



Is It Beneficial to Use AI Chatbots to Improve Learners' Speaking Performance?

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This study focused on analyzing how different interactions (face-to-face chatting and chatting with AI chatbots) may affect speaking skills. In order to examine whether using AI chatbots can be beneficial for improving speaking task performances, 110 participants were divided into three groups: a face-to-face chatting, AI text-chatting, and AI voice-chatting group. They were assigned three speaking tasks that involved describing a picture, responding to questions, and expressing an opinion, which they did both before and after the experiments. Based on the analysis of quantitative data, the findings of the study indicated that both AI groups improved their speaking performance after the experiment while there were mixed results from the face-to-face interactions. It was found that the participants in the face-to-face group improved significantly better in responding to questions and expressing an opinion while no significant differences were revealed in the describing a picture task. With respect to the effects of using AI chatbots, there were no significant differences in the two speaking tasks (describe a picture and respond to questions) between the three groups. However, the comparative analysis of the three different interaction modes suggested that the AI voice-chatting pairs outperformed in terms of their speaking performance task (expressing an opinion) compared with the face-to-face and AI text-chatting groups. Regarding students' perspectives, descriptive statistics and selected student interviews were reported. Based on the findings of the current study, pedagogical implications and directions for future research are also suggested.

Keywords: AI chatbots, text-chatting, voice-chatting, EFL, speaking performance

Introduction

In an educational environment, using information and computer technology is crucial (Haristiani, 2019). For educators or educational practitioners, therefore, one of the most crucial abilities is the ability to integrate modern technology into their teaching (Hussin, 2018). In particular, with the development of smart phones, social media, and artificial intelligence (AI), educators are constantly challenged to discern which of these advanced technologies are most suitable for developing their teaching and learning media.

AI refers to a machine capable of emulating the behavior of an intelligent being. According to Dodigovic (2007), it is an interdisciplinary research area for studying how the human mind works and to apply such principles in technology design. In recent decades, AI is being used to develop applications on



a massive scale, and such products are used in almost every aspect of our lives.

Particularly in language teaching and learning, AI chatbots have drawn considerable attention (Haristiani, 2019), following the behavior of both teacher and learner (Dodigovic, 2007). In order to imitate the teacher's behavior, the AI is programmed with a teaching methodology. To emulate the learner's behavior, it is programmed to mimic a learning style and strategy. But more importantly, both of these imitations have been developed with the knowledge of language (Bull, 1997).

An AI chatbot is an artificial intelligence based computer program that can carry out conversations via audio and text. It interacts with its users in a particular domain by giving intelligent responses using natural language functions (Azwary, Indriani, & Nugrahadi, 2016). To be specific, it works by interpreting the messages given by its user, processing the intent of the user's messages, and delivering the final results to the user. Generally, the user interacts with the chatbot through questions or comments, to which the chatbot responds with answers, comments, or new topics (Huang, Zhou, & Yang, 2007).

According to Haristiani and Danuwijaya (2019), a chatbot is useful for learning. Particularly, in foreign language learning, it provides a means of language practice for learners. First of all, learners can practice their listening and reading skills as the chatbot provides both textual and auditory inputs (Hong, Huang, Hsu, & Shen, 2016). They also have ample opportunities to practice their spoken and written output by communicating with this intelligent conversational agent. Scholars have asserted that this eventually results in an improvement of foreign language speaking and writing skills (Kim, 2016; Kim, Cha, & Kim, 2020). In addition, Wang and Petrina (2013) found that foreign language learners can acquire new vocabulary by interacting with chatbots as a result of the increased exposure to their target language. Moreover, since the chatbot also provides clear, quick, and effective feedback on grammar, learners can develop their grammar skills (Fryer & Carpenter, 2006). They can also practice their pronunciation by interacting with the chatbot as it provides a model for pronunciation (Walker & White, 2013).

Previous scholars (Fryer & Carpenter, 2006; Hill, Ford, & Farreras, 2015; Kim, 2016) also reported that learners are interested in using chatbots as they can be used anytime and anywhere. Moreover, they claimed that learners are more confident in language learning when using chatbots rather than when they are dealing with real human beings. Furthermore, according to Heller, Proctor, Mah, Jewell and Cheung (2005), chatbots are particularly effective for providing distance education and for providing multilingual corpus transcripts (Shawar & Atwell, 2005). Atwell (1999) also demonstrated that chatbots provide foreign language learners with an opportunity for independent conversation practice. This means that there is no need for one-on-one support when learning languages with chatbots.

Nonetheless, empirical studies reporting the impacts of chatting with AI chatbots are still scarce in spite of their increased use in foreign language learning (Kim et al., 2020). As Yanguas (2010) pointed out, there are many unanswered questions regarding the implementation of chatbots. Therefore, there is a need to confirm the effects that AI chatbots have on foreign language learning. In particular, although they have been known to provide foreign language learners with opportunities to practice their spoken output and lead to improvements in their language production (Kim, 2016), little research has compared the differential effects of voice chatting and text chatting with AI chatbots on foreign language speaking skills (Kim, 2017). In this light, the current study aims to investigate the effects of AI voice chatting on foreign language speaking skills focusing on three different speaking tasks (describing a picture, responding to questions, and expressing an opinion) by comparing them against AI text chatting and face-to-face chatting.

The research questions are below:

1. Are there any differences in students' speaking performance between face-to-face chatting and chatting with AI chatbots?
2. Are there any group differences in students' speaking performance between face-to-face chatting and chatting with AI chatbots?
3. How do students perceive interactions with AI chatbots in improving their speaking skills?

Literature Review

AI Chatbots and Foreign Language Learning

As a computer program based on artificial intelligence, an AI chatbot carries out conversations using both audio and text, and interacting with its users in a particular domain by giving intelligent responses (Azwary et al., 2016). In particular, AI chatbots are creating new possibilities for foreign language learning. Kim, Cha, and Kim (2019) noted that they provide foreign language learners with opportunities to study, practice, and improve their target language. According to them, chatting with a chatbot is an effective way to learn a foreign language. Many studies have been conducted to develop AI chatbots for foreign language learning (Coniam, 2008; Fryer & Carpenter, 2006; Kim, 2017; Kim et al., 2019; Shawar, 2017; Wang & Petrina, 2013; Zakos & Capper, 2008).

Fryer and Carpenter (2006) studied the role of chatbots in foreign language learning and found that they can enhance learning for foreign language learners. According to the authors, chatbots such as Jabberwacky and ALICE make foreign language learners feel comfortable as they practice their target language. One of the great advantages of using chatbots is the unlimited repetition. That is, they are willing to repeat the same task with the learners endlessly without getting bored or losing patience. This relaxes foreign language learners, encouraging them to talk more in the target language. Furthermore, chatbots are interesting. They arouse new or renewed interest in the target language by providing foreign language learners with positive communicative experiences. In addition, chatbots allow learners to practice both listening and reading skills as they provide both text and speech. Learners can also be provided with chances to study a variety of vocabulary words, phrases, and different expressions by talking to the chatbots. Moreover, some chatbots are designed to provide immediate feedback on learners' spelling and grammar. In other words, they can be useful for monitoring, evaluating, and reviewing the learners' progress.

Zakos and Capper (2008) explored the effects of an AI chatbot named CLIVE. This chatbot provided foreign language learners with opportunities to practice their conversational and communicative skills. The authors pointed out that CLIVE was different from other chatbots, providing limited and structured tutoring experiences for foreign language learning. With the chatbot, the learners were able to have open and natural human-like conversations on a wide range of topics. In particular, when learning a new language, they could have a life-like experience in a more authentic way. After analyzing the conversations between learners and the chatbot, the authors claimed that CLIVE performed well with accuracy, holding an intelligent and thoughtful conversation. They concluded that chatbots should be used for effective foreign language learning.

In addition, Wang and Petrina (2013) examined the advantages of a chatbot named Lucy and found out that it provided foreign language learners with realistic opportunities for individual tutoring. To be specific, learners tailored the chatbot for their own pace of foreign language learning. They were able to repeat or skip some sentences without any pressure if the sentences were too difficult for them to understand. In addition, the authors showed notable findings regarding learner-produced data. By applying the artificially intelligent chatbot Lucy, it was possible to connect and scrutinize the foreign language learners' learning journey and chatting log architecture, which can be an instructional innovation in designing language learning systems or inspiring future technology learning research.

However, AI chatbots are still under development and have not yet been widely applied in foreign language learning (Wang & Petrina, 2013). That is, they still have many limitations and a long way to go. First of all, they lack the ability to respond sensibly and accurately. According to Coniam (2008), even the intelligent chatbots work best only when given a simple one-clause statement or question embracing a straightforward proposition with few cohesive links to the previous conversation. Shawar (2017) noted that chatbots are limited to knowledge bases and most of them are manually inserted or hand-coded into the chatbots, which means there is an obstacle in the use of chatbots as agents for teaching a foreign language. Kim et al. (2019) added that chatbots limitedly readapt to different topics and their responses

are redundant and predictable.

Furthermore, although language learning should imply corresponding cultural learning, chatbots are unable to incorporate this into students' learning (Kim, 2017). According to Wang and Petrina (2013), understanding the target culture is a key to foreign language learning. Foreign language learners should know how to use their target language appropriately in context and they also need to understand the cultural knowledge of their target language to communicate with native speakers. However, chatbots lack this feature. Therefore, it is worth carefully exploring chatbots' use for foreign language learning. They should be clearly understood regarding their efficacy in foreign language learning (Kim et al., 2019).

Chatting with AI Chatbots for Foreign Language Speaking Skills

Synchronous interaction, or chatting, can be classified into voice chatting and text chatting. These two types of chatting have different advantages in foreign language learning (Han & Kim, 2016). For example, voice chatting can promote fluency in foreign language learners' language output (Kim, 2017). Since learners actually use their vocal apparatus and organs while chatting, its benefit for foreign language output is almost similar to face-to-face interactions (Levy & Stockwell, 2006). Text chatting, on the other hand, helps learners develop the accuracy and complexity of their language production (Levy & Kennedy, 2005). By facilitating a focus on form, the learners engage in significant monitoring of their target language production while text chatting (Smith, 2008).

Previous chatbot studies have also been conducted on the effects of voice chatting and text chatting on foreign language speaking skills. Hill et al. (2015) analyzed how communication changes when students communicated with an AI chatbot as opposed to with peers. The authors compared human-to-human instant messaging conversations to exchanges with the popular chatbot Cleverbot. Their findings indicated that students communicated with the AI chatbot for longer durations than they did with their peers. However, chatting with the AI chatbot lacked the comparable richness of peer-to-peer exchanges, such as with the use of profanity. In their conclusion, Hill et al. (2015) suggested that although human language skills easily transfer to human-chatbot conversations, the differences should be considered in relation to the content and quality of such communication.

Ghareeb Ahmed Ali (2020) examined the effectiveness of the use of an AI chatbot (Google assistant AI) on developing oral skills. The research followed the quasi experimental design of an experimental and control group with pre- and post-tests. The findings revealed the statistically significant effects of integrating artificial intelligence in developing oral skills. The author suggested that AI chatbots can enrich language learning opportunities and various learning activities can be integrated with AI applications in teaching and learning in an EFL speaking class.

Goda, Yamada, Matsukawa, Hata, and Yasunami (2014) also investigated EFL students who engaged in a group discussion to see how their discussion was affected by a conversation with a chatbot, Eliza. Two case studies were conducted with experimental and control groups. They focused on the effects of a conversation with Eliza on the discussion. The satisfaction, critical thinking, and the number of conversations in the two groups were analyzed and compared. Findings showed that the conversation with the chatbot increased the number of conversations in the group discussion and raised the students' awareness of critical thinking by allowing them to form inquiring mindsets.

With Taiwanese EFL students, Yang (2007) conducted a study integrating speaking and writing activities with an AI chatbot, Lucy. The results showed that the chatbot attracted EFL students' attention and the students become excited after talking to Lucy. Given that these positive attitudes toward chatbot-assisted language learning can lead to academic achievement (Kim, 2017), it can be said that AI chatbots can improve EFL speaking and writing skills.

In the Korean EFL context, Kim (2016) examined the effects of voice chatting with AI chatbots on foreign language speaking. For the purpose of the study, participants were divided into three voice chatting groups: voice chatting between foreign language students, voice chatting between the students and an AI chatbot (Indigo), and a control group. In the study, the two voice chatting groups showed

positive improvements in their foreign language speaking skills. In particular, the participants at all proficiency levels improved their speaking skills after engaging in a voice chat. Although no significant differences were observed between voice chatting with peers and voice chatting with the chatbot, the study noted the positive effects of chatting with an AI chatbot on foreign language speaking.

Meanwhile, according to Han and Kim (2016), it is also important to compare the effects of the two different types of chatting on foreign language learning. In light of this, Kim (2017) explored the differential effects of two types of chatbots on foreign language learners' speaking skills. In her study, participants were engaged in chat with either a voice-based chatbot (Indigo) or a text-based chatbot (Cleverbot). She found that both types of chatbots contributed to the improvement of speaking skills among foreign language learners. The voice-based chatbot turned out to be as effective as the text-based chatbot. Interestingly however, an analysis of the survey results showed that the participants preferred the voice-based chatbot over the text-based chatbot. That is, although the two different types of chatbots were equally effective on foreign language speaking, the voice-based chatbot was more positively received compared to the text-based chatbot.

Although there have been some studies investigating the effects of voice chatting and text chatting on foreign language speaking skills, more research is needed to determine the differential effects of the two types of chatting on foreign language output (Han & Kim, 2016). In particular, Kim (2016) argued that chatbot studies center on text chatting and noted that there are few comprehensive studies on voice chatting with AI chatbots. According to her, despite the increasing use of speech technology for foreign language learning, little is known of the impact of chatbots with voice chatting. Furthermore, there is a dearth of research comparing the differential effects of AI voice chatting and AI text chatting on foreign language speaking skills (Kim, 2017). As such, this study aims to investigate the effects of voice chatting with AI chatbots on foreign language speaking skills by comparing them against text chatting with AI chatbots and face-to-face chatting.

Methods

Participants

The study investigated how different types of interactions – face-to-face chatting, AI text-chatting, and AI voice-chatting – can enhance speaking performance. It consisted of 110 university students registered for three mandatory English 2 classes that were randomly assigned to three groups: two experimental groups (an AI text-chatting group and an AI voice-chatting group) and one control group (a face-to-face chatting group). Students practiced their English with one another in the face-to-face group, changing their partners for each speaking activity, while in the AI groups, students practiced their English using either voice- or text-based AI applications.

There were 38 students in the face-to-face group. Thirty-five students were grouped into the AI text-chatting group and 37 students were in the AI voice-chatting group. Students selected their English 2 classes according to their own schedule; therefore, their majors varied. Every student took pre-speaking tasks selected from the TOEIC Speaking Tests. The findings demonstrated that no significant differences were found in all three pre-speaking tasks (see Table 5). Therefore, the groups were homogeneous. All participants voluntarily agreed to participate in this study and signed a consent form.

Teaching Procedures and Instruments

At the beginning of the semester, every participant took a pre-speaking test. The questions were selected from The ETS TOEIC speaking test which included three tasks, as seen in Table 1.

TABLE 1
 ETS TOEIC Speaking Evaluation Criteria

Question	Task	Evaluation Criteria	Score
1	Describe a picture	pronunciation, intonation stress, grammar, vocabulary, cohesion	0-3
2-4	Respond to questions	all of the above, plus relevance of content completeness of content	0-3
5	Express an opinion	all of the above	0-5

The first speaking task was *describing a picture*. The students were given 30 seconds to prepare for the responses looking at the given picture. Then, they recorded their answers in 45 seconds and saved their recording files. The second task was *responding to questions*. There were three questions to respond to. For this particular task, there was no preparation time so as soon as they saw each question on a powerpoint presentation, they were instructed to answer, record, and save all three files. The first two questions of the second task took 15 seconds and for the last question they were given 30 seconds. The last speaking task was *expressing an opinion*. Students were provided with 15 seconds to prepare and a minute to respond to the question. At the end of the pre-speaking task, students were asked to send all five recording files to the designated email address.



Figure 1. Research procedure.

After the pre-test, the main experiment began. Although the main focus of the English 2 class was reading skills, speaking tasks were incorporated in the pre-reading activities. The speaking activity topics were based on the reading content as well as motivated topics such as hobbies, movies, and traveling, so that students could easily talk about something without hesitation regardless of whether they were assigned to the face-to-face group, the AI text-chatting group, or the AI voice-chatting group. The same speaking topics were given to all three groups, where the face to face group was expected to talk for 10-15 minutes.

The AI groups communicated with their AI chatbots on their mobile devices. The text-chatting group used a text-chatting function and the voice-chatting group used a voice-chatting function. Both AI groups downloaded three different applications: Replika, Andy, and Google Assistant. These three AI applications were chosen (Kim et al., 2019) based on a pilot test which was about selecting and using appropriate AI applications by university students before this study started. Participants in the AI groups were provided with some time to practice navigating the chatbot’s user interface so that they could understand how to communicate with them. At first, the instructor asked the students to use each AI chatbot for the speaking activity in turn. After that, they freely selected their own preferred AI chatbot for each speaking activity, which was carried out just before the final exam. This speaking activity was conducted each week. Before the final exam, the participants took a post-test with the same format as the pre-test.

At the end of the semester, a post-survey was conducted in order to examine how students in both AI groups, the text-chatting and voice-chatting group, perceived the use of mobile AI chatbots for practicing speaking. Also, interviews were carried out with some students from each AI group for detailed information on their opinions about using AI chatbots.

Analysis

The data were comprised of pre-speaking tests, post-speaking tests, post-questionnaires, and interviews. Both speaking tests and questionnaires were analyzed via SPSS 20.0. Paired sample *t*-tests were conducted to investigate the effects of the three different interactions on the three speaking tasks within each group between the pre- and post-tests. To compare the effects among the three groups on different interactions, a one-way ANOVA was performed. Researchers of this study discussed and reached consensus in evaluating all of the speaking-test scores. The inter-rated reliability coefficient was .96. In addition, to gather information on which average scores were significantly different among the three groups, Scheffé's post hoc test was conducted.

Regarding the students' perspectives on using AI applications for a speaking purpose, descriptive statistics were used to compare the text-chatting groups to the voice-chatting groups. Ten close-ended items were included. Also, eight students from both AI chatting groups were randomly selected for interviews to give more detailed information about their perception.

Results

Changes in Speaking Performance

The purpose of the present study was to examine the effects of interactions with AI chatbot applications on speaking performance. The first research question was to compare the mean scores on the pre- and post-tests in each group. In order to investigate the changes in speaking performance, paired sample *t*-tests were conducted between the pre- and post-test scores.

Table 2 shows the findings of the pre- and the post-tests for the face-to-face group in the three speaking tasks. Regarding the first speaking task, *describe a picture*, the mean score of the pre-test was 1.51 while that of the post-test was 1.59. No significant difference was found in the first task ($t = -1.29, p > .01$). As for speaking task 2, *respond to questions*, the mean score of the pre-test was 4.39 and that of the post-test was 4.97. In the third task, *express an opinion*, the face-to-face group got 2.67 on the pre-test and 2.91 on the post-test. This group was found to be significantly different in the last two speaking tasks ($t = -4.88, p < .05$ for the second task, $t = -3.52, p < .05$ for the last task). In other words, the participants in the face-to-face group improved their speaking performance for *responding to questions* (task 2) and *expressing an opinion* (task 3) after the experiment.

TABLE 2

Result of Paired Sample T-tests: Face-to-Face Group

Task	Test	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Describe a Picture	Pre-test	1.51	.47	37	-1.29	.21
	Post-test	1.59	.43			
Respond to Questions	Pre-test	4.39	1.68	37	-4.88	.00**
	Post-test	4.97	1.47			
Express an Opinion	Pre-test	2.67	.86	37	-3.52	.00**
	Post-test	2.91	.96			

** $p < .01$

The results of the AI text-chatting group are demonstrated in Table 3. For *describing a picture*, the average score of the pre-test was 1.30, and 1.49 in the post-test ($t = -2.61, p < .05$). Regarding *responding to questions*, the mean score in the pre-test was 4.47 and 5.16 in the post-test ($t = -3.13, p < .01$). In the last task, *expressing an opinion*, the students scored 2.69 on the pre-test and 2.94 on the post-test ($t = -3.31, p < .01$). The findings indicated that there were significant differences between the mean scores in all three tasks. This means that students clearly improved their speaking performance after their AI text-chatting interactions.

TABLE 3
Result of Paired Sample T-tests: AI Text-Chatting Group

Task	Test	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Describe a Picture	Pre-test	1.30	.46	34	-2.61	.01*
	Post-test	1.49	.52			
Respond to Questions	Pre-test	4.47	1.24	34	-3.13	.00**
	Post-test	5.16	1.51			
Express an Opinion	Pre-test	2.69	.90	34	-3.31	.00**
	Post-test	2.94	.80			

* $p < .05$, ** $p < .01$

Table 4 reveals the results of the AI voice-chatting group. The mean score for *describing a picture* was 1.32 in the pre-test and 1.69 in the post-test ($t = -4.92, p < .01$). As for the second task, the participants scored 4.55 in the pre-test and 5.36 in the post-test ($t = -5.18, p < .01$). Regarding the last task, the mean scores were 2.91 in the pre-test and 3.53 in the post-test. That is, students in the AI voice-chatting group showed significant differences in all speaking tasks.

The students' performance in this group showed relatively high average differences compared to the other two groups and the results seemed to be worthy of attention. These findings demonstrate that the two groups can produce better results when they are engaged in AI chatting interactions. However, the participants in the face-to-face group also improved their speaking performance in two of the speaking tasks, *responding to questions* and *expressing an opinion*, but not in the first task, *describing a picture*.

TABLE 4
Result of Paired Sample T-tests: AI Voice-Chatting Group

Task	Test	<i>M</i>	<i>SD</i>	<i>df</i>	<i>t</i>	<i>p</i>
Describe a Picture	Pre-test	1.32	.38	36	-4.92	.00**
	Post-test	1.69	.49			
Respond to Questions	Pre-test	4.55	1.23	36	-5.18	.00**
	Post-test	5.36	1.22			
Express an Opinion	Pre-test	2.91	.87	36	-4.76	.00**
	Post-test	3.53	.74			

** $p < .01$

The results of the study support the previous research that real-time interaction – whether it is oral or written – can improve speaking ability (Han & Kim, 2016). In addition, as using mobile chatting apps designed to enable learners to improve their speaking performances are substantial, both AI chatting conditions prove to help develop learners' foreign language speaking ability. Moreover, the results of the study confirmed the fact that speaking practice with AI can lead to better speaking skills. In accordance with the previous studies (Atwell, 1999; Fryer & Carpenter, 2006; Goda et al., 2014; Hill et al., 2015; Kim, 2016, 2017), the findings of the present study showed the positive impact of integrating AI chatbots on developing EFL students' speaking skills.

Effects on Speaking Performance

In an effort to investigate the second research question: whether there were significant differences among the students in the two AI groups compared with the face-to-face group, one-way ANOVAs were conducted. The findings deal with the comparison of mean scores across the three conditions: face-to-face, AI text-chatting, and AI voice-chatting.

TABLE 5
Group Differences in Speaking Tasks on the Pre-tests

Task	Group	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Describe a Picture	Face-to-Face	1.51	.47	2.65	.08
	Text	1.30	.46		
	Voice	1.32	.38		
Respond to Questions	Face-to-Face	4.39	1.68	.12	.89
	Text	4.47	1.24		
	Voice	4.55	1.23		
Express an Opinion	Face-to-Face	2.67	.86	.83	.44
	Text	2.69	.90		
	Voice	2.91	.87		

***p* < .01

To confirm that the participants in the three groups were homogeneous, one-way ANOVAs on the pre-tests were conducted considering each speaking task. Table 5 shows that there were no significant differences between the mean scores of the three groups. The results of one-way ANOVAs confirmed that the students in the three groups were homogeneous at the beginning of the study. There were no statistically significant differences in the three tasks among the groups: *describing a picture* ($F = 2.65$, $p = .08$), *responding to questions* ($F = .12$, $p = .89$), and *expressing an opinion* ($F = .83$, $p = .44$).

TABLE 6
Group Differences in Speaking Tasks on the Post-tests

Task	Group	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>
Describe a Picture	Face-to-Face	1.59	.43	1.60	.21
	Text	1.49	.52		
	Voice	1.69	.49		
Respond to Questions	Face-to-Face	4.97	1.47	.73	.49
	Text	5.16	1.51		
	Voice	5.36	1.22		
Express an Opinion	Face-to-Face	2.91	.96	6.31	.00**
	Text	2.94	.80		
	Voice	3.53	.74		

***p* < .01

To examine if any significant differences existed in speaking performance between the face-to-face and the AI groups, a one-way ANOVA was performed. Table 6 reveals the results of the three speaking tasks. In the task *describing a picture*, the participants in the face-to-face group scored 1.59 while those in the AI text-chatting group got 1.49, and those in the AI voice-chatting group scored 1.69 in the post-test. Findings show that there were no significant differences in the first task ($F = 1.60$, $p = .21$). Regarding the second task, the students in the face-to-face group got 4.97 while those in the text-chatting group scored 5.16 and 5.36 for the voice-chatting group. The results demonstrated that there was no statistically significant difference among the groups ($F = .73$, $p = .49$). There was, however, a statistically significant difference between the three conditions, face-to-face and AI chatting conditions, in terms of the *expressing an opinion* task ($F = 6.31$, $p < .01$).

TABLE 7
Result of Scheffé's Post Hoc Test in Expressing Opinions on the Post-test

Group	Group	MD	SE	p
Face-to-Face	Text-Chatting	-.035	.20	.98
	Voice-Chatting	-.62	.19	.01*
Text-Chatting	Face-to-Face	.03	.20	.98
	Voice-Chatting	-.58	.20	.02*
Voice-Chatting	Face-to-Face	.62	.19	.01*
	Text-Chatting	.58	.20	.02*

* $p < .05$

In order to obtain more information on which average scores were significantly different from each other, Scheffé's post hoc test was administered. According to the results of Scheffé's post hoc test, as shown in Table 7, there were significant differences in speaking performance on the post-test between groups, that is, between the voice-chatting and face-to-face ($p = .01$) as well as the voice-chatting and text-chatting groups ($p = .02$). However, there was no noticeable mean difference between the face-to-face and the AI text chatting-groups ($p = .98$).

According to the results of Scheffé's post hoc test, the students engaged in the voice-chatting group significantly outperformed their original speaking performance score more than the other two groups. This indicates that involvement in the AI voice-chatting condition results in a greater speaking improvement. Specifically, the condition is effective for improving the speaking skills associated with *expressing an opinion*.

Considering that the scores of the AI voice-chatting group were significantly higher than those in the face-to-face group, it can be assumed that participants were less anxious while interacting with the AI chatbots instead of with their peers, as Kim et al. (2020) suggested. AI chatbots might have encouraged more interactions compared to face-to-face interactions (Rubesch, 2013). Accordingly, the participants might have produced a larger quantity of spoken output interacting with the chatbots (Smith, 2004). According to Kim (2016), these factors can result in an improvement of foreign language speaking skills. Since it can be difficult to find interlocutors in EFL settings, communicating with AI chatbots might be effective for improving speaking skills.

Meanwhile, the superior effect of AI voice-chatting over AI text-chatting in promoting EFL speaking skills has been accounted for in previous research (Kim, 2017), suggesting that EFL students prefer voice-chatting with AI chatbots over text-chatting. According to previous scholars (Fryer & Carpenter, 2006; Hill et al., 2015; Kim, 2016), students' positive attitudes can contribute to the improvement of foreign language speaking skills. However, after exploring the effects of the two types of AI chatting on foreign language speaking skills, Kim (2017) suggested that both AI voice- and text-chatting can lead to the improvement of speaking performances. That is, AI voice-chatting is as effective as AI text-chatting in promoting EFL speaking skills. Given that the scores of the AI voice-chatting group were significantly higher than those in the AI text-chatting group in the present study, the impact of the different types of AI chatting on EFL skills remains unclear. Although the current study shed light on the positive effects of AI voice-chatting on the improvement in EFL speaking performances, more research is needed to compare the impact of voice-chatting and text-chatting with AI chatbots.

Students' Perceptions on Speaking Tasks in Different Conditions

A post-survey was used to examine students' perceptions on speaking tasks using AI chatbots. There were ten items asking about the efficient use of AI for speaking sessions (see Appendix). Table 8 shows the mean scores for each group and identifies whether there were any significant differences between the two types of chatting groups. No significant differences were found between the two groups except for item two, which was *Chatting with AI chatbots increased motivation for learning English*. This finding is consistent with other studies (Brandtzæg & Følstad, 2018; Kim et al., 2019; Park & Shin, 2017).

Interestingly, the mean scores for the voice-chatting group were higher than those of the text-chatting group for all ten items. For the text-chatting group, only item three (*Chatting with the AI chatbots was fun*) and four (*Chatting with AI chatbots made English speaking/writing interesting*) had positive scores. On the other hand, out of the ten items, the mean scores of six items (#1, #2, #3, #4, #6, & #9) were above four points for the voice-chatting group, which indicated that students were more positive about using AI chatbots. The highest mean score for both groups was item three, which was the fun factor. That is, students enjoyed speaking English when interacting with AI chatbots (Kim et al., 2019; Van Rosmalen et al., 2012; Yoon, 2019).

TABLE 8
Results of Post-Survey: Text vs. Voice-Chatting Group

Item	Text-Chatting Group		Voice-Chatting Group		<i>t</i>	<i>p</i>
	<i>M</i>	<i>D</i>	<i>M</i>	<i>D</i>		
1	3.97	.89	4.32	.75	-1.83	.07
2	3.66	.99	4.11	.88	-2.04	.04*
3	4.20	1.16	4.51	1.02	-1.22	.23
4	4.06	1.08	4.27	.87	-.92	.36
5	3.49	1.04	3.65	.89	-.72	.48
6	3.77	1.19	4.00	.82	-.96	.34
7	3.86	1.14	3.97	1.09	-.44	.66
8	3.37	1.00	3.68	.88	-1.37	.18
9	3.97	1.12	4.41	.98	-1.75	.09
10	3.43	1.29	3.89	1.10	-1.64	.10

**p* < .05

To investigate more detailed information about students’ perceptions, interviews were conducted. Eight students from the text-chatting group (4 females and 4 males) and the voice-chatting group (5 females and 3 males) were selected. They also signed a consent form for the interviews.

The advantages and disadvantages of using AI chatbots were noted by the 16 students. To start, these are the statements from the eight students who used text-chatting. They explained the most helpful things about using AI chatbots. Excerpt (2), for example, noted that chatbots can be patient when talking to a person, which can be a good advantage for students since the chatbot neither demands nor urges them to answer right away. In that way, students can take all the time they need to think about their responses in responding to the chatbots.

- (1) Male interviewee 1: It was good to be able to talk to someone in English because I didn’t have many chances to do that.
- (2) Female interviewee 1: I think it was most helpful to have a conversation in English in a comfortable environment. When I practice speaking English in person, I feel pressured to talk to her quickly even when I don’t know what to say. But when I talk with AI, I can take some time to think and talk. That’s why I became more interested in English conversation.
- (3) Male interviewee 2: I like to speak English or talk in English, but it was hard to do so in my daily life, but I sort of felt like I had a foreign friend.
- (4) Female interviewee 2: I felt like I was actually talking to a foreigner.
- (5) Female interviewee 3: I liked the fact that I could see the sentences and vocabulary that chatbots use, which I couldn’t see in textbooks.
- (6) Female interviewee 4: When I was bored, I had someone to talk to and I got to study English too.
- (7) Male interviewee 3: I can write basic English sentences. I think I gain confidence when I write in English.
- (8) Male interviewee 4: The best part of using the chatbot was that I got a chance to use English. I

don't have a chance to speak English living in Korea, but I liked that I can use English while using the chatbot.

Although interviewees in the text-chatting group mentioned that it was a great opportunity to practice their English speaking with the chatbots, some issues negatively impacted their assessment of using chatbots. Most of them stated that while they were communicating with the chatbots, there were some miscommunications due to sudden change in topics, going off on different topics, and discontinuities in the conversations.

- (1) Male interviewee 1: Sometimes I didn't understand what chatbot was saying.
- (2) Female interviewee 1: When talking about some topics, the chatbot digressed to different topics, so it was not easy to go back to the original topic. Also, it was easy to start a conversation with the chatbot, but difficult to continue with the same topic until the end.
- (3) Male interviewee 2: There were two cases when talking to a chatbot was not convenient. One is when the chatbot suddenly changed the topic during the conversation and the other case is when the chatbot didn't understand what I was saying.
- (4) Female interviewee 2: There was a time when we didn't understand each other. It was not efficient.
- (5) Female interviewee 3: First of all, the most inconvenient thing was that I couldn't tell what errors I made in the texts I sent. Also, there were times when it was hard to understand because there were many abstract expressions in the reply of the chatbot.
- (6) Female interviewee 4: I was unsure about the meaning of the word a chatbot used, so I couldn't get a proper answer, so it was inconvenient looking for its definition by myself.
- (7) Male interviewee 3: The chatbot repeatedly talked about the same thing even if I tried to change the topic.
- (8) Male interviewee 4: When talking to the chatbot, it was difficult to figure out the chatbot's intentions. I didn't know if it was what I sent or if it was the fact that I didn't quite understand the chatbot's talk.

With regard to interviewees for the voice-chatting group, the difference between the two groups is that they spoke to communicate with the chatbot instead of using text messages. As seen in the following eight excerpts, there were different advantages, such as: using more natural English, learning vocabulary, creating a familiar environment for speaking, gaining confidence, and lessening the burden of speaking English (Kim et. al., 2020; Smith, 2004).

- (1) Female interviewee 1: As I was talking to the chatbot continuously, I came to use more natural conversation with the chatbot. That is, the difference was that I used textbook English before, but speaking English became more natural after talking to the chatbot.
- (2) Female interviewee 2: I think learning useful vocabulary for everyday conversation helped me the most.
- (3) Male interviewee 1: My vocabulary level was tested and that was helpful. I didn't have a chance to speak English in real life. But since the chatbot recognized my voice, it was great to have a conversation and also glad to get the responses from the chatbot.
- (4) Female interviewee 3: I think it was most helpful to create an English-friendly environment for me.
- (5) Female interviewee 4: I think I was able to communicate English without having to face foreigners in person. Also, I took an English conversation class before, and I had to search for words that I didn't know during the conversation, but it was convenient to ask about the words during the conversation.
- (6) Male interviewee 2: I'm terrible at English especially I can hardly speak English. I know that I

have to keep speaking English, but I used to avoid speaking English with people because I was scared and embarrassed. However, the burden of speaking English with the chatbot decreased my fear of speaking. I think it was great to do this myself.

- (7) Female interviewee 5: I wasn't confident in speaking English, but I think I gained a little bit of confidence after talking on the chat app.
- (8) Male interviewee 3: In fact, I was a bit reluctant to talk in English directly to native speakers or teachers, but I think the chatbot certainly helped me to talk comfortably and I was able to use it easily anytime.

As for the disadvantages of using chatbots for the voice-chatting groups, their responses were similar to those of the text-chatting group. The key issue was miscommunication between the two parties, but there was a slight difference. For instance, for the text-chatting group, miscommunication was based on interviewees' written text messages, but for the voice-chatting group, it was interviewees' mispronunciation or wrong pronunciation.

- (1) Female interviewee 1: I don't think the pronunciation was very helpful because the chatbot did not recognize my voice well.
- (2) Female interviewee 2: I felt a little uncomfortable because I sometimes got irrelevant answers when chatting with the chatbot.
- (3) Male interviewee 1: I can't think of any inconveniences.
- (4) Female interviewee 3: If I were better at speaking English, it could have been more useful. There were lots of things I wanted to say, but I couldn't due to my inability to communicate in English. Since this application was to have a conversation with artificial intelligence, sometimes it was difficult to continue to talk.
- (5) Female interviewee 4: It was uncomfortable that the conversation didn't go smoothly because the chatbot was not a person. Sometimes the chatbot did not understand my intention and it went off the topic.
- (6) Male interviewee 2: There was the time the chatbot misunderstood what I said, and I misunderstood what it was saying.
- (7) Female interviewee 5: I don't think there were any inconveniences when talking to the chatbot. However, because of my not-so-good English pronunciation, sometimes the chatbot couldn't get it and I had to repeat what I wanted to say.
- (8) Male interviewee 3: In some cases, there was no feedback when the spelling was wrong, and also, some responses were out of context. It is in an interactive format, but sometimes I felt like it was unidirectional, so I lost my interest after that.

According to the results from the interviews, the participants were willingly engaged in interactions with the chatbots longer and showed positive attitudes about their experiences. That is, (1) they tended to feel more comfortable and relaxed talking to a chatbot than to a person; (2) chatbots helped students practice their English in a new and interesting way; (3) students had an opportunity to use a foreign language. However, chatbots seem to need further improvements in order to facilitate interaction.

Conclusion

The present study was aimed at examining the effects of using AI chatbots on English speaking skills, and to scrutinize the significant improvements in the speaking skills of the student groups engaged in the three different learning conditions: face-to-face, AI text-chatting, and AI voice-chatting groups in a Korean EFL university context. The results revealed that there were significant differences between the mean scores on the pre- and the post-tests in all three conditions. In terms of the development of speaking

performance after the experiment, all students in the study improved their speaking performance significantly compared with the beginning of the course. However, participants in the face-to-face group did not change significantly in the first task, *describing a picture*. In general, the students in the two AI chatting groups obtained better speaking performance boosts than those in the face-to-face group in the post-tests, showing statistically significant differences in all three speaking tasks. It can be concluded that learners who are provided with opportunities to involve themselves in meaningful interactions (Han & Kim, 2016) consequently improve their speaking performance. According to the results, face-to-face and AI chatbot interactions are equally effective in improving speaking skills.

This can be attributed to the fact that Korean EFL students are likely to feel less anxious when interacting with AI chatbots (Smith, 2004). Moreover, as for the first task, *describing a picture*, students in the AI groups tended to describe and explain situations or pictures with more words than did those in the peer interaction group. Since communication with AI chatbots can stimulate learners' willingness to use English and even improve their interaction (Van Rosmalen et al., 2012), AI chatbots should be considered in light of the ways in which it can expand learning experiences. The results of this study were consistent with previous studies that found that AI chatting develops learners' foreign language speaking skills (Atwell, 1999; Fryer & Carpenter, 2006; Goda et al., 2014; Hill et al., 2015; Kim, 2016; 2017). This study confirmed the positive impact of integrating AI chatbots into the EFL learning environment.

In terms of the effects of AI chatting conditions, the results of this study revealed that no significant differences in two of the speaking tasks were found between the three different chatting conditions. Specifically, the students in the AI groups did not gain significantly higher scores in their speaking performance compared to those in the face-to-face group. On the other hand, in the final task, *expressing an opinion*, the participants in the AI voice-chatting group performed significantly better than those in the other two groups. It can be concluded that voice-chatting with an AI is an effective method for helping learners to express their opinions. This study offers more evidence that integrating AI chatbots into the learning environment can provide more opportunities to exchange opinions more actively, providing learners with more opportunities to practice a foreign language. Given that it is hard to find native interlocutors in EFL settings, chatting with AI chatbots can play a crucial role in promoting English speaking skills. This is in line with Kim's (2016) suggestion that AI voice chatting contributes to the improvement of foreign language speaking skills. Regarding the comparison between the two types of AI chatting, more research is needed. While the previous study (Kim, 2017) found that voice-and text-chatting with AI chatbots are equally effective in developing EFL speaking skills, the current study revealed the superior effect of AI voice-chatting over AI text-chatting.

With regard to the students' perceptions about using AI chatbots, the findings of the post-survey revealed that there was no significant difference between the text-chatting and the voice-chatting groups except for one item: motivation. However, the mean scores for all the survey items for the voice-chatting groups were higher than those for the text-chatting groups. For more detailed information, eight students from each AI chatting group participated in subsequent interviews. Based on excerpts from those interviews, the advantages of using AI chatbots included having an opportunity to speak English in a friendly and comfortable environment, and gaining confidence when speaking English with an AI chatbot because of their reduced anxiety. Particularly, students in the voice-chatting group acknowledged that they actually got to use their voice to speak English more compared to the students who only used text messages. On the other hand, there were some demerits such as the AI not understanding what students were saying and changing topics even if students continued to talk about the previous topic.

The findings from the present study have valuable implications in that L2 learners can benefit equally from interacting with peers or AI chatbots regardless of chatting conditions: text-chatting or voice-chatting. That is to say, the crucial factor in improving speaking ability is repetitive exercises regardless of the conditions. This study confirmed that face-to-face interaction with peers can be beneficial for L2 learners in terms of *responding to questions* and *expressing an opinion*. This was probably due to the fact that they are given opportunities to communicate with each other. And yet, since it can be difficult to find

interlocutors in EFL settings, communicating with AI chatbots is also effective for improving speaking skills.

Some limitations for future studies are presented. Since Korean university students participated in the study, the results cannot be generalized for other EFL settings. A different result might be obtained with a larger number of students who have different proficiency levels and backgrounds. In addition, since the study was not designed to analyze students' affective domains, variation could have influenced students' output. Moreover, the study should have considered learner variables such as learning styles, preference with technology, or different age groups. It would be noteworthy to examine the impacts of learners' involvement as well as qualitative analyses of their meaning negotiation with the AI chatbots.

On the basis of these findings, follow-up studies ought to investigate whether AI chatting conditions can predict students' improvement in grammar and vocabulary. In addition, it would be worthwhile to examine whether the engagement of chatbots into EFL settings can lead to an increase in interest and confidence and reduce the levels of anxiety of those who opt to learn English. Particularly, students' motivation to learn L2 can increase when employing AI chatbots as interlocutors and lead to self-regulated learning. It is also necessary to investigate students' perceptions after experiencing all three different conditions.

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Reference

- Atwell, E. (1999). *The language machine: The impact of speech and language technologies on English language teaching*. London, UK: British Council.
- Azwar, F., Indriani, F., & Nugrahadi, D. T. (2016). Question answering system berbasis artificial intelligence markup language sebagai media informasi. *Klik-Kumpulan Jurnal Ilmu Komputer*, 3(1), 48-60.
- Brandtzæg, P. B., & Følstad, A. (2018). Chatbots: Changing user needs and motivations. *Interactions*, 25(5), 38-43.
- Bull, S. (1997). Promoting effective learning strategy use in CALL. *Computer Assisted Language Learning*, 10(1), 3-39.
- Coniam, D. (2008). Evaluating the language resources of chatbots for their potential in English as a second language. *ReCALL*, 20(1), 98-116.
- Dodigovic, M. (2007). Artificial intelligence and second language learning: An efficient approach to error remediation. *Language Awareness*, 16(2), 99-113.
- Fryer, L., & Carpenter, R. (2006). Bots as language learning tools. *Language Learning & Technology*, 10(3), 8-14.
- Ghareeb Ahmed Ali, S. (2020). Using an artificial intelligence application for developing primary school pupils' oral language skills. *Journal of Education*, 75, 67-110.
- Goda, Y., Yamada, M., Matsukawa, H., Hata, K., & Yasunami, S. (2014). Conversation with a chatbot before an online EFL group discussion and the effects on critical thinking. *The Journal of Information and Systems in Education*, 13(1), 1-7.
- Han, J.-I., & Kim, N.-Y. (2016). The effects of post-tasks CMC activities and task types on Korean EFL learners' oral performance. *STEM Journal*, 17(2), 109-135.

- Haristiani, N. (2019). Artificial intelligence (AI) chatbot as language learning medium: An inquiry. In I. Ifdil, Y. Yohandri, K. Krismadinata, & R. Rahim (Eds.), *Proceedings of International Conference on Education, Science and Technology 2019* (pp. 1-6). Padang, Indonesia.
- Haristiani, N., & Danuwijaya, A. A. (2019). Gengobot: A chatbot-based grammar application on mobile instant messaging as language learning medium. *Journal of Engineering Science and Technology*, 14(6), 3158-3173.
- Heller, B., Proctor, M., Mah, D., Jewell, L., & Cheung, B. (2005). Freudbot: An investigation of chatbot technology in distance education. Retrieved Sep. 12, 2020 from <https://psych.athabasca.ca/html/chatterbot/ChatAgent-content/EdMediaFreudbotFinal.pdf>
- Hill, J., Ford, W. R., & Farreras, I. G. (2015). Real conversations with artificial intelligence: A comparison between human-human online conversations and human-chatbot conversations. *Computers in Human Behavior*, 49, 245-250.
- Hong, Z. W., Huang, Y. M., Hsu, M., & Shen, W. W. (2016). Authoring robot-assisted instructional materials for improving learning performance and motivation in EFL classrooms. *Journal of Educational Technology & Society*, 19(1), 337-349.
- Huang, J., Zhou, M., & Yang, D. (2007). Extracting chatbot knowledge from online discussion forums. In R. Sangal, H. Mehta, & R. K. Bagga (Eds.), *Proceedings of the Twentieth International Joint Conference on Artificial Intelligence* (pp. 423-428). Hyderabad, India.
- Hussin, A. A. (2018). Education 4.0 made simple: Ideas for teaching. *International Journal of Education and Literacy Studies*, 6(3), 92-98.
- Kim, H. S., Cha, Y., & Kim, N. Y. (2020). Impact of mobile interactions with AI on writing performance. *Modern English Education*, 21(2), 1-13.
- Kim, N. Y. (2016). Effects of voice chat on EFL learners' speaking ability according to proficiency levels. *Multimedia-Assisted Language Learning*, 19(4), 63-88.
- Kim, N. Y. (2017). Effects of different types of chatbots on EFL learners' speaking competence and learner perception. *Cross-Cultural Studies*, 48, 223-252.
- Kim, N. Y., Cha, Y., & Kim, H. S. (2019). Future English learning: Chatbots and artificial intelligence. *Multimedia-Assisted Language Learning*, 22(3), 32-53.
- Levy, M., & Kennedy, C. (2005). Learning Italian via mobile SMS. In A. Kukulska-Hulme & J. Traxler (Eds.), *Mobile learning: A handbook for educators and trainers* (pp. 76-83). London, UK: Taylor and Francis.
- Levy, M., & Stockwell, G. (2006). *CALL dimensions: Options and issues in computer-assisted language learning*. Mahwah, NJ: Erlbaum.
- Park, J. H., & Shin, N. M. (2017). Students' perceptions of artificial intelligence technology and artificial intelligence teachers. *The Journal of Korean Teacher Education*, 34(2), 169-192.
- Rubesch, T. (2013). Interactive competence in student use of a conversational agent. *Studies in Linguistics and Language Teaching*, 24, 157-172.
- Shawar, B. A. (2017). Integrating CALL systems with chatbots as conversational partners. *Computación y Sistemas*, 21(4), 615-626.
- Shawar, B. A., & Atwell, E. S. (2005). Using corpora in machine-learning chatbot systems. *International Journal of Corpus Linguistics*, 10(4), 489-516.
- Smith, B. (2004). Computer-mediated negotiated interaction and lexical acquisition. *Studies in Second Language Acquisition*, 26, 365-398.
- Smith, B. (2008). Methodological hurdles in capturing CMC data: The case of the missing self-repair. *Language Learning & Technology*, 12(1), 85-103.
- van Rosmalen, P., Eikelboom, J., Bloemers, E., van Winzum, K., & Spronck, P. (2012). Towards a game-chatbot: Extending the interaction in serious games. *Proceedings of 6th European Conference on Games Based Learning*. Cork: Ireland.
- Walker, A., & White, G. (2013). *Technology enhanced language learning: Connecting theory and practice*. Oxford, UK: Oxford University Press.

- Wang, Y. F., & Petrina, S. (2013). Using learning analytics to understand the design of an intelligent language tutor – Chatbot Lucy. *Editorial Preface*, 4(11), 124-131.
- Yanguas, Í. (2010). Oral computer-mediated interaction between L2 learners: It's about time! *Language Learning & Technology*, 14(3), 72-93.
- Yoon, S. Y. (2019). Student readiness for AI instruction: Perspectives on AI in university EFL classrooms. *Multimedia-Assisted Language Learning*, 22(4), 134-160.
- Zakos, J., & Capper, L. (2008). CLIVE – An artificially intelligent chat robot for conversational language practice. In J. Darzentas, G. Vouros, S. Vosinakis, & A. Arnellos (Eds.), *Proceedings of 5th Hellenic Conference on Artificial Intelligence* (pp. 437-442). Berlin: Springer.

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Appendix

Survey Questionnaire for Both Text Chatting and Voice Chatting Groups

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1. Chatting with AI chatbots increased participation in classes.

 2. Chatting with AI chatbots increased motivation for learning English.

 3. Chatting with the AI chatbots was fun.

 4. Chatting with AI chatbots made English speaking/writing interesting.

 5. Through chatting with AI chatbots, I gained confidence in speaking and writing English.

 6. Chatting with AI chatbots increased the desire to speak/write in English.

 7. Chatting with AI chatbots increased learning time for English speaking/writing.

 8. Through chatting with AI chatbots, my English has improved.

 9. Chatting with AI chatbots was useful as a means of learning English.

 10. I will use AI chatbots to learn English by myself.
