



Developing AI Chatbots for Pragmatic Instruction of Korean Secondary L2 English Learners

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ABSTRACT

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This study explores the design and application of AI chatbots tailored for L2 English pragmatic instruction. Addressing the importance of pragmatic competence alongside the challenges faced by L2 learners, we developed four chatbots through Dialogflow CX and integrated them onto web user interfaces to examine the effectiveness of the AI chatbots in L2 pragmatic learning. We invited a cohort of six middle school students to practice the conversations in pragmatically intensive (i.e., PDR-high) situations. Our findings reveal the need for a dual structure in chatbot design, a separation of technological operation from dialogic content, and a pair-wise page design for cohesive conversations. Additionally, user interfaces should offer contextual clues and linguistic supports to assist learners in understanding and navigating pragmatic exchanges. The participants' positive perceptions highlight the chatbots' effectiveness in improving pragmatic awareness and knowledge, akin to other dialogue-based computer-assisted language learning systems. However, the need for guiding feedback mechanisms and inclusive training data for chatbot development has also been noted. In conclusion, chatbots show promise for L2 pragmatic instruction especially when their design architectures and user interfaces carefully reflect dialogue contents, information technology, and supportive elements for effective learner interaction.

KEYWORDS

L2 pragmatic instruction, PDR-high request, AI chatbot, Dialogflow CX, user interface

1. Introduction

The acquisition of pragmatic competence holds significant importance in facilitating successful communication (González-Lloret 2022). This significance is particularly pronounced for second language (L2) learners, who should cultivate pragmatic competence due to the potential divergence of pragmatic norms between their native language and the target language. In contrast to errors in phonetics, vocabulary, or grammar, errors in pragmatic usage can precipitate considerably more profound breakdowns in communication (Bardovi-Harlig and Dörnyei 1998, Thomas 1983), exerting detrimental effects on the discourse participants (Eslami-Rasekh 2005, Fraser 1990).

Despite the importance of attaining pragmatic competence, developing pragmatic competence is challenging for learners in a foreign language context where naturalistic input and interactions in L2 are limited (Eslami-Rasekh et al. 2015). Furthermore, since mastery of pragmatic competence necessitates not solely what to say in L2 but also how to say it tailored to the intended audience, the attainment of such competence remains an undeniably formidable endeavor (Taguchi 2019). This challenge is further compounded for L2 learners engaged in dynamic, real-time interactive exchanges.

Acknowledging both the importance and difficulties of developing pragmatic competence, L2 pragmatics instruction studies examined the effect of pragmatic instruction, yielding sound results of teachability. More recently, studies have begun to explore the application of technology such as robots (Alemi and Haeri 2020), computer simulations (Sydorenko et al. 2018), and digital games (Taguchi 2024, Tang and Taguchi 2020, 2021) in teaching pragmatics. By applying various dialogue-based computer systems simulating pragmatically important situations, these studies have proven the contribution of technology to pragmatic learning. Since the late 2010s, the dialogue-based computer system has shown remarkable technological advancement in AI chatbots such as Dialogflow CX and ChatGPT.

However, the contribution of AI chatbots to pragmatic learning has not been fully explored in technology-based pragmatic instruction. The advantages of AI chatbots have been widely recognized in foreign language learning (Fryer and Carpenter 2006) as chatbots can provide ample opportunities to practice conversations in various situations. This applicability extends to pragmatic acts as well. Chatbots can realize the flows of pragmatically delicate situations where L2 learners should perform appropriate pragmatic actions as they provide opportunities for practicing pragmatics in varied communication scenarios.

Given the importance of pragmatic competence and the possible contribution of AI chatbots to pragmatic learning, the current study aims to address two main objectives, namely the development of AI chatbots tailored for L2 English pragmatic instruction and the evaluation of their usability in real educational settings. We identified pragmatically delicate communication situations and pragmatic actions and then designed the communication situations into *L2 Pragmatic Instruction Bots* (L2-PIBots) based on the requirements of a chatbot builder platform. After developing the AI chatbots, we created user interfaces (UIs) that would facilitate learners' interaction with the chatbots and asked a group of learners to use and evaluate the chatbots, specifically focusing on their practical application and effectiveness in enhancing L2 pragmatic competence. To address the gap in technology-based pragmatic instruction, which is often limited to advanced adult L2 learners, the L2-PIBots in this study were developed for secondary school L2 learners. By focusing on this demographic, we endeavor to bridge the gap in pragmatic instruction and extend its benefits to a broader spectrum of learners. The following are the research questions addressed in the present study:

1. What are the major characteristics of AI chatbots for L2 pragmatic instruction as suggested by the development of the L2-PIBots?

2. What are the major characteristics of user interfaces where learners interact with the AI chatbots for L2 pragmatic instruction?
3. How do the learners use and evaluate the AI chatbots for L2 pragmatic instruction?

2. Previous Studies

2.1 Studies on L2 Pragmatic Instruction

Pragmatic competence encompasses two distinct forms of knowledge: pragmalinguistics and sociopragmatics (Beltrán-Planques and Querol-Julián 2018). According to Leech (1983), pragmalinguistic competence refers to an understanding of the linguistic tools inherent in a language, which facilitate specific illocutions (Leech 1983, p. 11). Conversely, sociopragmatic competence encompasses comprehension of the societal conventions that govern language usage, adeptness in evaluating politeness, and consideration of contextual factors such as social power dynamics and interpersonal proximity. In the interim, a more recent perspective on pragmatic competence conceives pragmatic competence as an ability to successfully perform pragmatic acts in interaction at the discourse level (Félix-Brasdefer and Shively 2021).

Acknowledging the importance of pragmatic competence for successful social interactions, studies in L2 pragmatics have examined how learners use pragmatic targets in a socially appropriate manner, with special attention to speech acts such as request and refusal (Taguchi 2015, Taguchi and Roever 2017). The results of the studies illustrated both similarities and differences between native speakers and L2 learners (Al-Gahtani and Roever 2018, Allami and Naeimi 2011) and the difficulties that L2 learners encounter in performing pragmatic acts in L2 (Cohen and Olshtain 1993, Hassall 2008, Park and Oh 2019).

To address such difficulties, numerous studies have examined what to teach among various pragmatic targets and how to teach them (e.g., Ahmadian 2020, Ajabshir 2019, Eslami et al. 2015, Huth and Taleghani-Nikazm 2006, Plonsky and Zhuang 2019, Taguchi and Roever 2017). Regarding what to teach, speech acts have been most prevalent, and among them, the speech act of request has received the most attention due to its face-threatening nature (Brown and Levinson 1987). By making a request, a speaker encroaches upon the listener's autonomy in choosing their actions while also assuming the risk of compromising their own public self-image. Consequently, to mitigate the imposition and convey politeness, it becomes imperative for the speaker to employ various politeness strategies and mitigating devices.

When it comes to how to teach pragmatic targets, explicit versus implicit teaching of L2 pragmatics has been the most researched topic, and the overall results illustrate the superior effect of explicit instruction (Plonsky and Zhuang 2019). More recently, moving away from the explicit and implicit dichotomy, researchers have incorporated diverse teaching approaches and methods into pragmatic instruction including task-based language teaching (García-Fuentes and McDonough 2018, Kim and Taguchi 2015) and technology (Cunningham 2016, Eslami et al. 2015, Sydorenko 2015).

Among these, there has been a remarkable increase in research concerning the intersection of L2 pragmatics and technology. Some studies utilized computer-mediated communication across a range of contexts including platforms like text or voice chat applications (Li 2019) while others developed tailor-made platforms using virtual reality or mobile games (Sykes 2018). These studies have shown that technology-mediated environments offer excellent contexts for learners to practice pragmatic targets (González-Lloret 2022). Recognizing technology as an imperative for pragmatic instruction (Taguchi 2024), more research is needed in the field by adopting

unexplored technology such as AI chatbots.

2.2 Chatbot as a Language Learning Tool

Chatbots are software programs that communicate with human users in natural languages such as English and Korean. Chatbots use a variety of natural language processing (NLP) technologies such as intent analysis and speech recognition. Chatbots usually require specific hardware devices, like AI speakers, monitors, and keyboards, to receive and transmit speeches and other forms of information (e.g., emojis and pictures). Also known as talking bots or conversational agents, there are several globally recognized chatbots, including ChatGPT (OpenAI 2023) and Bard (Pinsky 2023). They have found applications in numerous domains, with education being one of the most prominent (UNESCO 2023).

The pedagogical use of chatbots is unsurprising. Historically, language has been an essential tool in education, and chatbots excel at language. Thus, educators naturally gravitate toward these language experts. Chatbots have been deployed in various educational domains, ranging from computer science to mathematics (Kuhail et al. 2023), with foreign language education being no exception. Fryer and Carpenter (2006, pp. 9-10) highlight six major advantages of chatbots in foreign language education:

- a) Learners feel more relaxed and comfortable conversing with a chatbot.
- b) Chatbots allow learners to use a diverse range of language structures and vocabulary.
- c) Chatbots present a novel and engaging learning experience for students.
- d) Chatbots can repetitively present material without tiring.
- e) Many chatbots offer both text and synthesized speech, enabling learners to practice listening and reading.
- f) Chatbots can quickly provide feedback on students' mistakes.

Recognizing these benefits, many scholars have developed tailored chatbots that serve foreign language learners as teaching agents, peer agents, or motivational agents. For instance, Kang and Sung (in press) developed chatbots based on Dialogflow CX that acted as peer agents, allowing middle school EFL learners to practice role-playing scenarios. Another example is Hsu et al. (2023) who created a chatbot system that prompted learners to talk about a given topic, analyzed their responses and provided feedback akin to language teachers.

Acting out various roles in foreign language education, chatbots have proven valuable in enhancing knowledge in areas such as vocabulary (Kim 2018, Jeon 2023), grammar (Hsu et al. 2023, Kim 2019, Sung 2021), reading (Ruan et al. 2019), and speaking (Dizon 2020, Yang et al. 2022). As an illustration, Jeon (2023) designed a chatbot for dynamic assessment where young learners responded to target word queries and received incremental feedback from implicit to explicit ones. Those who engaged with this dynamic assessment outperformed their counterparts who interacted with a chatbot with a non-dynamic assessment. While meaningful efforts are being expanded to enhance L2 learners' abilities in diverse domains, there has been no study examining how chatbots can be developed and utilized to improve L2 learners' pragmatic competence.

In L2 pragmatic instruction studies, dialogue-based computer systems have gained traction (Bibauw et al. 2022). Researchers have crafted various dialogue-based CALL systems such as embodied robots (Alemi and Haeri 2020), computer simulations (Sydorenko et al. 2018), and digital games (Taguchi 2024, Tang and Taguchi 2020, 2021) to provide L2 learners with "direct access to contextualized communicative practice" (Taguchi 2024, p. 57). These systems are known for their multimodality, experiential learning, and real-time feedback. For instance, in Sydorenko et al. (2018), advanced L2 English learners watched a video clip, showing the other interlocutor to

whom they needed to make a request, audio-recorded their response to the clip, selected one of the response options that best matched their recorded response, and then viewed a subsequent video based on their selection. These systems have been shown to aid the learning of L2 pragmatics. However, despite their “strong effects on the acquisition of pragmatically appropriate speech acts” (Bibauw et al. 2022, p. 129), dialogue-based CALL systems have been investigated only in a few contexts of L2 learning, mostly with advanced-level university students. Additionally, recent technological advancements in conversation agents, such as fully automated interactive systems in Timpe-Laughlin and Dombi (2020), coupled with a growing interest in chatbots for language teaching (Huang et al. 2021), have yet to be thoroughly examined in L2 pragmatic instruction. This study aims to bridge this gap by developing chatbots via Google Dialogflow CX for an understudied demographic in L2 pragmatic instruction, namely secondary school EFL students.

3. Methods

3.1 Technological Resources

This study used three types of technological resources at Google Cloud to design, program, install, and use chatbots for L2 pragmatic instruction. First, Google Docs was used to document dialogue tables where each pragmatic step was paired with specific speeches for target contexts.

Second, Google Dialogflow CX was employed to program four NLP-based chatbots that could be integrated into various user interfaces such as websites and SNS messengers. Google Dialogflow CX is one of the most popular platforms for building chatbots: it effectively visualizes dialogue flows and offers a variety of data management systems. The decision to employ Google Dialogflow CX rather than other generative AI chatbots, such as ChatGPT, was based on the following reasons. First, generative AI chatbots often require parental consent for use by middle school students, posing challenges for implementation in school settings. Second, with Dialogflow CX, we could determine which utterances would not be accepted, and this design can provide learners with negative evidence and thus enhance learners’ awareness. Third, generative AIs like ChatGPT complicate control and prediction of generated expressions, which may lead to the excessive diversity of responses for L2 learners.

Third, we used Google Site to install the developed chatbots in the context of learner-friendly user interfaces. In Google Site, we revised the HTML source codes to customize the chatbots for L2 pragmatic instruction. In addition, Google site allows us to present the chatbots in line with other types of information such as sample dialogues and images to facilitate the interaction between the learners and the chatbots.

3.2 Participants

The AI chatbots for L2 pragmatic instruction, L2-PIBots, were developed by the two researchers of this study. They collaborated throughout the entire procedure in a way that one of them took a leading role in a task at hand with the other taking a supportive role. One researcher led the tasks of composing dialogues for target contexts, facilitating the learners to interact with and evaluate chatbots, and analyzing the learner experience. The other researcher led the tasks of designing chatbots in Dialogflow CX and creating user interfaces for using AI chatbots.

A total of six female middle school 3rd graders participated in using and evaluating the AI chatbots. All the participants had undergone six years of formal English education in Korea, with no prior experience of living in

an English-speaking country. Participants were recruited with the assistance of homeroom teachers of 3rd graders at the school. The study was briefly introduced after school, and only those who expressed interest participated. Their English language proficiency was assessed through an online English test provided by Cambridge Assessment English (<https://www.cambridgeenglish.org/test-your-english>) after the experiment. Based on the results, it was determined that they exhibited an intermediate level of English proficiency, falling within the B1 or B2 range according to the Common European Framework of Reference for Languages (CEFR).

The survey prior to the use of the AI chatbots revealed that every participant, except for one, knew little about what the chatbot is. Also, including the one who knew about what the chatbot is, all the participants had little knowledge about the role of chatbots in everyday life or English learning.

In terms of their knowledge of how to make a request in English, all of them wrote only the expressions for the request head act such as ‘Can you...?’, ‘Would you...?’, and ‘May I...?’ without mentioning the contexts where those expressions are used. Among these expressions, ‘Can you...?’ was the most common expression, which seems to have been affected by the textbook input they encountered during the regular English class hours.

3.3 Chatbot Development Procedures

3.3.1 Compose Dialogues for Target Contexts

The L2-PIBots were designed to practice the speech act of request in formal situations. Request is the speech act that has been most broadly studied in the field of pragmatics. Sociolinguistically, it is considered a ‘face-threatening act’ because of its potential risk of putting imposition on the counterpart, and it requires some degree of politeness strategies and mitigating devices.

According to Brown and Levinson’s (1987) contextual factors of power (P), distance (D), and rank of imposition (R), the formal request is defined as a request that carries a larger size of imposition and is made to someone in greater power and distance (i.e., PDR-high). For example, a student asking a teacher for an extension of a homework deadline would be a PDR-high request. This contrasts with PDR-low requests, which are requests with a lower level of imposition that are made to a person in equal power and small distance. An example of a PDR-low request would be a student asking his/her friend to share an umbrella. By adopting and adapting the PDR-high situations from the previous studies (Kang 2023, Taguchi and Kim 2016), the present study set the PDR-high request situations as follows:

- (a) Asking a teacher to reschedule a consultation
- (b) Asking a teacher to extend the homework deadline
- (c) Asking a busy teacher to provide an extra review session on math

In composing dialogues for the PDR-high request situations, the phases of a request sequence suggested by Roever (2022) were adopted. The phases of a request sequence include greeting, opener (e.g., Can I ask you a favor?), background or explanation, and request, and at each phase, there exist listener responses such as continuers (e.g., okay, sure). We also tried to reflect on the nature of request as a dispreferred action (Wong and Waring 2010) and the characteristics of natural conversation in the dialogues. Conversation analysis (CA) informed that the speech act of request potentially threatens the relationship between the interlocutors, which thus tends to be delayed, minimized, and accounted for in advance of the requests themselves. Its delayed sequential positioning within an interaction and the preceding moves in discourse structure suggest that it is a dispreferred action, while an offer is regarded as a corresponding preferred action (Schegloff 2007).

When deciding on pragmalinguistic forms for each step, the findings from Taguchi and Kim (2016) were

adopted. According to the study, what characterizes PDR-high requests are the mitigated preparatory head acts (e.g., I was wondering if...), preparators (e.g., May I ask you something?), and grounders (i.e., reasons or explanations that support the request). Together with the forms suggested in Taguchi and Kim (2016), forms that convey similar meanings and intentions were included based on the examples from previous research on PDR-high situations and large language models such as ChatGPT.

3.3.2 Design Chatbots in Dialogflow CX

The design of the L2-PIBots began by determining chatbot types. Since there were two conversation roles (i.e., a teacher and a student), two types of chatbots were developed. The first type, where the chatbot assumed the role of a student, naturally placed L2 learners in the role of a teacher. Talking with this chatbot, L2 learners were expected to become familiar with discourse contexts and structures and learn linguistic forms that a student needs to perform major communicative functions in request. The second type had the chatbot in the role of a teacher, allowing L2 learners to practice the role of a requesting student and adapt what they learned from the first type of chatbot.

After the chatbot types were determined, the number of chatbots to be developed for each type was planned. Two main approaches were considered. One was to develop a separate chatbot for each of the three contexts established in this study: putting off teacher's consultation, extending homework submission, and asking for an extra review session. The other was to integrate all three contexts into a single chatbot. Due to the architecture of Dialogflow CX, the first type (student role) could only be initiated by the chatbot and therefore each chatbot was limited to a single context. Conversely, the second type (teacher role) could be initiated by the L2 learner, allowing the dialogue to proceed in the context appropriate to the learner's prompt. In summary, three chatbots were developed for the first type (student role) and one for the second type (teacher role). Table 1 provides a summary of the chatbot design.

Table 1. Summary of Chatbot Design

Type	Chatbot Role	No	Contexts	Description
1	Student	1	Postponing a teacher's consultation	Chatbot initiates conversation, limited to single context. L2 learners act as the teacher, becoming familiar with necessary linguistic forms.
		2	Extending homework submission	Same as above.
		3	Requesting an extra review session	Same as above.
2	Teacher	4	Integrated: All contexts in one chatbot	L2 learners act as the student and initiate conversation, so they decide which of the three situations they will practice. Chatbot responds to L2 learner's initiation. Learners are expected to use what they have learned from the other chatbots.

Then, chatbot scenarios were developed into dialogue *flows* containing multiple *pages*. Each page corresponds to 1-2 turns of dialogue between the chatbot and the user, with the subsequent page determined by the content of the current page. For instance, a successful completion of the "greeting" page leads to the "opener" page. The number of pages in a dialogue flow varies depending on the complexity of individual pages. Given the research goal of facilitating relatively short dialogues, the design strategy adopted involved constructing simple and concise pages within each flow.

For each page, the interaction turns between the chatbot and the learner were structured using features like *entry fulfillment*, *intent*, and *responses*. Entry fulfillment determines what the chatbot says when a page starts. Intent recognizes user utterances as specific intentions, while responses pertain to the chatbot's reply to the intent. All three functions process speeches at particular stages. It's imperative that various utterances, even if distinct, can be recognized under the same intent. For instance, greetings such as "Hello" and "Good afternoon" should both be identified under the same "greeting" intent.

Lastly, the "Test Agent" feature of Dialogflow CX was employed to run tests on the developed chatbots. This enabled the identification and correction of errors or any unnatural sequences. This iterative process continued until the chatbot's performance reached a satisfactory level.

3.3.3 Create User Interfaces for Meeting AI Chatbots

A website was initiated using Google Sites where the L2-PIBots could be installed and accessed by learners. To provide the learners with a clearer understanding of dialogue scenarios, pertinent pictures depicting dialogic situations were sourced from the internet and positioned on the webpage. Each picture was appended with brief descriptions to elucidate the roles of the chatbots and learners in the subsequent practice.

We also composed dialogue situations and sample conversations so that learners got a grasp of the dialogues they would engage in with the chatbots. Alongside this textual information, the AI chatbots were seamlessly integrated into the form of the Dialogflow messenger, one of the many integration services provided by Dialogflow CX. Upon activation of the messenger, Dialogflox provided its HTML source code, which was slightly modified and subsequently embedded into the webpage.

3.4 Usability Evaluation Procedures

3.4.1 Facilitate the Participants to Interact with and Evaluate Chatbots

A website was initiated using Google Sites where the L2-PIBots could be installed and accessed by learners. To provide the learners with a clearer understanding of dialogue scenarios, pertinent pictures depicting dialogic situations were sourced from the internet and positioned on the webpage. Each picture was appended with brief descriptions to elucidate the roles of the chatbots and learners in the subsequent practice.

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3.4.2 Analyze the Participants' Records

An analysis was conducted on the responses of participants, as measured on a five-point Likert scale, in both pre- and post-surveys (see Appendices 1 and 2). This analysis focused on the quantification of responses in terms of percentages. Additionally, we conducted a qualitative examination of the responses to open-ended questions and the participants' conversations with chatbots, leading to the identification of recurring themes (Colaizzi 1978). In the context of participants' comprehension of English request strategies, their responses were examined from

two distinct aspects, i.e., their knowledge of pragmalinguistics and sociopragmatics, and presented with pseudonyms.

4. Results

4.1 Characteristics of AI Chatbots

Four L2-PIBots have been developed for L2 English pragmatic instruction using Google Dialogflow CX. Three of them are designed to help users (L2 English learners) practice the role of a teacher in three request-related situations: postponing a teacher’s consultation, extending homework submission, and requesting an extra review session. Each of the three chatbots consists of a single flow, further divided into seven pages. Of these, the *Start* and *End Flow* pages are exclusively utilized for initializing and terminating chatbot operation. The remaining five pages constitute the main body of the conversation (see Figure 1). Each of these five pages is constructed as a pair of speech acts between the student and the teacher: a) greeting-greeting (“*Hello.*”-“*Hello.*”), b) opener-response (“*May I ask you something?*”-“*Sure. What is it?*”), c) grounder-continuer (“*I know you are busy with club activities, but I have many questions about math before the exam.*”-“*Okay.*”), d) request-acceptance (“*I was hoping you could give me an extra review session after school. Is that possible?*”-“*Absolutely.*”), and e) thanking-closing (“*Thank you very much.*”-“*My pleasure.*”).

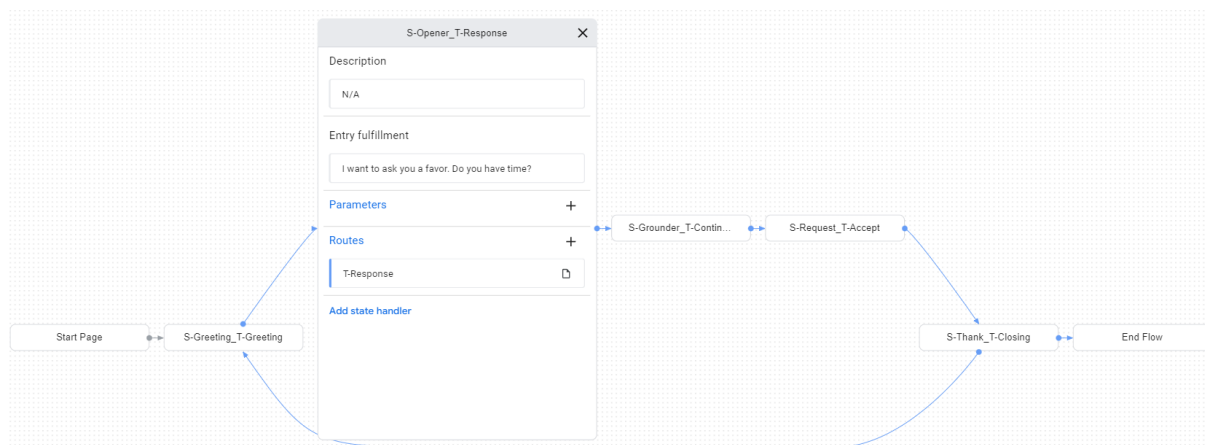


Figure 1. Flow Design of a Chatbot for Practicing the Teacher Role

Each page is primarily structured with *entry fulfillment* and *routes*. The entry fulfillment denotes tasks automatically executed by the chatbot when the page starts. In this study, each entry fulfillment is designed to prompt the chatbot to say one of the utterances for a speech act as a requesting student. For instance, as in Figure 1, when the page “S-Opener_T-Response” begins, the chatbot performs the speech act of *opener* by saying, “I want to ask you a favor. Do you have time?”

Routes, on the other hand, decide how the chatbot interprets the user’s utterances into specific intents and makes the conversation flow. For example, when the user responds to the chatbot’s question (i.e., I want to ask you a favor. Do you have time?) with an appropriate utterance such as “Sure. What is it?” or “Of course. What’s on your

mind?”, the chatbot interprets the user utterance as a relevant intent (i.e., T-response) and progresses to the next page. Each intent has been trained with various expressions that perform the target speech act.

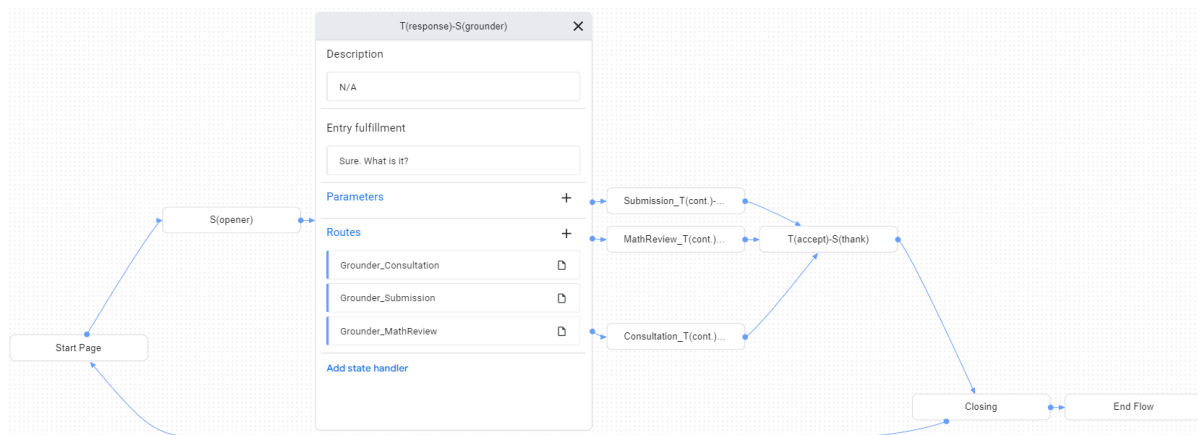


Figure 2. Flow Design of the Chatbot for Practicing the Student Role

On the other hand, we have designed only one chatbot for L2 learners to practice the student role in the three requesting situations. This chatbot is structured such that it can respond to a user’s different requests. For this design, a page named “T(response)-S(grounder)” contains three different routes (see Figure 2). This means that the user’s *grounder* speech is identified as an intent for one of the three requesting situations, guiding the conversation to one of the three divergent pages.

All four L2-PIBots are designed with a cyclical conversation structure to support users in repetitive practice. As illustrated in Figures 1 and 2, the final conversation page connects to two pages: one redirecting the user to the beginning of the conversation for further practice and the other concluding the chat (=End Flow). Therefore, L2 learners are expected to assess the degree of their practice and whether to repeat or terminate their practice. To highlight this decision-making process, at the end of the dialogue, the chatbots guide, “Say ‘AGAIN’ to practice once more. Say ‘END’ to finish the chat.”

4.2 Characteristics of Chatbot Integration

On the Google site, two webpages have been generated to host two types of chatbots: three chatbots for practicing the teacher role and one chatbot for practicing the student role. The former three chatbots are vertically presented on a single web page.

Both web pages present two pictures at the top to visualize the context of the conversations. Both pictures depict a student and a teacher earnestly engaging in a conversation. One picture features a male teacher and the other a female teacher because the chatbots use both “Mr.” and “Ms.” To ensure that users can distinctly comprehend their role vis-à-vis the chatbot, all the interlocutors in the pictures have been labelled with the roles of the chatbot and the user. For instance, on the page with the chatbots for practicing the teacher role, the labels of “Chatbot (student)” and “YOU (teacher)” are presented under the images of the students and teachers (cf. Figure 3).

Below the pictures, the page is divided into two columns. The left column provides a succinct description of the conversation scenario accompanied by a sample dialogue. Within this dialogue, the user’s lines are emboldened for clarity. For the chatbots with which a user practices the teacher role, full-sentence examples are provided.

Conversely, for the chatbots with which a user practices the student role, linguistic patterns are highlighted within incomplete sentences such as “Would it be possible if ...?” so that the user applies the linguistic patterns to the target context (see Figure 3).

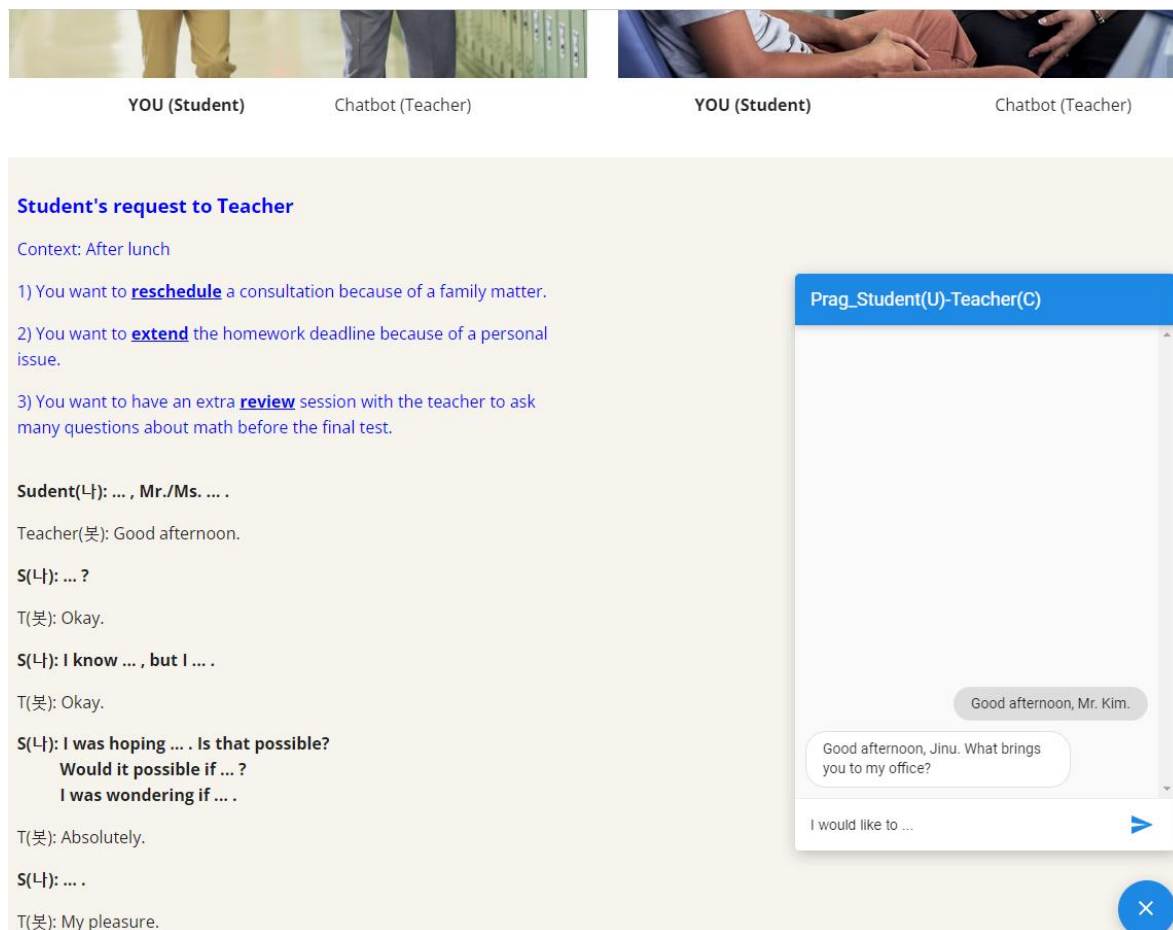


Figure 3. User Interface for Practicing the Student Role with a Chatbot

In the right column, the Dialogflow messenger is embedded using HTML, enabling the chatbot’s activation with a click. To create an environment where the chatbots playing the student role initiates the conversation with a greeting, the default HTML source code from the integration function of Dialogflow CX has been slightly modified. This modification enables a specific intent to be activated without any user input when a user visits the webpage. In Dialogflow messengers, user-chatbot interactions are usually done in a text-chatting format but oral interactions are also possible with the aid of dictating functions and TTS technology.

4.3 Use and Evaluation of Chatbots

The results of the post-chatbot user survey revealed that learners found the use of the chatbots to be entertaining (93%), convenient (90%), and authentic (87%). They perceived it as motivating (93%) and helpful (90%) for the

improvement of their English conversation skill. They were also willing to practice English conversation with chatbots in the future (90%) and recommend the practice to their friends (93%), which all showed their willingness to use chatbots for their English conversation skills. For example, Mina and Jina mentioned how the utilization of chatbots had engendered a heightened perception of achievement and confidence in English conversation:

Excerpt 1. Mina

I felt a **sense of accomplishment** when I could start and finish the conversation. I like the diverse responses of the chatbot. The conversations were perceived to be quite real.

Excerpt 2. Jina

By practicing virtually, I feel like I'll be **more confident** in real-life conversations. If I faced the situations that I practiced with the chatbots, I would definitely **be able to speak fluently without any hitches**. I also like the point that I could learn diverse expressions.

[all the survey excerpts translated by the researchers]

Furthermore, the use of the pragmatic chatbots appeared to help the learners increase their pragmatic awareness. First, all the learners showed increased awareness of the pragmalinguistic forms when performing a polite request. For example, as can be seen in excerpts 3 and 4, Hana and Jina were aware of the pragmalinguistic forms they had newly learned from the chatbot use. Interestingly, these forms not only included the request head acts (e.g., I was hoping...) but also the preparators which work as a projector for the upcoming request (e.g., Can I ask you a favor?). Second, the participants demonstrated enhanced sociopragmatic awareness (See excerpts 3 to 5). After interacting with the chatbots, their attention was naturally directed to the contextual factors (e.g., interlocutor) and politeness. That is, they learned how to map form, function, and context, a core of pragmatic competence. This result shows the potential role of chatbots in the development of pragmatic competence.

Excerpt 3. Hana

I could learn how to make a **polite request** in English. “**Can I have a favor?**”, “**I was hoping...**”, and “**Would I...**” are the expressions I can remember.

Excerpt 4. Jina

I could learn how to make requests in English. Here is what I thought: ‘I can navigate **this kind of request** more naturally and easily when **the requests are made in this way**’. “**Can I ask you a favor?**” is the expression I remember.

Excerpt 5. Minji

It was my first-time making requests in English, but it was doable than I thought. Here is what I thought: ‘I can make requests to **a teacher like this!**’

The participants’ enhanced pragmatic awareness may have resulted from their practice of two roles. While they practiced the role of a teacher, they likely noticed how a student (i.e., the chatbot) makes polite requests. While they practiced the role of a student, their effort to successfully manage and complete the conversation likely helped them learn how to make polite requests. As can be seen in excerpt 6, learners tried to make a polite request in a sequentially appropriate manner with proper pragmalinguistic forms for the contexts. When the chatbot did not

understand their previous turns, they tried to reformulate the turn in other ways. What proved intriguing was that as they practiced the polite requests, their accounts for the request became more and more specific, thereby enhancing the prospect of their requests being favorably received. For example, Heejin, in her first conversation, just insisted that she can't have a consultation (line 5), but in her second conversation, she provided a reason for her request (line 17)

Excerpt 6. Heejin's First and Second Dialogue (Heejin=Student [S]; Chatbot=Teacher [T])

[First Dialogue]

03 S: Do you have any time?

04 T: Yes. What is it?

05 S: **I know we've had this schedule for long time. but I can't do it.**

06 T: Um hmm.

07 S: **I was hoping a consultation reschedule. Is it possible?**

08 T: I think that's a fair request. Don't worry about it.

[Second Dialogue]

13 S: I want to talk with you

14 T: Sorry, what was that?

15 S: Do you have any time?

16 T: Of course.

17 S: **I know homework deadline is tomorrow, but I can't do it because of my personal issue.**

18 T: Um hmm.

19 S: **I was hoping the homework deadline extend. Is that possible?**

20 T: Absolutely. Don't worry.

Meanwhile, the dialogue records presented in excerpt 6 shed light on the necessary enhancements required for pragmatic chatbots. First, the current chatbots often accepted inappropriate utterances without any feedback, as shown in lines 7-8 and 19-20. Such generous acceptance may not help learners practice the target pragmatic forms. Second, the chatbots sometimes asked back (e.g., Sorry, what was that?) even when the learner produced a contextually appropriate sentence. This was because the sentence had not been included in the training data of the chatbots. These limitations of the current chatbots appeared to be noticed by the learners, as shown by Mina's evaluation in Excerpt 7:

Excerpt 7. Mina

I want to practice more diverse request situations such as between friends or family members. I wish I could get clear guidelines when I produce a wrong expression.

While most learners could clarify their expressions in response to chatbot cues, this procedure appeared to be burdensome or perplexing in some cases, which has led to the discussion of possible improvements of the chatbots.

5. Discussion

This study has investigated the design of AI chatbots for L2 pragmatic instruction (L2-PIBots) and L2 learners' experiences and evaluations of the chatbots. We have found several interesting findings regarding the three guiding research questions of the present study.

The first research question is related to the major characteristics of AI chatbots for L2 pragmatic instruction. It is found that the overall structure of AI chatbots for L2 (pragmatic) instruction should consist of two areas: one for chatbot operation (e.g., activation, termination) and the other for speech acts (e.g., opener, appreciation). This dual structure distinguishes between technological functionality and dialogic interaction, which may allow chatbot developers and language experts to collaborate in a complementary manner. For example, chatbot developers can focus on technological functionality while language experts focus on dialogic interaction.

Another finding is that a pair of speech acts in two turns can be designed into a single page or similar unit. For example, a student's opener and a teacher's response are paired into a single page of Dialogflow CX (i.e., S-Opener_T-Response). Consistently applying this pair-wise page design to chatbot development helps the dialogue sound cohesive and coherent, reducing the likelihood of unwanted communication breakdowns. In addition, such design requirements may give a clear direction for language experts who want to design dialog models for AI chatbots or other types of interactive technology.

We have also identified the potential of chatbot design in terms of self-regulated learning (cf. Pintrich and de Groot 1990). Every chatbot in the present study has been designed to ask a learner, at the completion of a dialog scenario, whether the learner wishes to practice again. Then, the learner needs to self-evaluate oneself and decide whether to restart or end the interaction with the chatbot. If the interaction restarts, the learner may be exposed to different utterances that were used for the chatbot's training and produce different expressions from the previous dialogs.

The second research question concerns with the characteristics of chatbots' user interfaces for L2 pragmatic instruction. We have found two major characteristics: contextualization and linguistic support. Contextualization of the target dialogue can be achieved by various aspects of the user interface. For example, we can post pictures or images to show not only the genders, ages, and roles of the interlocutors but also the time, the place, and the mood. It is also possible to provide a brief written description of the context. Then, learners may strategically combine information from different sources of the user interface and have a clear understanding of a target context.

On the other hand, the user interface of AI chatbots for L2 pragmatic instruction can provide linguistic support for L2 learners. We can show a sample dialogue script, then learners may imitate its utterances or modify some lines with synonymous expressions. We can also show an incomplete script that has key expressions and blanks (e.g., *Would it be possible if ...?*). Then, learners may use the key expressions as a frame and fill in the blanks to express their meanings.

The third research question delved into how learners use and evaluate chatbots for L2 pragmatic instruction. To begin, learners expressed a favorable perception of the chatbots, considering them to be authentic, engaging, convenient, and beneficial. Additionally, chatbots were proven to be valuable in enhancing learners' pragmatic awareness and knowledge in other areas such as vocabulary (Kim 2018, Jeon 2023) and grammar (Hsu et al. 2023, Sung 2021). Furthermore, similar to the other dialogue-based CALL systems (e.g., digital games), custom-designed chatbots appear to provide contextualized communicative practice for learning L2 pragmatics. This outcome holds particular significance as it underscores the constructive role of chatbots in advancing pragmatic awareness and knowledge among a previously underexplored population – secondary school EFL learners in the domain of second language pragmatic instruction.

Learners' use and evaluation of pragmatic chatbots also suggested what kind of improvement is necessary for the current chatbots. Even though the majority of learners were adept at effectively clarifying their expressions in response to cues from the chatbots, this procedure was regarded as burdensome or confusing, thereby necessitating more explicit directives or corrective feedback regarding their inappropriate utterances. In addition, the training data for chatbot development should be inclusive enough to process a variety of contextually appropriate responses.

6. Conclusion

In this study, we developed AI chatbots for pragmatic instruction, designed user interfaces where learners can interact with the chatbots, and examined how adolescent EFL learners use and evaluate the chatbots. We have found that chatbots for pragmatic instruction need to be designed based on sound dialog content from pragmatics literature and technological functionality. We have also noticed that providing context and linguistic support helps learners use the chatbots effectively. It was shown that carefully designed pragmatic chatbots are positively perceived by the learners, helping their development of pragmatic awareness and knowledge. Simultaneously, the research revealed certain constraints inherent to chatbots, offering opportunities for enhancement through more extensive development.

The use of AI chatbots for pragmatic instruction is still in its initial phase, so there should be more empirical evidence for the wider use of AI chatbots in learning pragmatics. For example, given the importance of non-verbal features such as facial expressions and tones in pragmatic competence, AI technology that can interpret one's social and emotional status from the person's face and tone will be a useful tool in L2 pragmatic instruction. Since this study is limited to a specific context of L2 learning and a handful of learners, we need to test the pedagogical effectiveness of chatbots in a variety of contexts with a larger population of learners.

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Examples in: English

Applicable Languages: English

Applicable Level: Secondary

Appendix 1. Presurvey for chatbot users (Originally written in Korean)

Likert-scale questions

N	Item	1	2	3	4	5
1	I know what a chatbot is.					
2	I know what a chatbot can do.					
3	I use chatbots in my daily life.					
4	I use chatbots to learn English.					
5	I think chatbots can help me in my daily life.					
6	I think chatbots can help me learn English.					

Note. 1=Strongly disagree; 2=disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Open questions

- 1) Write down everything you know about "making a request in English".

Appendix 2. Postsurvey for chatbot users (Originally written in Korean)

Likert-scale questions

N	Item	1	2	3	4	5
1	The conversation practice with the chatbots was fun.					
2	The conversation practice with the chatbots was easy and comfortable.					
3	The conversation practice with the chatbots was similar to real English conversations.					
4	The conversation practice with the chatbots helped me improve my English conversation skills.					
5	The conversation practice with the chatbots made me more interested in English conversations.					
6	I would like to practice conversation with chatbots in the future.					
7	I would recommend the conversation practice with the chatbots to my friends.					

Note. 1=Strongly disagree; 2=disagree; 3=Neutral; 4=Agree; 5=Strongly Agree

Open questions

- 1) Write down the advantages of "conversation practice with chatbots".
- 2) Write down what you learned about "making a request in English" through the conversation practice with the chatbots.
- 3) Write down any difficulties you had with the conversation practice with the chatbots.
- 4) Write down your suggestions for improving the conversation practice with the chatbots.