks increased communicative engagement and skill development. A quasi-experimental method was used, comparing an experimental group with a control group across a 10-week intervention. Chou (2021) finally demonstrated that AI-enhanced task-based instruction significantly improved learners' communicative skills and engagement. Chou (2021) has also gain similar results that Godwin-Jones had reached before on positive effects of the AI tools in second language learning process.

Looking at the effect of AI tools in second language learning classes from another perspective, Hassan et al. (2021) investigated AI tools in Middle Eastern EFL classrooms. The study took place in a private school in Saudi Arabia with 50 students (25 males and 25 females, ages 17–19). The objective was to examine the impact of AI tools on speaking confidence and learner autonomy, using a pretest–posttest quasi-experimental design. Hassan et al. (2021) found that Middle Eastern EFL learners who used AI tools reported greater confidence and autonomy in their speaking performance.

All the studies above have shown direct and indirect but positive effects of using AI tools in second language classes; Godwin-Jones (2018) reported that AI chatbots that provided learners with authentic interaction opportunities, contributed to their speaking proficiency, Chou (2021) finally demonstrated that AI-enhanced task-based instruction significantly improved learners' communicative skills and engagement and Hassan et al. (2021) found that Middle Eastern EFL learners who used AI tools reported greater confidence and autonomy in

their speaking performance. Most researchers have explored the effect of AI tools on speaking proficiency solely but the notable gap in between is that these investigations are done usually without taking individual differences like critical thinking into account which we are going to consider in this article.

Method

The present study employed a quasi-experimental design with pre-tests and post-tests to measure changes in communicative performance. The following parts details the participants and their selection process, the instruments used, the procedures for administering tests and interventions, and the data analysis methods, including SPSS (version 26) statistical procedures such as ANOVA, paired sample t-tests, and independent sample t-tests.

Design of the study

In the present study the independent variables were the use of AI-assisted collaborative tasks and also learners' varying levels of critical thinking that acted as the moderating variable while the primary dependent variable was communicative proficiency, measured through IELTS-based pre-tests and post-tests.

Furthermore, the present study employed a quasi-experimental pre-test and post-test design with six groups to investigate the impact of AI-assisted tasks on communicative proficiency of learners with different levels of critical thinking. The quasi- experimental design is a research method that is mostly used to establish a cause-and-effect kind of relationship between dependent and independent variables when the researcher cannot use random assignment to create comparison groups. So, a quasi-experimental design was chosen because it allowed the researcher to compare groups under different conditions without fully randomized assignment, making it suitable for classroom-based research. Random assignment of participants to groups after taking proficiency and critical thinking assessments helped to ensure internal validity. Also, the use of paired pre- and post-tests enabled measurement of individual progress over time, while it allowed for meaningful comparisons between AI-supported and traditional instruction.

Participants

The participants of this study were 80 female, Iranian EFL learners who were between 13 – 17 years old who were actively studying with volume 1 and 2 of Top-Notch series. They were chosen from a group of 150 learners at a private language institute in Shahindezh. To ensure they all had similar English skills, all 150 students took the Preliminary English Test (PET) which is a standardized test that matches the CEFR levels. Based on the test results, 80 learners classified as intermediate. Then these 80 learners completed a Critical Thinking Skills Test adapted from Facione (2011) to assess their critical thinking levels. Based on the results, learners were categorized into three main groups considering their level of critical thinking: high, moderate, and low critical thinking. learners with the same level of critical thinking were randomly divided into two groups; one experimental and one control group. In other word, to ensure comparability and eliminate confounding variables, each experimental group was paired with a corresponding control group with similar critical thinking characteristics.

Materials and Instruments

4 different types of instruments were used in this study in order to determine learners' level of English proficiency, critical thinking, implementing the intervention and comparing the learners' communicative proficiency before and after it.

English Proficiency Tests

At the beginning of the study, the Preliminary English Test (PET) was administered to assess the overall English proficiency of 150 learners. This standardized test helped select 80 intermediate-level learners to participate in the main study.

Critical Thinking Skills Test

To assess critical thinking levels, participants completed a test adapted from Facione (2011). The test categorized learners into low, moderate, and high critical thinking groups based on their ability to make inferences, recognize assumptions, draw conclusions, interpret information, and evaluate arguments.

Communicative Proficiency Pre- and Post-Tests

Validated communicative proficiency tests were used as pre-test and post-test measures. To assess participants' communicative skills, the study used pre- and post-tests designed based on the IELTS Speaking Band Descriptors (International English Language Testing System, IELTS). The tests included structured tasks that evaluated fluency, vocabulary, grammar, and pronunciation, ensuring consistency in the assessment criteria. The same test was administered before and after the intervention to provide a fair comparison of communicative proficiency of experimental and control group.

AI-Based Learning Platforms: During the treatment phase, the experimental group used three AI-driven tools to support their learning activities.

1. ChatGPT was employed for interactive role-plays, collaborative discussions, and simulated conversations, enabling learners to practice their communicative skills in realistic contexts.
2. ELSA Speak provided AI-powered feedback on pronunciation, helping participants refine their spoken language accuracy.
3. Grammarly offered real-time feedback on grammar and writing accuracy, allowing learners to identify and correct errors effectively.

Procedure

The study followed a structured sequence of steps. First, 150 learners completed the PET to determine their English proficiency levels. Based on their scores, 80 learners who demonstrated intermediate proficiency were selected for deliberation on choosing participants for the main phase of the study. Following this selection, all participants took the Critical Thinking Skills Test, which categorized them into three levels: learners with low, moderate, and high level of critical thinking. After these classifications were established, learners with the same level of critical thinking were randomly assigned to two groups. This arrangement ensured that experimental group had a corresponding control group with matching critical thinking characteristics but without exposure to AI-assisted tasks. Once the groups were formed, all

participants completed a speaking pre-test designed according to IELTS criteria. This assessment provided baseline data on their fluency, vocabulary, grammar, and pronunciation before the intervention began.

The intervention period lasted for five weeks, during which all six groups attended two 90-minute sessions per week. There were six separated classes in which learners were studying Top Notch 1 and 2 (Top Notch 1A, Top Notch 1B, Top Notch 2A, Top Notch 2B). The experimental groups engaged in AI-assisted tasks that involved speaking, problem-solving, and information-sharing, all structured according to principles of Task-Based Language Teaching (TBLT). In contrast, the control groups performed equivalent tasks using traditional instructional methods without any AI support. To maintain consistency in instructional delivery, the same teacher conducted all sessions across groups. At the conclusion of the five-week intervention, all participants completed a post-test that was identical to the pre-test. This allowed for an unbiased comparison of their speaking performance before and after the treatment.

Data analysis

This part of the article presented the procedure of statistical analyses conducted to address the research questions and examine the effect of AI-assisted collaborative tasks on the communicative proficiency of Iranian EFL learners with low, moderate and high levels of critical thinking (CT). Data were collected through standardized English proficiency tests (PET), critical thinking assessments (Facione, 2011), and a speaking proficiency test evaluating fluency, vocabulary, grammar, and pronunciation. A quasi-experimental pre-test and post-test design was employed to investigate the topic of this article. The analyses included descriptive statistics, paired-samples t-tests to examine within-group pretest–posttest changes, and a one-way ANOVA on gain scores to compare performance across the six experimental and control groups. The findings provided insight into how learners with different CT levels benefitted from AI-mediated instruction.

Out of 150 learners who were first screened using PET, a sample of 80 at the intermediate level was selected. The level of critical thinking was measured by using Facione test (2011) and the learners were categorized into high, moderate, and low CT groups. As the next step the learners in each level of CT category were further divided into an experimental group - those engaged in AI-assisted tasks - and a control group - those engaged in traditional tasks. Consequently, six groups were formed, each containing 13–14 learners to accommodate the total sample of 80 learners.

Experimental Group 1 (High Critical Thinking + AI Tasks)

Control Group 1 (High Critical Thinking + Traditional Tasks)

Experimental Group 2 (Moderate Critical Thinking + AI Tasks)

Control Group 2 (Moderate Critical Thinking + Traditional Tasks)

Experimental Group 3 (Low Critical Thinking + AI Tasks)

Control Group 3 (Low Critical Thinking + Traditional Tasks)

This design ensures that differences in outcomes can be attributed to AI-assisted interventions rather than heterogeneous group composition.

Results

Normality of the date

The Shapiro–Wilk test confirmed that pretest and posttest speaking scores were normally distributed within both groups (all p-values > .05), which warranted the use of parametric analyses.

Test	Treatment Group	Kolmogorov-Smirnov	Df	Sig.	Shapiro-Wilk	df	Sig.
Pretest Score	Control	129	30	.200*	.958	30	283
	Experimental	114	30	.200*	974	30	660
Posttest Score	Control	151	30	.078	957	30	266
	Experimental	114	30	.200*	963	30	370

Descriptive Statistics

The research question aimed at determining whether collaborative tasks supported by AI made a difference in the communicative proficiency of Iranian EFL learners in different levels of CT skills.

Table1. *Descriptive Statistics for Pretest, Posttest, and Gain Scores*

Group	N	Pretest M ± SD	Posttest M ± SD	Gain M ± SD
Exp 1	*14*	22.21 ± 0.95	30.14 ± 1.05	7.93 ± 0.76
Ctrl 1	*12*	21.50 ± 0.87	23.42 ± 0.90	1.92 ± 0.76
Exp 2	*14*	20.36 ± 0.84	27.64 ± 0.92	7.29 ± 0.65
Ctrl 2	*12*	19.50 ± 0.84	22.75 ± 0.89	3.25 ± 0.65
Exp 3	*14*	18.50 ± 0.53	25.50 ± 0.53	7.00 ± 0.60
Ctrl 3	*14*	18.50 ± 0.53	20.50 ± 0.53	2.00 ± 0.53

Note: Ns reflect the distribution of participants in the dataset. Experimental groups show higher gains than their matched controls.

Results for Research Question 1

Table 2. *Descriptive Statistics for High CT Group*

Test	N	M	SD
Pretest	14	22.21	0.98
Posttest	14	30.14	1.05

The first research question examined whether AI-assisted collaborative tasks significantly affected high CT learners. Descriptive statistics revealed a pretest mean of 22.21 and a posttest mean of 30.14, resulting in the largest gain of 7.93 points. Standard deviations were slightly higher posttest (1.05), indicating some variability but overall consistent improvement.

Table 3. *Paired-Samples T-Test for High CT Group*

Paired Differences	Mean	SD	SE	95% CI Lower	95% CI Upper	t	df	Sig. (2-tailed)
Post – Pre	7.93	1.05	0.28	7.34	8.52	39.65	13	< .001

The t-test confirmed a statistically significant improvement, with a very large effect size (Cohen's d ≈ 2.94). High CT learners maximized AI feedback through advanced metacognitive and problem-solving skills, strategically integrating pronunciation, grammar, and vocabulary support into communicative practice. These findings were consistent with cognitive-constructivist and metacognitive theories, and with empirical evidence indicating high CT learners achieve maximal benefit from AI-facilitated tasks.

Results for Research Question 2

Table 4. *Descriptive Statistics for Moderate CT Group*

Test	N	M	SD
Pretest	14	20.36	0.84
Posttest	14	27.64	0.92

The second research question investigated the effect of AI-assisted collaborative tasks on moderate CT learners. Descriptive statistics showed pretest and posttest means of 20.36 and 27.64, respectively, resulting in an average gain of 7.28 points. Standard deviations were 0.84 and 0.92, reflecting moderate variability among participants.

Table 5. *Paired-Samples T-Test for Moderate CT Group*

Paired Differences	Mean	SD	SE	95% CI Lower	95% CI Upper	t	df	Sig. (2-tailed)
Post – Pre	7.23	0.92	0.25	6.77	7.79	42.88	13	< .001

The t-test indicated a highly significant improvement with a very large effect size (Cohen's d ≈ 2.83). Moderate CT learners effectively integrated AI feedback into peer collaboration and self-assessment, enhancing fluency, accuracy, and communicative confidence. These findings were consistent with Sociocognitive and constructivist theories, emphasizing scaffolding, cooperative learning, and reflective engagement. Empirical parallels included studies demonstrating that learners with moderate analytical skills can leverage AI support optimally within collaborative, task-based settings.

Results for Research Question 3

Table 6. *Descriptive Statistics for Low CT Group*

Test	N	M	SD
Pretest	14	18.50	0.53
Posttest	14	25.50	0.53

The first research question examined whether AI-assisted collaborative tasks improved communicative competence in low CT learners. Descriptive statistics showed a mean increase from 18.50 (pretest) to 25.50 (posttest), representing a 7-point gain. Standard deviations remained low (≈0.53), indicating consistent performance.

Table 7. *Paired-Samples T-Test for Low CT Group*

Paired Differences	Mean	SD	SE	95% CI Lower	95% CI Upper	t	df	Sig. (2-tailed)
Post – Pre		7.00	0.53	0.14	6.70	43.75	13	< .001

The t-test revealed a statistically significant improvement, with a very large effect size (Cohen's d ≈ 2.94). Low CT learners benefited from AI feedback, including pronunciation corrections, vocabulary support, and sentence-structure guidance. However, their gains were smaller than those of higher CT learners, likely due to limited self-regulatory skills and less effective strategic use of feedback. The results aligned with cognitive-constructivist perspectives, which emphasize the role of immediate, contextualized feedback, while empirical studies suggested AI could enhance oral performance even among learners with weaker analytical skills.

Comparative Summary

To examine whether AI-assisted collaborative tasks produced different effects depending on learners' levels of critical thinking, a one-way ANOVA was conducted on the gain scores (posttest – pretest) for all four groups.

Table 8. *Descriptive Statistics for Speaking Proficiency Gains Across Groups*

Group	N	Gain M ± SD
Exp 1	*14*	7.93 ± 0.76
Ctrl 1	*12*	1.92 ± 0.76
Exp 2	*14*	7.29 ± 0.65
Ctrl 2	*12*	3.25 ± 0.65
Exp 3	*14*	7.00 ± 0.60
Exp 3	*14*	2.00 ± 0.53

Note: Mean gains progressively increased from the control to high CT experimental groups.

Table 9. *One-Way ANOVA Results for Speaking Proficiency Gains*

Source	SS	df	MS	F	Sig. (p)	η^2
Between Groups	1502.17	3	500.72	310.2	< .001	0.97
Within Groups	62.88	52	1.21			
Total	1565.05	52				

These results suggested that the impact of AI-assisted collaborative tasks on communicative proficiency was moderated by learners' critical thinking abilities. High CT learners utilized AI feedback more strategically and demonstrated superior gains, moderate CT learners benefited substantially through balanced integration of AI support, and low CT learners showed smaller yet meaningful improvements. Control group learners exhibited minimal improvement, confirming that traditional instruction was less effective than AI-mediated collaborative activities.

Discussion

The results indicated that AI-mediated collaborative tasks enhanced learners' communicative ability. The low CT group showed a statistically significant increase from pretest to posttest, whose averages were 18.50 and 25.50, respectively. The Control groups made very minimal gains, pretest score increasing from 18.50 to posttest score 20.20 leaving a total 2.00 score

increase, confirming that traditional instruction unsupported by AI was less effective than AI-mediated collaborative tasks. Not to mention that the results of the paired-samples t-tests indicated that the improvement was significant at $t(13) = 43.75$ ($p < .001$) with a very large effect size at Cohen's $d \approx 2.94$. So, the results suggested that AI-assisted tasks which had given feedback, had modeled pronunciation, had given lexical prompts, and had guided sentence structure, really helped to facilitate oral proficiency even among learners with relatively weak analytical and self-regulative capacities.

These findings are theoretically resonant with cognitive-constructivist perspectives, which support the view that AI can offer immediate feedback contextualized in tasks, thereby scaffolding the learners' knowledge of language use. The findings also coincide with Vygotsky (1978) and Bruner (1990), that AI is likely to have facilitated the growth of linguistic performance among learners due to the role of intelligent technologies acting as a knowledgeable teacher who -as Long (1996) also believed- facilitates the second learning process through giving feedbacks and providing a replete place for peer interaction and negotiation of meaning.

Going through some more details, in compliance with Ellis (2003) and Facione (2011), low CT learners seemed to remain challenged in strategically reflecting upon or exploiting such feedback, because of their underdeveloped metacognitive skills and problem-solving capabilities. During the five-week treatment phase we encountered such difficulties with learners that found it sometimes difficult to engage in meaningful communication across diverse contexts because they were mostly depending on memorization and rote learning but on the other hand the results were promising and we witnessed improvement in communicative proficiency in learners with low level of critical thinking.

Empirically, the findings underpin the pedagogical promise of AI in fostering linguistic and cognitive development in EFL contexts; the findings provided empirical support for the fact that AI-augmented collaborative learning, effectively underpinned by ChatGPT, ELSA Speak, and Grammarly, enhanced the communicative proficiency of Iranian EFL learners. The findings got along with Godwin-Jones (2018) and Chou (2021) who reported improvement in speaking proficiency due to AI chatbots that provided learners with authentic interaction opportunities. The findings also are aligned with Hassan et al. (2021) who found that Middle Eastern EFL learners who used AI tools reported greater confidence and autonomy in their speaking performance.

Conclusion

This study investigated the impact of AI-supported collaborative learning activities with ChatGPT, ELSA Speak, and Grammarly on EFL learners' communicative proficiency with different levels of critical thinking. It was found that AI-supported instruction was effective and contributed to a gain in learners' communicative proficiency. The findings retrieved from the paired samples t-test depicted the results that shows substantial progress was gained.

The research questions were fully answered in this study, which showed that AI-supported collaborative learning produced a significant improvement compared to traditional

instructional methods and AI tools facilitated immediate and interactive feedback while enhancing fluency, accuracy, and learner engagement.

Iin general, the research proved its worth within the context of technology-mediated language learning by showing that AI-enhanced collaborative learning processes formed efficient and effective methods of developing EFL learners' communicative abilities. According to the results, it was obvious that in the future, both researchers and educators would have to increasingly engage with the role that AI technologies play in EFL learning and design more comprehensive, dynamic instructional processes that incorporate multiple digital tools. At the same time, though, it was realized that challenges were associated with these technologies, and that processes of learning would differ among individual learners; therefore, flexibility and adaptability on the part of educators and researchers were necessary.

The findings of this study have several implications for EFL teaching and learning. For the learners, participation in AI-assisted collaborative tasks offered ample opportunities for speaking practice, receiving feedback immediately, and self-reflection. This promoted fluency, accuracy, and communication confidence, particularly for learners. For educators, the study highlighted the advantages of implementing AI tools in collaborative tasks. AI-supported platforms can scaffold student performance, mediate peer interaction, and provide individualized feedback, which reduces anxiety and promotes active participation and for curriculum and syllabus designers, the study provided implications for the integration of AI-assisted collaborative activities in language syllabuses. Syllabuses can be designed to include structured AI-assisted speaking activities, reflective assignments, and peer interactive opportunities, with strong alignment with Task-Based Language Teaching (TBLT) principles and communicative principles. This would facilitate learner-centered classrooms, critical thinking, and long-term language acquisition.

Although the study demonstrated the benefits of AI-assisted collaborative learning, several areas must be studied in greater depth. Future research can examine the long-term effects of AI-facilitated instruction on communicative proficiency to determine whether sustained exposure results in durable gains. Cross-cultural studies and application in other EFL or ESL settings would provide further evidence on the generalizability of these findings. Also, Further studies can take into account the influence of classroom rollout and teacher professional development strategies on optimizing AI integration, investigating whether particular instructional designs can optimize the effect of AI tools. Studies can also contrast the influence of learner proficiency levels on results through comparing beginner, intermediate, and advanced learners.

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