Journal of Mathematics Instruction, Social Research and Opinion
Vol. 5, No. 3, September 2026, pp. 2063 – 2077, https://doi.org/10.58421/misro.v5i3.1825
ISSN 2962-7842

AI-Powered CALL and L2 Pragmatic Competence Development among Indonesian EFL Learners

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Article Info

Article history:

Received 2026-06-03
Revised 2026-07-09
Accepted 2026-07-10

Keywords:

AI-powered CALL
EFL Learners
Interactive Learning
L2 Pragmatics
Pragmatic Competence

ABSTRACT

This research examines whether using AI-generated feedback enhances learners' pragmatic competence and how they engage with intelligent feedback during task-based communication. The study employed an explanatory sequential mixed-methods design with 60 undergraduate EFL students divided into experimental and control groups over eight weeks. Results indicated that learners in the experimental group significantly outperformed learners in the control group in the pragmatically appropriate use of language, politeness strategies and contextually appropriate use of language. Additionally, the analysis showed that immediate and adaptive AI-generated feedback led learners to notice their mistakes, self-repair, and repeat their revisions in cycles. Qualitatively, learners described the AI environment as supportive, flexible, and less anxiety-inducing, which helped them feel more confident in their language use. This study also shows how AI-powered CALL environments can help learners develop L2 pragmatic competence by providing personalized, interactive feedback. Finally, these findings describe the pedagogical possibilities of intelligent feedback systems within a **s**ystematically designed instructional approach to support pragmatic instruction in EFL contexts.

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1. INTRODUCTION

The widespread adoption of digital technologies in language teaching has profoundly altered second- and foreign-language instruction [1]. Computer-Assisted Language Learning (CALL) has evolved within this landscape from a means of providing input through structured practice tasks to an interactive, meaningful communication environment [2]. In recent years, AI has been integrated into CALL systems to create adaptive learning environments that can provide immediate, individualized feedback [3], [4]. Although much has been achieved in the field of grammatical and lexical instruction through the application of these tools, little research has been done into L2 pragmatic learning using technology.

This is especially important given the common observation that students exhibit high grammatical accuracy but struggle with contextual appropriateness in language use [1], [5]. Recent research indicates that while cognitive gains from AI-mediated connections are substantial, the current generation of fully automated systems is unable to replicate the complexity and culture-specific nature of conventional human-to-human connections [6].

Successful communication requires learners to develop pragmatic competence, namely the ability to use language appropriately in accordance with contextual and sociocultural norms. Pragmatic competence comprises two interrelated dimensions: pragmalinguistic competence, which refers to the knowledge of linguistic resources used to perform communicative functions, and sociopragmatic competence, which concerns the ability to select language appropriately based on contextual variables such as power, social distance, and cultural expectations. One important manifestation of pragmatic competence is the ability to perform speech acts effectively, including requests, refusals, and apologies [7]. Unfortunately, in many EFL settings, such as Indonesia, many learners do not have access to native-speaking models for authentic language interaction to develop their pragmatic competence through naturalistic exposure [8]. As a result, it is essential to develop instructional interventions to facilitate learning pragmatics. However, traditional classroom practices typically focus on the accuracy of language forms rather than systematically teaching pragmatics, which allows for iterative practice and feedback [9], and thus learners often develop their linguistic accuracy without concomitant pragmatic appropriateness [10].

The use of AI-based Computer-Assisted Language Learning (CALL) offers a new avenue for tackling this issue through various approaches. For example, the intelligent feedback mechanisms within AI-enabled platforms can provide immediate, context-specific feedback by simulating interactive communication and analyzing the learner's input [11]. These tools can enhance learners' awareness of pragmatic features, encourage self-repair, and help build their pragmatic competence [3]. Additionally, the advantages of using AI-based environments to reduce the social pressures inherent in face-to-face communication may motivate learners to take more risks with language and increase their willingness to participate in communicative activities [12], [13]. Despite these advantages, however, research into how learners use intelligent feedback systems for L2 pragmatic development has been limited to date, especially in EFL settings [3], [14].

This research aims to fill a gap in the literature by exploring the use of AI-based CALL tools to enhance advanced L2 pragmatic ability through intelligent feedback systems. Specifically, this study aims to evaluate AI-based feedback systems for promoting advanced L2 pragmatic ability and to examine the extent to which learners utilize the delivered AI-mediated feedback when completing L2 tasks. This study uses a mixed-methods approach to collect sufficient data related to learner outcomes and learner interactions within the learning environment.

This research is important because it examines the relationship between educational technology, applied linguistics and pragmatics. The theoretical perspective of the study extends our understanding of interlanguage by suggesting that artificial intelligence (AI) could serve as a mediating factor in the pragmatic development of second-language (L2) learners. In the pedagogical area, this research guides the design and delivery of CALL

materials using AI to offer learners more effective opportunities to develop their pragmatic competence. There is an increasing tendency towards using digital learning environments; therefore, understanding how intelligent feedback affects the development of L2 learners' pragmatic competence is both an urgent and necessary investigation.

Digital technology integration in Language Learning has been widely discussed in education theory, most commonly in terms of Computer-Assisted Language Learning (CALL) - as a way to increase learning success through the use of digital tools [15]. The extension of CALL programs to use artificial intelligence (AI) has further adapted the pedagogy to assist learners through interactive, adaptive and personalized learning [16] to such an extent that CALL systems based on AI can align with an Interactionalist perspective of language development in that they utilize the provision of meaningful interaction [17].

The relationship between technology and L2 pragmatic development presents several areas that have not been fully explored. To use language appropriately within a given context, an L2 learner must develop their pragmatic language skills. These skills include performing speech acts, using politeness strategies, and accurately interpreting implied meanings [18]. However, multiple studies indicate that L2 learners often experience pragmatic failure, regardless of their grammatical language proficiency [19], [20]. This phenomenon has been observed frequently in EFL contexts. For example, in Indonesia, L2 learners of English rarely experience authentic interaction or receive the sociocultural input that would help them to develop pragmatic language competence [21]. Explicit instruction and feedback have been deemed integral to the development of pragmatic language skills [22].

Many studies have shown that AI-enhanced chatbots can help learners learn to perform speech acts appropriately through practice in the specific context provided by the AI [23]. The role of AI in providing intelligent feedback has been shown to facilitate 'noticing' and self-repair, both of which are critical for pragmatic development [24], [25]. Additionally, many studies have shown that AI-generated corrective feedback can be as effective as teacher-generated feedback for improving both pragmalinguistic and sociopragmatic competence, because it can deliver feedback rapidly, consistently, and adaptively [26].

Despite these areas of potential growth, there are still limitations to note. Inconsistencies often exist in AI feedback; some AI feedback may lack nuances of cultural norms or produce socially inappropriate pragmatic feedback [24]. Additionally, most research focuses on outcome measures, such as test performance, rather than on how learners interact with and respond to AI-generated feedback during the learning process [14].

Most research on EFL learner pragmatics focuses on learning outcomes and has been conducted in technologically advanced Western contexts, creating an imbalance in the representation of EFL learners in Southeast Asian contexts. Because of the cultural specificity of pragmatics, researchers rightly question whether existing research findings can be generalized across cultures, given this lack of contextual diversity. Furthermore, most research does not use a mixed-methods approach that combines quantitative and qualitative methods to examine the pragmatic development of learners through their interactions with

intelligent feedback systems. Therefore, researchers do not have a complete understanding of how learners acquire pragmatics and how they learn from intelligent feedback.

Thus, this study will address these limitations by examining how AI-based computer-assisted language learning systems can support the development of L2 pragmatics, with a specific focus on learners' interactions with intelligent feedback systems. This study will (1) examine whether AI-based feedback improves EFL learners' pragmatic competence and (2) examine how learners interpret, interact with, and respond to intelligent feedback during task-based interactive activities. This research will use both quantitative and qualitative methodologies to develop a stronger and more contextually relevant understanding of how AI facilitates pragmatic development in EFL contexts.

2. METHOD

This study employed an explanatory sequential mixed-methods design, in which quantitative data were collected and analyzed first, followed by qualitative data to explain and elaborate on the quantitative findings. The quantitative phase adopted a quasi-experimental pre-test–post-test control-group design using intact classes, whereas the qualitative phase examined learners' interactions with AI-generated feedback through interaction logs and reflective journals. This mixed-methods approach enabled the researchers to investigate not only whether AI-powered CALL improved learners' pragmatic competence but also how learners interacted with intelligent feedback throughout the learning process [27], [28], [29].

The study was conducted at Cirebon Prima Bangsa Institute in West Java, Indonesia, over one academic semester. Because the university scheduling system did not permit random assignment of individual students to different classes, two existing second-year English classes were selected as intact groups. One class was assigned to the experimental group, and the other to the control group. Therefore, this study should be considered a quasi-experimental classroom study rather than a true experimental design [30], [31], [32].

A total of 60 undergraduate English Education students participated voluntarily in the study (30 students in the experimental group and 30 students in the control group). The participants consisted of 42 females (70%) and 18 males (30%), aged 19 to 21 years. All participants were enrolled in the second year of the English Literature undergraduate program and had completed foundational English language courses before participating in the study. English proficiency was determined using the institutional English placement test administered at the beginning of the academic year. All participants were classified as intermediate-level learners (equivalent to CEFR B1–B2). Prior to the intervention, participants completed a background questionnaire that indicated their prior experience with AI-assisted learning tools. Although most students had previously used general AI applications such as ChatGPT for vocabulary or grammar assistance, none had received formal instruction in L2 pragmatics using AI-powered CALL systems.

The AI-assisted instruction was delivered through a ChatGPT-based CALL platform designed for task-based pragmatic learning. The platform integrated ChatGPT with instructor-designed prompts focusing on three target speech acts: requests, refusals, and apologies. Students interacted individually with the AI by completing contextualized

communication tasks that simulated authentic social situations involving differences in social distance, power relations, and degree of imposition. The AI-generated feedback was designed to provide immediate adaptive responses following each learner submission. Rather than merely correcting grammatical errors, the system evaluated learners' pragmatic performance according to four dimensions: (1) politeness strategy, (2) contextual appropriateness, (3) degree of directness or indirectness, and (4) speech-act realization. When learners produced pragmatically inappropriate responses, the AI generated explicit corrective feedback, metapragmatic explanations, contextual prompts, and alternative expressions appropriate for the communicative situation. Students were encouraged to revise their responses iteratively until they produced pragmatically acceptable utterances.

The control group received teacher-led conventional pragmatic instruction covering the same learning objectives, target speech acts, instructional materials, and classroom tasks as the experimental group. Instruction consisted of textbook-based explanations, teacher demonstrations, classroom discussions, role-play activities, and written practice accompanied by teacher feedback. Both groups received identical instructional content, task difficulty, instructional time (two 90-minute sessions per week for eight weeks), and learning outcomes. The only difference between groups was the source of feedback: AI-generated feedback in the experimental group versus teacher-generated feedback in the control group.

Four instruments were employed in this study: (1) a pragmatic competence test, (2) AI-mediated learning tasks, (3) AI interaction logs, and (4) reflective journals. The pragmatic competence test consisted of 24 Discourse Completion Test (DCT) items, equally distributed across requests, refusals, and apologies (eight items for each speech act). Each item presented a contextualized communicative scenario varying in social distance, relative power, and degree of imposition. For example, one request item required learners to respond to the following situation:

"You need your lecturer to extend the deadline for an assignment because of unexpected family circumstances. What would you say?"

Responses were evaluated using an analytic scoring rubric adapted from interlanguage pragmatics research [33], [34]. Each response was scored on four criteria: pragmalinguistic accuracy, sociopragmatic appropriateness, politeness strategy, and contextual suitability. Each criterion was rated on a five-point scale, yielding a maximum score of 20 per item and an overall possible score of 0 to 480, which was subsequently converted to a 100-point scale for statistical analysis [35], [36]. The DCT instrument was reviewed by three experts in applied linguistics and L2 pragmatics to establish content validity [37]. A pilot study involving students with characteristics similar to those of the target participants was conducted before the main study. Internal consistency demonstrated satisfactory reliability (Cronbach's $\alpha > .80$).

Two experienced lecturers specializing in pragmatics independently scored all DCT responses. Prior to scoring, both raters received rubric training using sample responses to ensure consistent interpretation of scoring criteria. Inter-rater reliability was assessed using the Intraclass Correlation Coefficient (ICC), yielding excellent agreement (ICC = .91). Discrepancies were resolved through discussion until consensus was reached. Data collection proceeded in four stages. First, both groups completed the pragmatic competence

pre-test. Second, the experimental group participated in AI-mediated task-based instruction, whereas the control group received conventional classroom instruction over eight weeks, consisting of two sessions per week. Throughout the intervention, interaction logs were automatically recorded for all AI-mediated activities, while students completed weekly reflective journals documenting their learning experiences. Finally, both groups completed the post-test using the same pragmatic competence instrument administered before the intervention.

Quantitative data were analyzed using IBM SPSS version 27. Prior to hypothesis testing, statistical assumptions were examined. The normality of score distributions was assessed using the Shapiro–Wilk test, while homogeneity of variance between groups was evaluated using Levene's Test. Since all assumptions were satisfied ($p > .05$), paired-sample t-tests and independent-sample t-tests were performed. Cohen's *d* was calculated to estimate effect sizes. Qualitative data from interaction logs and reflective journals were analyzed using Braun and Clarke's thematic analysis procedures [38]. Two independent coders coded the data separately, then discussed coding discrepancies to reach consensus. Inter-rater reliability was assessed using Cohen's Kappa ($\kappa = 0.87$), indicating almost perfect agreement according to McHugh [39]. The qualitative findings were subsequently integrated with the quantitative results during the interpretation stage to explain how learners utilized AI-generated feedback to facilitate noticing, self-repair, and pragmatic development.

Ethical approval for the study was obtained from the institutional research ethics committee prior to data collection. All participants received written informed consent forms explaining the objectives of the research, voluntary participation, confidentiality procedures, and their right to withdraw at any stage without academic consequences. Participants also provided explicit permission for the researchers to collect anonymized AI interaction logs for research purposes. To protect participants' privacy, all personal identifiers were removed before analysis, unique participant codes replaced student names, and interaction log data were stored on password-protected institutional servers accessible only to the research team.

3. RESULTS AND DISCUSSION

3.1. Results

An initial analysis will be conducted using quantifiable measures to evaluate students' pragmatic language use before and after an instructional intervention.

Table 1. Descriptive Statistics of Pre-test and Post-test Scores

Group	Test	N	Mean	SD	Min	Max
Experimental Group	Pre-test	30	61.27	6.41	50	73
Experimental Group	Post-test	30	84.63	5.72	74	94
Control Group	Pre-test	30	60.84	6.78	49	72
Control Group	Post-test	30	69.51	6.13	57	81

Table 1 shows each group's descriptive statistics using the pre-test and post-test scores. The language proficiency of each group was quite similar prior to the instructional intervention; thus, both groups had similar levels of proficiency before participating. The results of the present study show that students in the experimental group showed a significant

increase in pragmatic language use after 8 weeks of instruction compared to the control group.

Table 1 presents the descriptive statistics for learners' pragmatic competence scores on the pre- and post-test for each group. Prior to the treatment, both learner groups showed comparable levels of pragmatic competence. The pre-test mean for the experimental group was 61.27 (SD=6.41) while the control group's pre-test mean was 60.84 (SD=6.78). Since these means are similar, the participants in both groups had a similar level of pragmatic competence prior to the instructional treatment.

The outcomes between the two groups were greatly dissimilar following interventions; in contrast to the regular control group, which earned only 69.51 (SD = 6.13), the experimental group, which benefited from Artificial Intelligence-assisted CALL teaching with intelligent feedback, produced an average post-test score of 84.63 (SD = 5.72). By providing 23.36 points more than the regular control participants (8.67), the experimental participants have shown significant progress toward using pragmatically sound language in their everyday use and societal interactions, compared to their instruction without the use of technology via Artificial Intelligence.

3.1.2. Paired-Sample t-Test Analysis

Paired-samples t-tests were conducted on both groups (experimental and control) to examine statistically significant differences in learners' pragmatic competence before and after instruction. To determine how much learners developed pragmatically as a result of instruction and to assess the effectiveness of AI-based CALL instruction compared to traditional instruction, pre- and post-test scores were calculated. By comparing the mean differences in both testing times, the analysis will provide insight into the empirical effects of intelligent feedback systems on learners' ability to use contextually appropriate language.

Table 2. Paired-Sample t-Test Results of Pragmatic Competence Scores

Group	Mean Difference	t-value	df	Sig. (2-tailed)	Effect Size (Cohen's d)
Experimental Group	23.36	14.872	29	0.000	1.84
Control Group	8.67	5.114	29	0.001	0.67

Note:
p-values are reported in exact form. Statistical significance levels:
$p < 0.05$; $p < 0.01$; $p < 0.001$.

The results of the paired-sample t-test for the experimental group indicated a statistically significant difference ($t(29) = 14.872$, $p < .001$) in the score (pragmatic competence) between the first and second testing phases (i.e., after the intervention) with a large effect size ($d = 1.84$). The control group also demonstrated a statistically significant difference ($t(29) = 5.114$, $p < 0.001$) between the first and second testing phases with a medium effect size ($d = 0.67$). These results suggest that AI-driven CALL instruction has a much greater impact on learners' pragmatic skill development than traditional instruction.

3.1.3. Independent-Sample t-Test Analysis

To further determine whether the observed differences in pragmatic competence between the experimental and control groups achieved statistical significance following the instructional treatment, an independent-samples t-test was conducted on the post-test scores. This analysis aimed to examine how well AI-powered CALL instruction with intelligent feedback enhanced learners' pragmatic development compared with conventional classroom instruction. Such a comparison of means for both groups at the conclusion of the intervention provides clear evidence of how efficient AI-mediated feedback is in improving learners' abilities. The results are given in Table 3.

Table 3. Independent-Sample t-Test of Post-test Pragmatic Competence Scores

Variable	Group	Mean	SD	t-value	Sig. (2-tailed)
Post-test Pragmatic Competence	Experimental	84.63	5.72	8.924	0.000
	Control	69.51	6.13		

Note:
$p < 0.05$; $p < 0.01$; $p < 0.001$.

An independent-samples t-test revealed a significant difference in post-test pragmatic competence scores between the experimental and control groups, $t = 8.924$, $p < 0.001$; full results are presented in Table 3. The experimental group averaged a markedly higher score ($M = 84.63$, $SD = 5.72$) than the control group ($M = 69.51$, $SD = 6.13$), indicating that AI-powered CALL instruction effectively develops learners' pragmatic competence. The analysis indicates a statistically significant difference between the two groups in their post-test performance, with learners who received AI-generated feedback achieving significantly higher pragmatic competence scores than those who received traditional classroom instruction.

3.1.4. Pragmatic Performance Across Speech Acts

To provide a complete picture of learners' pragmatic development, the study examined how learners used three major speech acts: requests, refusals and apologies. These were chosen as the most basic forms of pragmatic competence and also require sociocultural awareness, politeness strategies, and context-dependent use of language in everyday communication; an individual analysis of these speech act types allowed for detailed insight into individual categories of how AI-based feedback influenced learner ability to create contextually appropriate utterances for different contexts of communication. The analysis also provided insight into which pragmatic functions benefited the most from the AI-based intervention and the degree of success in using intelligent feedback systems to facilitate speech act production. The results of the analysis are shown in Table 4.

Table 4. Mean Scores Across Pragmatic Speech Acts

Speech Act	Experimental Group	Control Group
Requests	86.42	71.37
Refusals	82.18	68.24
Apologies	85.31	69.12

Table 4 shows that, in general, learners who received experimental instruction had significantly higher average performance than those who received regular, or control, instruction in all three areas of pragmatic speech acts (i.e., requests, refusals, and apologies). In the case of requests, the experimental group had an average score of 86.42; in the case of apologies, an average score of 85.31; and, finally, in the case of refusals, an average score of 82.18. In contrast, the average performance levels of the control group were markedly inferior to those of the experimental group in all three areas, with average scores of 71.37 for requests, 69.12 for apologies, and 68.24 for refusals. The differences in average scores suggest that learners who received AI-assisted feedback developed better pragmatic competence and greater awareness of the sociocultural appropriateness of their English communication than learners who received traditional instruction.

The higher performance exhibited by the experimental group regarding request strategies shows that AI-based (or computerized) feedback is an effective way to help learners produce contextually appropriate requests by providing rich, adaptive suggestions, correcting errors immediately and offering learners the opportunity to revise their utterances interactively. Producing requests is often pragmatically difficult for learners because of the lengths required to balance politeness level, degree of indirectness, and social distance simultaneously. The intelligent feedback system appeared to assist learners in recognizing when they used an inappropriate level of directness in their requests and to help them modify their language by using a more socially acceptable politeness level and/or mitigation devices to reduce the face-threatening nature of their utterances. Overall, the findings show that AI-powered CALL environments can significantly enhance learners' ability to master the use of multiple speech acts by promoting noticing, self-repair, and repeated exposure to pragmatically appropriate speech acts.

3.1.5. Learner Interaction with Intelligent Feedback Systems

A qualitative analysis of the interaction logs revealed high levels of student involvement in the AI-integrated CALL environment throughout the task-based activities. The presence of three key interaction patterns (immediate revision, pragmatic noticing, and iterative self-repair) indicated that learners were using the CALL environment as both a tool for correction and an environment for interaction in which pragmatic development could take place. The use of AI-generated feedback prompted many instances of immediate modification of learners' utterances as they reflected on their pragmatic issues and responded to them. The use of AI feedback also resulted in greater student awareness of the sociocultural appropriateness of language, politeness strategies and levels of directness, and the context-dependent use of language in speech acts (requests, refusals, and apologies). In addition, students revised and refined their utterances repeatedly by trying different expressions, adjusting their politeness level and using mitigating devices until they created a more pragmatically appropriate output.

The learners showed they thought critically about negotiating meaning and making sense of the language used, not just mechanically fixing errors, as evidenced by how they changed their work to fit the suggestions given. Together, these patterns of interaction demonstrate how intelligent feedback systems can effectively encourage individual learners

to participate actively, enhance their pragmatic awareness, and develop their language skills through AI-supported learning environments. Interaction patterns were coded at the utterance level. Immediate revision refers to revisions completed immediately after AI-generated feedback without additional prompts. Pragmatic noticing referred to learner comments or revisions demonstrating explicit awareness of pragmatic appropriateness. Iterative self-repair refers to two or more consecutive revisions made before the learner produced a final response. Two independent coders analyzed all interaction logs. Inter-rater reliability was high (Cohen's $\kappa = 0.86$), indicating excellent agreement.

Table 5. Frequency of Learner Interaction Patterns

Interaction Pattern	Frequency	Percentage
Immediate Revision	148	41.8%
Pragmatic Noticing	112	31.6%
Iterative Self-Repair	94	26.6%
Total	354	100%

The data suggest that the majority of interactions involved immediate revisions by learners. In line with this, many responses appeared to be immediate reactions to the AI system's feedback, indicating that the learners were highly engaged with it.

3.1.6. Types of AI Feedback Utilized by Learners

Information about the types of feedback given via the AI-Powered CALL platform is outlined in Table 6. As shown in Table 6, learners used explicit corrective feedback more than any other feature when trying to repair their inappropriate pragmatic forms. Explicit correction was coded when the AI directly identified an inappropriate pragmatic expression and suggested an alternative form. Metapragmatic explanation referred to feedback explaining why an utterance was pragmatically inappropriate. Contextual prompts consisted of questions that encouraged learners to reconsider contextual variables, such as social distance or power relations. Alternative expressions included AI-generated examples of pragmatically appropriate utterances.

Table 6. Types of AI Feedback Used During Interaction

Feedback Type	Frequency	Percentage
Explicit Correction	126	35.6%
Metapragmatic Explanation	98	27.7%
Contextual Prompt	73	20.6%
Alternative Expressions	57	16.1%

Using an AI-enhanced learning environment lowered students' anxiety levels during communication. The learning environment created by AI-positive learners gave learners a chance to experiment and practice without fear of embarrassment or pressure from other learners (i.e., social expectations and peer pressure) or their teacher. In addition, students were able to take greater responsibility for their learning by making more independent revisions to their language use and by self-monitoring throughout the process. Due to the immediacy and availability of AI-generated feedback, students gained more self-confidence regarding their ability to communicate in English. Students indicated higher levels of

confidence regarding producing appropriate language for social situations than they had prior to this study.

Table 7. Themes Emerging from Reflective Journals

Theme	Representative Response
Immediate revision	"I changed my answer immediately after reading the AI suggestion because I realized my request sounded too direct." "I rewrote the same response several times until the AI accepted it."
Increased Pragmatic Awareness	"I became aware for my English sounded too direct before getting feedback from the system." "The feedback helped me notice that speaking politely depends on who I am talking to." "Practising with AI felt safer than speaking directly in class."
Reduced Anxiety	"I got more confident when working with the AI because I wasn't worried about making an error." "Practising with AI felt safer than speaking directly in class."
Learner Autonomy	"I was able to improve my performances by receiving feedback from the AI to help me identify what I needed to change in my replies." "I learned to evaluate my own responses before asking my teacher."
Enhanced Confidence	"I also got more competent and comfortable using polite English expressions after having practice with the AI." "Now I am more confident when making requests in English."

Based on the study results above, learners using AI-mediated environments enhanced their pragmatic communication skills and increased their ability to engage positively with content. Furthermore, many learners viewed AI-mediated feedback as being constructive, low-risk, and useful for self-initiated learning.

3.1.7. Feedback Uptake and Revision Behavior

Using interaction data, we can also see that students used AI-generated feedback when creating new responses. An overwhelming majority (79%) of multiple revisions resulted in improved pragmatic responses after receiving feedback.

Table 8. Feedback Uptake and Successful Revision

Category	Frequency	Percentage
Successful Revision	236	79%
Partial Revision	43	14%
No Revision	21	7%

The datasets presented in Tables 5 and 8 represent different units of analysis. Table 5 summarizes all interaction events recorded during learner-AI interaction (N = 354), including repeated interaction episodes generated by the same learner within a single task. Table 8, however, reports only the subset of learner responses that underwent revision following AI-generated feedback (N = 294). Consequently, not every interaction resulted in a revised response, which accounts for the difference in totals.

The data presented in Table 8 demonstrate the robustness of student engagement with AI-generated feedback during learning about pragmatic communication. Evidence indicates that when learners receive intelligent feedback, they are likely to revise their responses; in fact, 236 of 294 total revised responses were identified as satisfactorily revised (79%). Given

the high percentage of successful revisions, it is clear that most students did not merely identify pragmatic errors in their original output, but also modified the context and social acceptability associated with the language they used in response to AI-generated feedback. In contrast, only 43 responses (14%) showed partial revisions, indicating that a small number of learners did develop their ability to identify and understand pragmatic norms; however, they still did not implement all the suggested changes presented by the AI system.

The study shows that 21 responses (7%) lacked revisions, suggesting that a smaller proportion of learners did not pay attention to the feedback, misunderstood what was being suggested as a corrective action, or had limited pragmatic abilities to modify their responses appropriately. The data from this study provide evidence that the use of an AI-supported CALL environment can help promote learner engagement, encourage the use of immediate feedback, and provide opportunities for learners to use repeated iterations in self-repair. The large number of successful revisions demonstrates that the use of intelligent feedback systems can promote learners' noticing of sociopragmatic aspects of their interactions with others, as well as support the development of independent pragmatic learning behaviours through repeated interaction and reflection.

3.2. Discussion

In this study, a research investigation was conducted to determine whether the use of AI-enabled CALL can support learners' development of pragmatic competence in EFL settings. The results indicated that learners who received AI support achieved better overall results than those who received traditional teaching, particularly improving their abilities to demonstrate pragmatic appropriateness, use politeness strategies, and use language appropriately to the context.

These results support earlier research that claims that the use of technology in language teaching can provide more individualized and flexible language development through immediate interactional and reflective feedback [40], [41]. The findings from this study also show that CALL with AI promotes not only measurable learning outcomes but also learners’ cognitive engagement, interactive participation and affective development during pragmatic language learning. The high rates of successful revision and self-repair identified in this study indicate that the use of AI-generated feedback assists in noticing, reflecting, and becoming aware of metapragmatic practice, all of which are essential elements of interlanguage pragmatic development [42], [43].

In addition, learners' reflections when using the AI-supported environment indicated decreased anxiety about communicating and increased willingness to experiment with language form; thus supporting the argument that intelligent CALL systems can help create psychologically supportive learning environments that encourage autonomous learning behaviours [44]. Unlike traditional teacher-centred instructional methods, the learner/AI interaction in CALL allows learners to engage in iterative revision and receive personalized feedback in a timely fashion, which promotes both sociopragmatic and pragmalinguistic competence.

Through this research, our comprehension of AI-based pedagogies for language instruction has improved. Rather than presenting themselves merely as technological

devices, intelligent feedback systems collaborate with other devices to foster deeper pragmatic awareness and more effective learner-centered communication in EFL classrooms.

Despite these advancements, however, it is important to evaluate the limitations of this study. First, since the sample for this study was limited to one small-scale Indonesian university and therefore does not allow any generalizations about educational or cultural contexts outside of this specific area, the applicability of the results is severely restricted. Second, eight weeks is not nearly enough time to foster sufficient pragmatic development, as pragmatic competence develops over an extended period and is influenced by the length of time one has been involved in, or has begun developing an understanding of, cultural contexts through language use. Therefore, it is likely that this study could not capture or document the continued growth or maintenance of participants' pragmatic abilities after the completion of the intervention period.

Thus, future research needs to include larger, more diverse learners from a range of educational and cultural contexts, as well as longitudinal designs. Despite these limitations, the findings of this study provide important empirical support for the claim that AI-based CALL can effectively support L2 pragmatic skills through robust feedback, contextualized interaction, and learner-specific support.

4. CONCLUSION

This study investigated (1) whether AI-generated feedback within an AI-powered CALL environment improves L2 pragmatic competence and (2) how learners interact with intelligent feedback during task-based communication. The findings indicate that, among intermediate undergraduate EFL learners at one Indonesian higher education institution, learners who received AI-generated feedback demonstrated greater improvement in pragmatic competence than those who received conventional instruction. The qualitative findings further revealed that learners actively engaged with the feedback through pragmatic noticing, immediate revision, and iterative self-repair, suggesting that AI-generated feedback supported reflective learning during pragmatic task completion.

These findings should be interpreted within the context of this study and should not be generalized beyond similar learner populations and instructional settings. Rather than replacing teachers, AI-generated feedback appears to be most beneficial when incorporated into a pedagogically structured learning environment. From a pedagogical perspective, AI-supported CALL can be integrated with teacher-guided reflection, explicit instruction on pragmalinguistic and sociopragmatic features, and peer discussion or collaborative feedback activities to strengthen learners' pragmatic awareness and communicative competence. Such an integrated approach may help learners critically evaluate AI-generated suggestions while developing contextually appropriate language use.

Future research should involve larger and more diverse learner populations, employ longitudinal designs to examine the sustainability of pragmatic development, and investigate a broader range of pragmatic phenomena, including implicature, discourse management, and intercultural communication. Incorporating multimodal data (e.g., screen recordings, stimulated recall, and interaction videos) would provide richer evidence of learners'

engagement with AI-generated feedback. In addition, future studies should compare the effectiveness of AI-generated feedback, teacher feedback, peer feedback, and combined AI–teacher feedback to identify the most effective instructional models for developing L2 pragmatic competence.

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