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Effects of Different Types of Chatbots on EFL Learners' Speaking Competence and Learner Perception

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Abstract

This study explores effects of two types of chatbots – voice-based and text-based – on Korean EFL learners' speaking competence and learner perception. Participants were 80 freshmen students taking an English-speaking class at a university in Korea. They were divided into two experimental groups at random. During the sixteen-week experimental period, participants engaged in 10 chat sessions with the two different types of chatbots. To take a close examination of effects on the improvement of speaking competence, they took the TOEIC speaking test as pre- and post-tests. Structured questionnaire-based surveys were conducted before and after treatment to determine if there are changes in perception. Findings reveal two chatbots effectively contribute to improvement of speaking competence among EFL learners. Particularly, the voice-based chatbot was as effective as the text-based chatbot. An analysis of survey results indicates perception of chatbot-assisted language learning changed positively over time. In particular, most participants preferred voice-based chatbot over text-based chatbot. This study provides insight on the use of chatbots in EFL learning, suggesting that EFL teachers should integrate chatbot technology in their classrooms.

Key Words : Voice-based Chatbot, Text-based Chatbot, EFL, Communicative Competence, Speaking Competence

Ⅰ. INTRODUCTION

Culture involves socially acquired knowledge which can be organized in culture-specific ways. This knowledge is claimed to play a central part in cognition framing the perception of reality. Particularly, in native language learning, this kind of knowledge develops concurrently. However, in foreign language learning, it is quite different. Learners of a foreign language have already been socialized into the knowledge associated with their mother tongue and initiated into their own culture in the process of language learning[1]. Thus, their natural inclination is to interpret the foreign language in relation to this established association. When language learners confront the use of target language, the fit between culture-specific aspects of their native and foreign language suffers from conflict[2]. This makes the learners have difficulty in learning a foreign language.

If foreign language learners are not familiar with their target language society and culture, they cannot use the language in socially and culturally acceptable ways[3]. As a case in point, English as a foreign language (EFL) learners who have never resided in English speaking culture are most likely to experience trouble in processing English systemic data presented through unfamiliar contexts. Learners in EFL contexts are poor at English due to the minimal exposure to the English language and culture as well as limited contact with native speakers of English[4]. In this respect, it has been

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1) Henry George Widdowson, *Aspects of Language Teaching*. Oxford: Oxford University Press, 1990, p.151.

2) Cem Alptekin, "Target-language Culture in EFL Materials," *ELT Journal, 47*(2), 1993, pp.136-143.

3) Mobina Rahnama, Neda Fatehi Rad, and Hamid Bagheri, "Developing EFL Learners' Speaking Ability, Accuracy, and Fluency," *ELT Voices 6*(1), 2016, pp.1-7.

4) Kang Shumin, "Factors to Consider: Developing Adult EFL Students' Speaking Abilities," *Methodology in Language Teaching: An Anthology of Current Practices, ed. by Jack Richards and willy A. Renandya*, Cambridge: Cambridge University Press, 2002, pp.204-211.

emphasized that foreign language learners should be exposed to not only their target language itself but also the context where the language is used.

As the importance of continuous and repeated exposure to the target language been highlighted, foreign language teachers have done their best to provide learners with authentic and genuine input as well as output opportunities to practice the language[5]. That is, the extended use of the target language can contribute to promoting learners' foreign language acquisition. Nonetheless, in EFL settings, learners still have fewer chances to be exposed to English in real-life situations. In EFL environments, there are only a few opportunities for learners to engage in natural interaction using their target language[6]. Because of the lack of such interaction, EFL learners' communicative competence consequently fails to develop. In particular, Korean EFL learners are not good at communicating in English despite the fact that English is compulsory in their secondary schools[7].

With the development of technology, however, teachers have created supportive language learning environments encouraging purposeful and meaningful interaction[8]. Combined with a variety of communication tools, recent technology allows language learners to experience natural and genuine conversation with authentic audience around the world. This kind of exposure is particularly important for building speaking competence in foreign languages. Among them, Computer-mediated communication (CMC) plays a crucial role as a tool for communicative interaction. According to the

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5) Luke Fryer and Rollo Carpenter, "Bots as Language Learning Tools," *Language Learning and Technology 10*(3), 2006, pp.8-14.

6) Mark Warschauer, "Comparing Face-to-face and Electronic Communication in the Second Language Classroom," *CALICO Journal 13*(2), 1996, pp.7-26.

7) Jong-Im Han and Na-Young Kim, "The Effects of Post-task CMC Activities and Task Types on Korean EFL Learners' Oral Performance," *STEM Journal 17*(2), 2016, pp.109-135.

8) M. Rafael Salaberry, "A Theoretical Foundation for the Development of Pedagogical Tasks in Computer Mediated Communication," *CALICO Journal 14*(1), 1996, pp.5-34.

communicative language teaching approach, comprehension of input - listening or reading – as well as learner output – speaking and writing - are both essential for foreign language acquisition. By providing both input and output, CMC helps learners improve their foreign language skills. Previous studies have continuously proven its beneficial effects on language learners' improvement of communicative ability including speaking competence[9].

Aside from learner-to-learner interactions through CMC, the utilization of chatbots in foreign language learning has also drawn attention[10]. As computer programs, chatbots can mimic a human conversation using a natural and ordinary language. By simulating an intelligent conversation via textual or auditory methods with human users, they are distinguished from other types of computer technology. Because they were originally designed to play a role of native speakers, foreign language learners can particularly take advantage of these chatbot programs[11]. With increased exposure to the target language, learners of a foreign language can have ample opportunities to communicate with these conversational agents, which can finally result in improvement of speaking competence.

Chatbots used for foreign language education are not new. Performing a role as a language tutor/facilitator, they have been widely reported in the computer-assisted language learning field. Nevertheless, they have been least explored regarding their efficacy in foreign language learning and have not been extensively applied yet[12]. Furthermore, even though voice-based

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9) Na-Young Kim, "Effects of Types of Voice-based Chat on EFL Students' Negotiation of Meaning According to Proficiency Levels," *English Teaching 72*(1), 2017, pp.159-181.

10) Luke Fryer and Rollo Carpenter, "Bots as Language Learning Tools," *Language Learning and Technology 10*(3), 2006, pp.8-14.

11) Na-Young Kim, *Effects of Different Voice-chat Conditions on Korean EFL Learners' Speaking Ability, Oral Interaction, and Affective Factors*. Unpublished Doctoral Dissertation, Ewha Womans University, Korea, 2016, p.40.

12) Yong Zhao and Chun Lai, "Technology and Second Language Learning: Promises and Problems," *Technology-mediated learning environments for young English*

chatbots have continuously been advanced with the development of speech recognition technology, a number of previous studies still tended to center around the text-based chatbots[13]. Considering that chatbots have been used in language learning fields and learners can communicate with chatbots through both text and voice input as well as text and voice output, it is needed to compare the differential effects of two types of chatbots – voice-based chatbot and text-based chatbot – on foreign language learning. Particularly, given that speaking competence has been considered as the most essential part in EFL environments[14], it is necessary to explore the effects of two different types of chatbots on Korean EFL learners' speaking competence. Research questions are posed as follows:

1) What are some effects of two different types of chatbots – voice-based chatbot and text-based chatbot – on Korean EFL learners' speaking competence?
2) What are some effects of two different types of chatbots – voice-based chatbot and text-based chatbot – on Korean EFL learners' perceptions of English learning?

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learners. ed. by Leann Parker, London: Lawrence Erlbaum Associates, 2008, pp.167-205.

13) Na-Young Kim, "Effects of Types of Voice-based Chat on EFL Students' Negotiation of Meaning According to Proficiency Levels," *English Teaching 72*(1), 2017, pp.159-181.

14) Martin Bygate, "Speaking," *The Cambridge Guide to Teaching English to Speakers of Other Language*, ed. by David Nunan and Ronald Carter, Cambridge: Cambridge University Press, 2001, pp.14-20.

II. LITERATURE REVIEW

1. Communicative Competence

Language learning and teaching became influenced by cognitive and sociolinguistic theories in the 1970s, putting greater emphasis on meaning in language use. That is, language learners need to know how a message is constructed and understood, how to express their message clearly, and how to find out what others are trying to communicate. They also need to understand how language is used in relation to the structure of culture and society in which they use the target language. In light of these influences, language learning and teaching turned its attention to communication[15]. This attention became formalized under the title of communicative language teaching (CLT). As an approach to language teaching which emphasizes interaction, CLT is based on the idea that successful language learning comes through having to communicate real meaning, encouraging language learners to be involved in a wide range of activities, tasks, and strategies for communication[16].

Over the course of the last few decades, the focus for teaching English has moved from a single person, one-way, staged lesson perspective to a more communicative, authentic, and interactive perspective, which can be related to CLT approach. With the growing popularity of communicative approaches, initial interpretations of a communicative approach put much emphasis on communicative competence[17]. Communicative competence has

15) Michael Canale, "From Communicative Competence to Communicative Language Pedagogy," *Language and communication 1*(1), 1983, pp.1-47.

16) Mark Warschauer, "On-line Communication," *The Cambridge Guide to Teaching English to Speakers of Other Languages,* ed. by David Nunan and Ronald Carter, Cambridge: Cambridge University Press, 2001, pp.207-212.

17) Dell Hymes, "On Communicative Competence," *Sociolinguistics: Selected Readings, ed. by John B. Pride and Janet Holmes,* Harmondsworth: Penguin,

been taken as a goal for communicative language teaching. In a classroom environment, teachers can effectively help their learners to develop communicative competence by implementing the communicative approach. Language practitioners can give language learners encouragement to use authentic language and to engage in classroom exchanges where they can communicate with one another. Teachers must see the use of communicative tasks as an effective way to assist language development. This theoretical perspective supporting the use of communication tasks is based on the premise that language is best learned and taught through interaction[18].

As communicative language teaching has been accepted as an effective way of developing interactional skills, there has been a growing awareness of the need to find these authentic and interactive opportunities for language learners to improve their communicative competence[19]. Given that language learning and teaching must include expressing, interpreting, and negotiating meaning, learners need to be given opportunities to work cooperatively with their partners in turn-taking, giving feedback to speakers, asking for clarification, and starting and ending conversations[20]. Through this interaction, the learners can share ideas and thoughts and correct each other, assuming responsibility for their own language learning and leading themselves to be self-confident communicators.

Therefore, foreign language learners should be provided maximum opportunities for real-time social interaction, not just by exposure to comprehensible input, but by involvement with the conversational usage, which is similar to the conversation outside the classroom. However, in EFL

1972, pp.6-15.

18) Heesook Cheon, "The Viability of Computer Mediated Communication in the Korean Secondary EFL classroom," *Asian EFL Journal 5*(1), 2003, pp.1-33.

19) Rod Ellis, *Task-based Language Learning and Teaching,* Oxford: Oxford University Press, 2003, p.334.

20) Claire Kramsch, "From Language Proficiency to Interactional Competence," *The Modern Language Journal 70*(4), 1986, pp.366-372.

contexts where English is not used as their first/second language, there are relatively few chances to engage in natural, communicative, and person to person communication in English. In EFL settings, interactive learning involves learners working in pairs or small group, but various factors ranging from a lack of class time to a large number of students in class also hamper this. Because of the lack of such interaction, EFL learners' communicative competence consequently fails to develop and the learners feel uncomfortable and stressed when communicating in English[21].

2. Chatbot-Assisted Language Learning

Technology is a powerful tool for creating a synchronous social interaction community. In the past, most of communicative and interactive language learning activities were designed for pair work or group work in fixed classroom settings. However, the rapid expansion of access to computer systems has introduced new possibilities for cooperative and collaborative projects to be considered in much broader contexts both inside and outside the classroom. The bringing together of computer technology, foreign language learning and teaching has been explored in several sources. Among them, a prospect supporting the CLT philosophy involves the use of CMC to link EFL learners with others from all around the world in authentic, natural, interactive, and real-time communication. Thus, the interactive and communicative principles of CLT, the instructional needs of EFL learners, and CMC activities are likely to represent a natural partnership. CMC, tailored to the communicative needs of EFL learning, appears to be gaining increasing interest and support from EFL teachers and EFL learners.

In relation to CMC, another attention to the use of chatbots for EFL learning has been paid. With the development of artificial intelligence and virtual

21) Heesook Cheon, "The Viability of Computer Mediated Communication in the Korean Secondary EFL classroom," *Asian EFL Journal* 5(1), 2003, pp.1-33.

assistants, chatbots have been progressed and have enabled EFL learners to join more quantitative and qualitative conversation[22]. Chatbots are now available on the computer or can be downloaded onto mobile devices. Robot-like characters, called chatbots or chatterbots, simulate a human conversation using a natural language via textual or auditory methods. Engaging in a human-like conversation, chatbots provide foreign language learners with chances to practice their target language. Their potential role as a language tutor or facilitator has consistently been reported in the computer-assisted language learning field. Particularly, learners can interact with chatbots on an individual basis by tailoring them for their own pace of language learning[23].

Chatbots are new and interesting to learners. The learners are inclined to be more relaxed and less threatened talking to chatbots than to a human[24]. Chatbots never get bored or lose patience even though the learners practice and repeat the same material endlessly and unlimitedly. By providing text and synthesized speech, they allow learners to learn both listening and reading skills. In addition, chatbots offer opportunities for the learners to practice a variety of vocabulary and language structures that they would not have a chance to use in their real-life situations. They also provide quick, effective, and quality feedback for learners' spelling and grammar.

For language learners, chatbots offer potential as peers or tools. A number of previous studies have explored the use of chabots in language learning. The promises of chatbot technology have been reported related to its communicative function for creating an interactive English learning environment[25]. Chatbots have great potential both inside and outside the

22) David Coniam, "Evaluating the Language Resources of Chatbots for their Potential in English as a Second Language," *ReCALL Journal 20*(1), 2008, pp.98-116.

23) Aisha Walker and Goodith White, *Technology Enhanced Language Learning: Connecting Theory and Practice*. Oxford: Oxford University Press, 2013, p.38.

24) Na-Young Kim, "Effects of Types of Voice-based Chat on EFL Students' Negotiation of Meaning According to Proficiency Levels," *English Teaching 72*(1), 2017, pp.159-181.

language classroom as the chatbot programs can encourage learners to practice their target language as much as they want and develop their confidence in an individualized manner at their own leaning pace and preference. In a stress-free manner, chatbots can improve learners' concentration and academic achievement. They can reduce language learners' negative feelings increasing positive emotions such as motivation and interest in target language learning, and more importantly, improve speaking competence[26)][27)].

Although chatbots have considerably matured, they still have a long way to go. Chatbots are a less-than-ideal communicative model for language learners because they do not allow appropriate mutual interaction[28)]. In addition, learners do not have enough opportunities for generating their own output because of fixed sentence structures designed in chatbot technology[29)]. Furthermore, most current chatbots are restricted to converse on a pre-selected topic and they often work with pre-determined phrases[30)]. Also, chatbots do not provide affordances for learners to negotiate meaning and expressions. This can result in technological limitations of conventional natural language processing. Thus, there is a need to carefully examine the effects of the use

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25) Yi Fei Wang and Stephen Petrina, "Using Learning Analytics to Understand the Design of an Intelligent Language Tutor – Chatbot Lucy," *International Journal of Advanced Computer Science and Applications 4*(11), 2013, pp.124-131.

26) Minoo Alemi, Meghdari Ali, and Ghazisaedy Maryam, "Employing Humanoid Robots for Teaching English Language in Iranian Junior High-schools," *International Journal of Humanoid Robotics, 11*(3), 2014, pp.1-25.

27) Ali Derakhshan, Farahnaz Tahery, and Nasrin Mirarab, "Helping Adult and Young Learners to Communicate in Speaking Classes with Confidence," *Mediterranean Journal of Social Sciences 6*(2), 2015, pp.520-525.

28) Luke Fryer and Rollo Carpenter, "Bots as Language Learning Tools," *Language Learning and Technology 10*(3), 2006, pp.8-14.

29) Yi Fei Wang and Stephen Petrina, "Using Learning Analytics to Understand the Design of an Intelligent Language Tutor – Chatbot Lucy," *International Journal of Advanced Computer Science and Applications 4*(11), 2013, pp.124-131.

30) Bayan Abu Shawar and Eric Atwell, "Fostering Language Learner Autonomy Through Adaptive Conversation Tutors," *Proceedings of the Fourth Corpus Linguistics Conference* Birmingham, England, 2007, p.6.

of chatbots in foreign language learning and teaching.

Ⅲ. METHODOLOGY

1. Participants

This study took place in an English speaking class at a university in Korea. The class was elective and participants were 80 freshmen who enrolled in this course to improve their speaking competence. The course was taught only in English by a Korean instructor who completed TESOL certificate course and had more than 5-year experience in teaching EFL learners. The participants were also asked to speak only in English during class. They had completed more than 6 years of English education in their secondary schools, but they had little experience in speaking English. For the current study, they were randomly divided into two groups before the experiment and engaged in different types of chat sessions during the sixteen-week experimental period. The chat sessions with two types of chatbots – voice-based chatbot and text-based chatbot – were to be conducted in English as well.

2. Data Collection and Procedures

The present study adopted a pretest-treatment-posttest design to document the learning outcome of chatbot- assisted language for Korean EFL learners. The main independent variable, two types of chatbots, represents the treatment of the experiment. In the current study, two experimental groups engaged in a chat with two different types of chatbots – voice-based chat and text-based chat – and practiced conversational skills. After the researcher of the current study provided the basic instructions on the use of chatbots, the

participants were asked to have a chat with the either voice-based chatbot or text-based chatbot. There were 10 chat sessions scheduled outside of class time. Each participant chose an appropriate time for themselves.

For the voice-based chatbot group, Indigo application (http://www.hello-indigo.com/) was adopted in that it enables language learners to experience a human-like conversation. Users can send a voice message by pressing or touching the microphone icon. Using the speech recognition program, Indigo software provides the users with opportunities to have a voice chat. Through the speech-to-text system, the chatbot program can convert the user's spoken input into text, compare it with a database of possible replies, send back a text reply, which is then converted into speech via text-to-speech technology. For the text-based chatbot group, CleverBot application (http://www.cleverbot.com/) was employed in that this is one of the popular chatbot applications in the language learning field[31]. As a computerized chatbot for conversation practice, when text input is sent to the chatbot by the human user, the chatbot parses the text, replies, and sends back a text reply. The entire process takes place automatically so users might feel as if they are holding a conversation with a real person.

In order to take a close examination of spoken/written interactions in chat sessions and its effects on the participants' speaking competence, the materials for the current study included pre- and post-treatment speaking tests. All participants were asked to take TOEIC speaking test as pre- and post-tests before and after the experiment began and ended. It took about 20 minutes to complete and the scores ranged between 0-200 in total. The participants' responses were recorded, submitted to the researcher of the current study, scored by trained raters following the scoring guides on a basis of specific evaluation criteria which was developed by ETS. Rater agreement was reasonably high. This speaking test was developed to

31) Paul Daniels, "Using Web Speech Technology with Language Learning Applications," *JALT CALL Journal 11*(2), 2015, pp.177-187.

associate with theories of communicative competence[32]. The TOEIC speaking test was employed in that the participants were required to submit their test score to establish their speaking proficiency in the near future.

Questionnaires were also included to provide insights into the participants' interactions with two different types of chatbots and to offer a more comprehensive view of perceptions and reactions to the chatbots. Structured questionnaire-based surveys were carried out before the pre-test and after the post-test to see whether there are any changes in the participants' perceptions of chatbot-assisted language learning. The pre- and post-questionnaires were developed on a basis of the previous research[33]. Questionnaire items were composed of 15 closed items: belief (5 items), motivation (5 items), and interest (5 items). A six-point Likert scale was employed (See Appendix).

3. Data Analysis

Data were then collected for the analysis of the improvement of speaking competence, which compares pre- and post-test scores. Then, data from pre- and post-surveys were analyzed to examine whether there are any changes in participants' perceptions of chatbot-assisted language learning. The scores of the pre- and post-tests were analyzed utilizing SPSS 18.0. Descriptive statistics as well as paired samples t-tests were reported to examine how the synchronous chat sessions influenced the differences between the two tests. Independent samples t-tests were also employed to compare the mean differences between the two groups: voice-based chatbot group and text-based chatbot group. P value was set at $\leq .05$.

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32) Frances A. Butler, Dan Eignor, Stan Jones, Tim McNamara, and Barbara K. Suomi, *TOEFL 2000 Speaking Framework: A Working Paper*. Princeton, NJ: ETS, 1999, p.3.

33) Jong-Im Han and Na-Young Kim, "The Effects of Post-task CMC Activities and Task Types on Korean EFL Learners' Oral Performance," *STEM Journal 17*(2), 2016, pp.109-135.

Ⅳ. RESULTS

1. Effects on Speaking Competence

The main purpose of this study was to explore the effects of two different types of chatbots – voice-based chatbot and text-based chatbot – on Korean EFL learners' speaking competence. To examine the changes in mean scores of pre- and post-tests, statistical methods employed were paired samples t-tests. Table 1 shows the descriptive statistics and t-test results regarding pre- and post-test mean scores.

Table 1. Paired-Samples T-tests for Speaking Competence

Group	Pre-Test (n=80)		Post-Test (n=80)		*t*	*P*
	M	*sd*	*m*	*sd*		
Voice-Based Chatbot	117.14	7.08	129.05	14.28	7.964	.000
Text-Based Chatbot	112.11	17.58	127.37	16.39	6.050	.000

Findings of the paired-samples t-tests indicate that chatbots can yield positive results for EFL learners. There were significant mean differences between pre- and post-tests for both the voice-based chatbot group (t = 7.964, p = .000) and the text-based chatbot group (t = 6.050, p = .000). That is, both two types of chatbots lead to the improvement of the participants' speaking competence. To be specific, in terms of the voice-based chatbot group, mean scores were 117.14 on the pre-test while 129.05 on the post-test. Similarly, mean scores of the text-based chatbot group jumped from 112.11 on the pre-test to 127.37 on the post-test. Findings of this study show that chatbots, either voice-based or text-based, can effectively contribute to the improvement of communicative competence among EFL learners.

Previous studies have noted that there are only a few opportunities for foreign language learners to engage in a natural interaction, and because of

this lack of interaction, EFL learners' speaking competence often fails to develop[34]. However, findings of this study show that both two types of chatbots are equally beneficial for improving their communicative competence. That is, engaging in chat with the voice-based chatbot can also improve the participants' speaking competence. Although reliable programs of voice-based chatbots are still far from reality and have a long way to go[35] and previous studies have centered around the text-based chatbots and only a few comprehensive studies have been conducted related to voice-based chatbots[36], the current study proves that not only text-based chatbots but also voice-based chatbots can help EFL learners' language development. Considering that the effects of voice-based chatbots are not well substantiated, this study provides insight into chatbot-assisted language learning in EFL contexts. In particular, given that speaking competence has been claimed to be the most essential part in EFL environments[37], great advantages in chatbot technologies have been found in that they offer learners realistic opportunities for individual tutoring to improve their communicative competence.

To investigate if any group differences exist regarding the improvement of speaking competence, independent-samples t-tests were conducted. There was no significant difference in the improvement between two groups (t = 1.145, p = .257). However, findings reveal that the participants in the text-based chatbot group (m = 15.26) more improved their speaking competence than

34) Heesook Cheon, "The Viability of Computer Mediated Communication in the Korean Secondary EFL classroom," *Asian EFL Journal* 5(1), 2003, pp.1-33.

35) David Coniam, "Evaluating the Language Resources of Chatbots for their Potential in English as a Second Language," *ReCALL Journal 20*(1), 2008, pp.98-116.

36) Na-Young Kim, *Effects of Different Voice-chat Conditions on Korean EFL Learners' Speaking Ability, Oral Interaction, and Affective Factors*. Unpublished Doctoral Dissertation, Ewha Womans University, Korea, 2016, p.42.

37) Martin Bygate, "Speaking," *The Cambridge Guide to Teaching English to Speakers of Other Language*, ed. by David Nunan and Ronald Carter, Cambridge: Cambridge University Press, 2001, pp.14-20.

those in voice-based chatbot group (*m* = 11.90), as shown in Table 2.

Table 2. Independent-Samples T-tests for Speaking Competence

	Voice-based Chatbot (n=42)		Text-based Chatbot (n=38)		*t*	*P*
	m	*sd*	*m*	*Sd*		
Improvement	11.90	9.69	15.26	15.55	1.145	.257

Figure 1 shows that engaging in chat with a text-based chatbot is more beneficial for improving the participants' speaking competence compared to having a chat with a voice-based chatbot. This result can be accounted for by the previous research comparing voice-chat and text-chat[38].

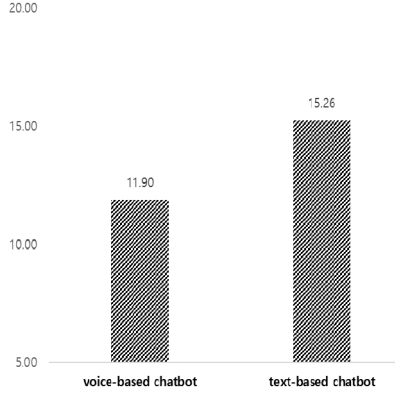

Figure 1. Improvement in Speaking Competence

38) Rod Ellis and Fangyuan Yuan, "The Effects of Planning on Fluency, Complexity, and Accuracy in Second Language Narrative Writing," *Studies in Second Language Acquisition 26*(1), 2004, pp.59-84.

Compared to voice chat, learners involved in text chat can have more time to monitor their own language, notice the problematic points, and modify their own language production probably because pauses and silences are more tolerated in text chat[39]. That is, learners can have more time to think and construct their language production through text chat. With the increased time in text chat, learners can ease their cognitive load, relieve their communicative pressure, and consequently, improve their language output. Results of the current study can be in line with previous findings in that the participants benefited more from having a chat with the text-based chatbot than with the voice-based chatbot[40]. Even though there was no significant difference, it can be suggested that text-based chatbots are more effective in improving EFL learners' communicative competence compared to voice-based chatbots.

2. Effects on Perceptions of English Learning

Another purpose of this study was to understand the effects of two different types of chatbots – voice-based chatbot and text-based chatbot – on EFL learners' perceptions of English learning. In order to compare the changes between pre- and post-surveys, paired-samples t-tests were carried out before and after the treatment. Table 3 shows the descriptive statistics and t-test results regarding pre- and post-surveys.

As seen in Table 3, there were significant mean differences between pre- and post-surveys except one category which was observed in the text-based chatbot group regarding interest (t = 1.348, p > .05). As for the voice-based

39) H. Müge Satar and Nesrin Özdener, "The Effects of Synchronous CMC on Speaking Proficiency and Anxiety: Text versus Voice Chat," *The Modern Language Journal 92*(4), 2008, pp.595-613.

40) Richard G. Kern, "Reconstructing Classroom Interaction with Networked Computers: Effects on Quality and Quantity of Language Production," *The Modern Language Journal 79*(4), 1995, pp.457-476.

chatbot group, participants' perceptions of language learning changed positively over time. To be specific, participants' belief about the improvement of communicative competence showed significantly positive changes (t = 4.741, p = .000), with the mean scores of 3.78 on the pre-survey and 4.36 on the post-survey. That is, the participants involved in chat with the voice-based chatbot believed that they were improving their communicative competence more effectively than before. In addition, their motivation level jumped from 3.14 on the pre-survey to 4.37 on the post-survey, and it was significant (t = 5.776, p = .000). This indicates that the participants were more motivated to acquire English communicative competence as a result of chatting with the voice-based chatbot. Regarding participants' interest in language learning, a significant mean difference was also found between pre- and post-surveys (t = 3.243, p = .002). The mean scores were 3.48 on the pre-survey while 4.26 on the post-survey, indicating that the participants in the voice-based chatbot group became more interested in language learning after having a chat with the voice-based chatbot.

Table 3. Paired-Samples T-tests for Perceptions of Chatbot-Assisted Language Learning

Group		Pre-Survey (n=80)		Post-Survey (n=80)		T	p
		m	*Sd*	*m*	*sd*		
Voice-Based Chatbot	Belief	3.78	0.60	4.36	0.84	4.741	.000
	Motivation	3.14	0.86	4.37	1.05	5.776	.000
	Interest	3.48	0.94	4.26	1.04	3.243	.002
Text-Based Chatbot	Belief	3.66	0.94	3.97	0.79	2.313	.026
	Motivation	3.01	0.93	4.68	0.90	7.591	.000
	Interest	3.39	1.20	3.61	0.79	1.348	.186

In the case of the text-based chatbot group, participants' belief about improving their communicative competence revealed significantly positive

changes (t = 2.313, p = .026), with the mean scores of 3.66 on the pre-survey and 3.97 on the post-survey. Findings indicate that text-based chatbots can serve to bolster the participants' belief in improvement of communicative competence. In terms of motivation, another significant difference was observed between pre- and post-surveys (t = 7.591, p = .000). Mean scores increased from 3.01 on the pre-survey to 4.68 on the post-survey, demonstrating that the text-based chatbot gave the participants integrative motivation to engage in a successful conversation. Although there was no significant mean difference between pre- and post-surveys related to the participants' interest (t = 1.348, p = .186), results show their increased interest in English learning as an outcome of chatbot-assisted language learning, with the mean scores of 3.39 on the pre-survey and 3.61 on the post-survey.

Overall, survey responses of the participants in both two chatbot groups positively changed. That is, integrating chatbots into foreign language learning is effective in increasing EFL learners' beliefs, enhancing their motivation, and promoting interest in the improvement of communicative competence. Findings of the current study are in accordance with a number of previous studies[41]. Learners who experienced chatbot-assisted language learning had a great fun and believed that they were learning a language more effectively with the chatbot. Consequently, it allowed the learners to increase their motivation and interest in language learning, making beneficial effects on the improvement of communicative competence.

Language learners can benefit from the educational technology because language teachers manipulate their class to be more exciting by using various tools[42]. Results of this study provide empirical evidence for the use

41) Minoo Alemi, Meghdari Ali, and Ghazisaedy Maryam, "Employing Humanoid Robots for Teaching English Language in Iranian Junior High-schools," *International Journal of Humanoid Robotics, 11*(3), 2014, pp.1-25.

42) Ali Derakhshan, Farahnaz Tahery, and Nasrin Mirarab, "Helping Adult and Young Learners to Communicate in Speaking Classes with Confidence," *Mediterranean*

of both two types of chatbots – voice-based chatbot and text-based chatbos – in improving the learners' positive perceptions of language learning, which can consequently result in successful foreign language acquisition. Given that learners' perceptions of language learning are said to be a significant factor affecting their language development[43], the present study provides insight on the use of chatbots in foreign language classroom settings, suggesting that EFL teachers should attempt to integrate chatbots into their classroom.

To compare participants' perceptions of two different types of chatbots – voice-based chatbot versus text-based chatbot – independent-samples t-tests were then administered. As seen in Table 4, the participants' responses were mostly positive with regard to chatbot-related items for both two groups. A close examination demonstrates that there were significant differences between two groups except one category related to motivation (t = 1.433, p > .05).

Table 4. Independent-Samples T-tests for Perceptions of Chatbot-Assisted Language Learning

	Voice-Based Chatbot (n=42)		Text-Based Chatbot (n=38)		t	p
	m	sd	m	sd		
Belief	4.36	0.84	3.97	0.79	2.149	.035
Motivation	4.37	1.05	4.68	0.90	1.433	.156
Interest	4.26	1.04	3.61	0.79	3.160	.002

To be specific, participants' belief about the improvement of communicative competence showed more positively in the voice-based chatbot group (m = 4.36) compared to the text-based chatbot group (m = 3.97), and the difference was found to be significant (t = 2.149, p = .035). In terms of

Journal of Social Sciences 6(2), 2015, pp.520-525.

43) Judith O'Donnell Dooling, "What Students Want to Learn about Computers?," *Educational Leadership 58*(2), 2000, pp.20-24.

interest, similar findings were observed. Participants in the voice-based chatbot group revealed more interests in chatbot-assisted language learning (m = 4.26) than those in the text-based chatbot group (m = 3.61). The significant difference was also obtained between two groups (t = 3.160, p = .002). In regard to motivation, on the other hand, the text-based chatbot group showed more positive reactions (m = 4.68) than the voice-based chatbot group (m = 4.37). However, there was no significant difference between two.

It is noticeable that chatting with the voice-based chatbot was more beneficial for positively influencing the participant' perceptions related to two categories, belief and interest. These results indicate that the voice-based chatbot increased the participants' belief in improvement of communicative competence more than the text-based chatbot. Moreover, participants in the voice-based chatbot group became more interested in language learning compared to those in the text-based chatbot group. This can be explained by the previous studies[44]. To engage in a voice chat, learners use their vocal organs and apparatus, which is directly connected to the act of speaking itself. In other words, voice chat is directly linked to the articulation stage of Levelt's model and the benefit is similar to the face-to-face conversation, contributing to the improvement of communicative competence. Consequently, engaging in voice chat has beneficial effects on enhancing the learners' beliefs about language ability improvement.

When it comes to interests in chatbot-assisted language learning, the participants in the current study showed more interests in the voice-based chatbot. This result confirms the previous findings, reporting that the use of voice-based chatbots generates interest in foreign language learners[45].

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44) Mike Levy and Glenn Stockwell, "Computer-mediated Communication," *CALL dimensions, ed. by Mike Levy and Glenn Stockwell,* Mahwah, NJ: L. Erlbaum, 2006, pp.84-109.

45) Minoo Alemi, Meghdari Ali, and Ghazisaedy Maryam, "Employing Humanoid Robots for Teaching English Language in Iranian Junior High-schools," *International*

Another experimental study also provided support, reporting that learners involved in voice chat with chatbots had great fun[46]. On the other hand, there can be an issue for learners who participated in chat with text-based chatbots using mobile phones. In the current study, participants in the text-based chatbot group downloaded the chatbot application onto their mobile phone and had a text chat. Although these hand-held mobile devices have a great reputation in mobile learning, their small screens can be frustrating. The text chat group may feel uncomfortable and cumbersome because they have to type on the small-sized keyboard of their mobile phones. In this regard, the participants with the text-based chatbot might have difficulties and lose their interests in communicating.

In terms of motivation, on the other hand, participants in the voice-based chatbot group were less motivated in English language learning than those in the text-based chatbot group. Considering that having a voice chat is almost similar to face-to-face conversation in that learners use their vocal organs and apparatus, findings of the current study can be explained. Previous studies reported that foreign language learners are reluctant to participate in oral activities and they often feel demotivated when engaging in speaking tasks[47]. Because voice chat is directly related to the act of speaking itself, EFL learners can be particularly uncomfortable and stressed. Compared to voice chat, pauses and silences are more tolerated in text cha t[48]. With the increased time in text chat, learners can ease their cognitive load, relieve their communicative pressure, and thus, feel less threatened[49].

Journal of Humanoid Robotics, 11(3), 2014, pp.1-25.

46) Na-Young Kim, "Effects of Types of Voice-based Chat on EFL Students' Negotiation of Meaning According to Proficiency Levels," *English Teaching 72*(1), 2017, pp.159-181.

47) Heesook Cheon, "The Viability of Computer Mediated Communication in the Korean Secondary EFL classroom," *Asian EFL Journal 5*(1), 2003, pp.1-33.

48) H. Müge Satar and Nesrin Özdener, "The Effects of Synchronous CMC on Speaking Proficiency and Anxiety: Text versus Voice Chat," *The Modern Language Journal 92*(4), 2008, pp.595-613.

This can result in more positive perceptions of learners' motivation in foreign language learning even though findings of the current study did not show significant differences.

Overall, findings of the current study shed light upon which type of chatbot helps Korean EFL learners have more positive perceptions of language learning. An analysis of the survey results indicate that most participants preferred the voice-based chatbot over text-based chatbot. The participants believed that chatting with the voice-based chatbot can more improve their communicative competence compared to the text-based chatbot. In addition, they responded that the voice-based chatbot more increased their interest in language learning than the text-based chatbot. Regarding motivation, the participants seemed to react more positively toward the text-based chatbot. More research is needed to help learners keep motivated in language learning after having a chat with the voice-based chatbot.

V. CONCLUSION

Understanding culture can be a key to understanding language use in contexts. However, because foreign language learners are not familiar with their target language culture, they cannot use the language in culturally acceptable ways Furthermore, since EFL learners have little chances to interact in real-life situations, their communicative competence is likely to fail to develop With the advances in technology, however, chatbots have shown great potential improving EFL learners' communicative competence. Considering that there have been few empirical studies related to chatbot-assisted language learning, this study aimed to investigate two types

49) Rod Ellis and Fangyuan Yuan, "The Effects of Planning on Fluency, Complexity, and Accuracy in Second Language Narrative Writing," *Studies in Second Language Acquisition 26*(1), 2004, pp.59-84.

of chatbots – voice-based chatbot and text-based chatbot – on EFL learners' speaking competence.

Major findings of the current study are as follows: First, chatbots – either voice-based or text-based – can effectively contribute to the improvement of speaking competence among EFL learners. Although there were no significant differences between two groups, findings reveal that the participants in text-based chatbot group more improved their speaking competence than those in voice-based chatbot group. Given that improvement of speaking competence is necessary for effective foreign language acquisition, it can be suggested that chatbot-assisted language learning can result in successful foreign language learning. In addition, survey responses of the participants revealed that integrating both two types of chatbots into foreign language learning can be effective in increasing EFL learners' beliefs, enhancing their motivation, and promoting interest in communicative competence. Compared the text-based chatbot, the voice-based chatbot was more beneficial improving the participant' perceptions related to belief and interest in language learning. Considering that no significant difference was found between two groups related to motivation, more research is needed.

Results of the study indicate that chatbots can serve an important role to achieve the improvement of communicative competence in EFL fields. Tailoring chatbots for their own pace of learning, language learners can benefit from chatbot-assisted language learning. Particularly, findings of the current study shed light upon which type of chatbot helps Korean EFL learners improve their speaking competence. As text-based chatbots appeared to be more beneficial in improvement of speaking competence, this study also confirms the effects of voice-based chatbots on foreign language learning. Considering that previous studies centered around the text-based chatbots and there have been few comprehensive studies related voice-based chatbots, the current study opens up possibilities for their use.

Additionally, given that EFL learners' perceptions of the use of technology in language learning are crucial but often disregarded[50], findings of the

present study provide empirical evidence for the use of both two types chatbots in improving learners' positive attitudes toward language learning. In particular, the present study provides insight on the use of voice-based chatbots in a foreign language classroom in that they positively influence learners' belief and interest more than the text-based chatbots. This suggests EFL teachers should select the most efficient types of chatbots for their pedagogical goals when they attempt to integrate chatbots into their classroom.

These findings can yield some pedagogical implications for EFL teachers. Teachers in EFL settings need to consider chatbots as a new and interesting technology and apply them into educational settings, specifically in teaching and learning a foreign language. Limitations and suggestions for future research can be also offered. The main limitation of the present study was that the two experimental groups involved in chat featured only 80 college students in Korea, which means that this study is limited by the small size and lack of generalizability. Also, even though the present study adopted an experimental pretest-posttest design, there was no control group. Given that using a control group makes it easier to control threats to internal validity[51], the future study needs to include the control group. Finally, for the effective use of chatbot technology in EFL class, the class should be designed to consider learner variables such as learning aptitude or familiarity with technology. Furthermore, to make the best use of chat technology in their class, teachers should also have technology literacy.

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50) Judith O'Donnell Dooling, "What Students Want to Learn about Computers?," *Educational Leadership 58*(2), 2000, pp.20-24.

51) Berg Kris E., and Latin Richard Wayne, *Essentials of Research Methods in Health, Physical Education, Exercise Science and Recreation.* Baltimore, MD: Lippincott Williams and Wilkins, 2004, p.202.

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Appendix – Questionnaire

This survey is to understand your experience with English learning in this course. Data collected through this questionnaire will remain confidential. For each statement below, mark with a tick. The survey will take less than ten minutes. Thank you for your time.

Statement	Strongly Disagree	Disagree	Somewhat Disagree	Somewhat Agree	Agree	Strongly Agree
1. I like English Class.						
2. I enjoy communicating in English.						
3. I look forward to coming to English class.						
4. I am interested in English learning.						
5. It's fun to interact with others in English.						
6. I think my English is good enough to have a conversation with others.						
7. I believe my English is decent.						
8. I am going to be a good English speaker.						
9. My English has improved.						
10. My English communication skills are getting better.						
11. I'm motivated to learn English.						
12. I'm encouraged to learn English.						
13. I want to participate actively in English class.						
14. I want to communicate actively with others in English.						
15. I want to improve my English communication skills.						

국문초록

서로 다른 챗봇 유형이 한국 EFL 학습자의 말하기능력 및 학습자인식에 미치는 영향

김 나 영

본 연구의 목적은 서로 다른 두 유형의 챗봇(음성기반 챗봇 및 문자기반 챗봇)이 한국 EFL 학습자의 말하기 능력 및 학습자 인식에 미치는 영향을 파악하는데 있다. 실험 참가자는 총 80명으로, 한국에 있는 한 대학교의 신입생들이었으며, 모두 교양 영어 말하기 수업을 듣는 학생들이었다. 참가자들은 무작위 하게 두 실험집단으로 나뉘어 16주 동안 서로 다른 두 유형의 챗봇과 10번의 채팅에 참여하였다. 실험 전후 참가자의 말하기 능력에 변화가 있는지를 알아보기 위하여 사전사후 말하기 시험을 진행하였고, 챗봇을 이용한 영어학습에 대해 인식변화가 있는지를 살펴보기 위해 사전사후 설문조사를 실시하였다. 말하기시험결과, 챗봇을 이용한 한국 EFL 학습자들의 의사소통능력은 유의미하게 향상되었고, 그 중 문자기반 챗봇이 의사소통능력 향상에 더욱 도움이 되는 것으로 나타났다. 설문조사결과, 챗봇기반 영어학습에 대한 학습자들의 인식은 긍정적으로 변화하였고, 그 중 음성기반 챗봇에 대한 인식이 좀 더 호의적으로 바뀐 것으로 조사됐다. 본 연구는 EFL 상황에서 챗봇기반 영어학습에 대한 새로운 가능성을 모색하고, 효과적인 챗봇활용을 위한 제언을 도출하고 있다.

주제어 : 음성기반 챗봇, 문자기반 챗봇, 외국어로서의 영어, 의사소통 능력, 말하기 능력

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