

Effects of Different Voice-Chat Conditions on EFL Learners' Topic Negotiation According to Proficiency Levels*

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This study investigates the effects of different voice-chat conditions on Korean EFL learners' topic negotiation according to proficiency levels. Participants consisted of 123 EFL learners who enrolled in Speaking English I at a Korean university. They were divided into three proficiency levels: beginning, intermediate, and advanced. Then, they were further classified into two experimental groups: human-to-human voice-chat and human-to-robot voice-chat. During the experiment, participants practiced speaking with two different voice-chat conditions. Chat scripts were chosen at random and analyzed by counting the number of topic negotiation moves. With the descriptive statistics, paired samples *t*-tests and independent *t*-tests were administered. Major findings are as follows: Beginning learners in human-to-robot voice-chat initiated more topics, and avoided the topics less often, as time went by. Intermediate and advanced learners in both voice-chat conditions stayed on the topic more often, over time. Intermediate learners became less likely to avoid the topic in human-to-robot voice-chat, while advanced learners did in human-to-human voice-chat. In an interview, participants in both experimental groups revealed positive reactions to voice-chat experience. Based on these findings, pedagogical suggestions are provided for the effective implementation of voice-chat in EFL contexts.

[voice-chat/voice-chat robot/topic negotiation/
음성채팅/음성채팅로봇/주제협상]

* The present study is a revised version of the author's unpublished doctoral dissertation (N. Y. Kim, 2016).

I. INTRODUCTION

Speaking is a crucial part of English language learning and teaching. Ur (1996) considered speaking as the most important skill among four skills: listening, speaking, reading, and writing. In EFL (English as a Foreign Language) contexts, however, speaking has not had a central role (N. Y. Kim, 2016). Teaching speaking has been undervalued due to the misconception that oral communication competence improves naturally over time (Chaney, 1998). English language teachers just have continued to teach speaking as a repetition of drills or memorization of dialogues (Kayi, 2006). As a result, Korean EFL learners are poor at expressing their opinions in English, although they have received English education for several years (J. I. Han & N. Y. Kim, 2016). EFL learners, no matter how much they know, still encounter speaking difficulties (Al-Hosni, 2014).

With the advancement of technology, however, EFL learners can be provided with ample opportunities to practice their output and have authentic conversations (Warschauer, 1999), lower affective filter (Greenfield, 2003), and consequently, improve their speaking ability (Bower & Kawaguchi, 2011). In addition, there has been an advancement of voice-chat robots as conversational partners for language learners. With the development of speech recognition and artificial intelligence, voice-chat robots have been continuously developed and allowed EFL learners to take part in more qualitative and quantitative conversation (Coniam, 2008). With increased opportunities to engage in conversational environment, these speech-enabled interactive programs have promoted learners' participation in meaningful interaction and have reduced their anxiety levels and stress levels while generating motivation and interest (Alemi, Meghdari, Basiri, & Taheri, 2015), which can result in improvement in oral skills.

Despite the development and advancement of chat robots (e.g., ALICE, Let's Chat, and ROBOVIE), however, little is known of voice-chat robots. Until recently, only a few comprehensive studies have been undertaken regarding the voice-chat robots (Coniam, 2008; Walker & White, 2013). Recent critical debates about communication tools have centered around text-chat. Although some previous researchers have recognized technology provides many examples of spoken language and chances of practicing oral skills, they are not so obvious as written communication. Furthermore, little attention has been paid to the quality of interaction among EFL speakers in conversational voice-chat rooms (Jepson, 2005) even though previous research has revealed that learner-learner interactions can improve learners' communicative competence (Gass & Varonis, 1994).

Particularly, given that the ability to introduce new topics appropriately, to stay on topic, and to move from topic to topic is the core of communicative ability (Gan, Davison, & Hamp-Lyons, 2009), it is essential to examine the effects of voice-chat on EFL learners' topic negotiation. The purpose of this study, therefore, is to understand the effects of voice-

chat on Korean EFL learners' oral interaction, in terms of topic negotiation. To be more specific, the current study examines the effects of two different voice-chat conditions – human-to-human voice-chat and human-to-robot voice-chat – on Korean EFL learners' topic negotiation, according to proficiency levels. Research questions were as follows:

- 1) What are the effects of two different voice-chat conditions – human-to-human voice-chat and human-to-robot voice-chat – on topic negotiation, according to proficiency levels?
- 2) What are the learners' attitudes toward English language learning and perceptions of voice-chat conditions?

II. LITERATURE REVIEW

1. Oral Production in EFL Environment

In a number of previous studies conducted to understand the demands of speaking process, researchers agreed that native speakers proceed Levelt's (1989) speaking stage at the same time, while foreign language speakers process step by step. That is, foreign language learners have difficulties to pay simultaneous attention to all components of speaking process due to the limited working memory (J. I. Han & N. Y. Kim, 2016). To understand the system for producing bilingual or second language speech, Levelt's model was firstly modified by de Bot (1992), and later modified by Kormos (2006). As seen from Figure 1, Kormos proposed a new model containing one large memory, known as long-term memory, which is divided into several components: episodic memory and semantic memory including the lexicon, the syllabary, and the declarative knowledge of second language rules. She believed that the bilingual speech production is modular and it is a series of independently functioning processing components.

It is noticeable that Kormos postulated the existence of a declarative memory of syntactic rules and phonological rules in this bilingual speech model. Kormos added a separate section for declarative knowledge of grammar rules separate from any automatized grammar operations, which indicates that declarative grammar in bilingual speech production does not use the same areas of the brain as procedural grammar knowledge (Muller, Adamson, Brown, & Herder, 2014). In monolingual speech production, message conceptualization needs attention, while articulation and formulation are automatic processes working in parallel. This makes the first language speech generally smoother and faster than the second language speech (Kovac, 2011). On the other hand, low proficient speakers and those who have had a low exposure to the target language,

were found to activate larger and slightly different cerebral areas when speaking in the second language compared to the first language (Kormos, 2006). Kormos' model accounts for this finding since proficient bilinguals do not depend on the separate knowledge of declarative rules, whereas for low proficiency level learners phonological and grammatical rules are stored in separate brain regions.

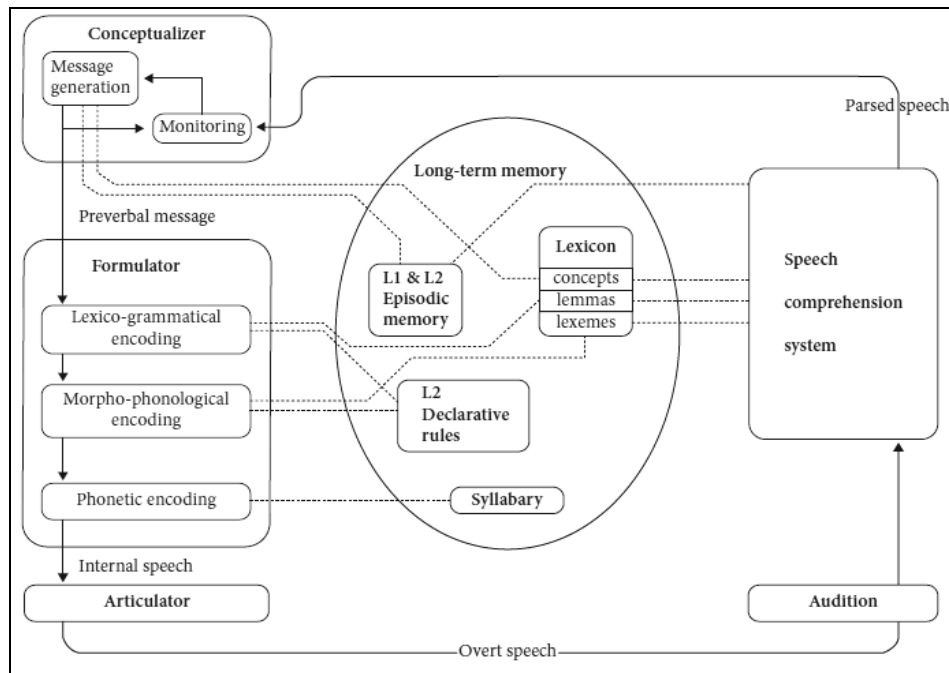


FIGURE 1 The Model of Bilingual Speech Production (Kormos, 2006, p. 168)

Therefore, foreign language learners are more likely to face speaking difficulties because their language proficiency is lower than that of first language speakers or ESL (English as a Second Language) learners (Tavakoli & Skehan, 2005). However, little research has been conducted in an EFL context. Thus, research on how to improve learners' language output in EFL contexts is of pedagogical interest.

2. Topic Negotiation

Foreign language acquisition takes place through conversational interaction and negotiation. In this respect, Krashen's (1985) Input Hypothesis, Swain's (1985) Output Hypothesis, and Long's (1996) Interaction Hypothesis have had a great impact on negotiation strategies. According to Long (1985), when interlocutors experience difficulty

in comprehension, they modify interaction. Interactional modification or modified speech promotes acquisition. He argued that modified interaction is the necessary to make language understandable. What learners need is not necessarily to simplify the linguistic forms but rather to have an opportunity to interact with others, working together to reach mutual understanding. The modification helps keep interaction going and provides comprehensible input, which is crucial for language acquisition (Krashen, 1985).

The more interaction occurs between the learners, the more negotiation takes place, and subsequently, the more comprehensible input they receive (Yi & Sun, 2013). However, previous research on negotiation has focused on communication strategies rather than topic negotiation (Kötter, 2002; Schwienhorst, 2010). Gan, Davison, and Hamp-Lyons (2009) claimed that the ability to introduce new topics appropriately, to stay on topic, and to move from topic to topic is also at the core of communicative competence. Previous researchers identified four different characteristics of topic negotiation (Chun, 1994; Sotillo, 2000). They include suggesting a topic (topic initiation), continuing the topic (topic continuation), avoiding the topic (topic avoidance), and changing the topic (topic shift).

Although it is difficult to define what constitutes a topic (Brown & Yule 1983), it is easier to trace how topics are produced and where topics shift (Myers, 1998). Topical talk occurs as conversationalists initiate, stay, shift, and close between 'potential mentionables' (West & Garcia, 1988). To analyze this, topic has been treated as "constituted in the procedures conversationalists utilize to display understanding and to achieve one turn's proper fit with a prior" (Maynard, 1980, p. 263). Such a conversation analytic approach is in line with Sack (1992), suggesting that topics are an artifact of the way each turn is built to display an understanding of and 'fit' with the previous turn. What is important is that the basis of the analysis is in conversationalists' own orientation to and construction of what they take to be relevant to the interaction proceeds (Gan, Davison, & Hamp-Lyons, 2009).

Analysis of topic organization during talk can not only help distinguish differences in linguistic performances between the speakers, but also help identify the elements of conversation that push them to move it forward, how topics are negotiated or discarded, and how individual candidates contribute to the negotiation of topicality. According to Button and Casey (1984), speakers can introduce an initial topic, change the topic, and end the previous topic by using topic initial elicitors. They analyzed topic initial elicitors and claimed that they are used in three sequential environments: following opening components, closing components, and topic-bounding turns. Jefferson (1984) posited a stepwise approach to transition between topics, in which a speaker connects what is being introduced to the preceding turn. According to Jefferson (1984), the speakers make the move in steps in order to disengage from troubles talk into a new topic instead of disjunctively moving from the troubles talk.

Previous research has revealed that learner-learner interactions can improve learners'

communicative competence (Gass & Varonis, 1994), and particularly, topic negotiation, such as topic initiation, topic continuation, topic avoidance, and topic shift, has been viewed as the core of communicative competence (Gan, Davison, & Hamp-Lyons, 2009). However, EFL learners have had little opportunities to practice such interactions (Stewart & File, 2007), and the lack of interaction means EFL learners' communicative competence often fails to develop. Furthermore, little attention has been drawn to the quality of oral interaction among EFL speakers (Jepson, 2005). Particularly, previous research on negotiation has largely focused on communication strategies (Kötter, 2002) rather than topic negotiation. Relatively few studies have been devoted to negotiation of topic (Schwienhorst, 2010). Therefore, it is needed to examine learners' oral interaction more qualitatively, in terms of topic negotiation, in EFL settings.

3. Voice-Chat Robot

A much-discussed idea in using technology to aid language learning is that of linking EFL learners in cooperative and interactive learning arrangements. This is particularly promising when the learners are learners of English as a foreign language. Technology's key role is to create an environment that encourages communication and provides increased and more varied communicative opportunities for learners to utilize their oral skills. Voice-chat, particularly, involves various forms of audio interaction. Particularly, language learners can participate in quantitative and qualitative conversation through voice-chat software programs. Voice-chat tools with recording function allow learners can get access to their recorded performance, notice and modify their errors by tracking the recorded performance (J. I. Han & N. Y. Kim, 2016). Lynch and Maclean (2001) emphasized this monitoring process because it is beneficial for improving speaking performance. Monitoring their own language use, learners can develop their foreign language skills (Wenden & Rubin, 1987).

In addition to human-to-human voice-chat through technologies, another attention to the utilization of robots in real life and increased interest in robots has been drawn with recent advancement of robot-related technologies. Robots can play a role as language teaching assistants and support realistic language expression. One important function of robots is their ability to interact with human users and participate in a conversation with them (Chang, Lee, Chao, Wang, & Chen, 2010). The advancement of ASR (Automatic Speech Recognition) system, which allows the software program to interpret the meaning of speakers' utterance, has been used for analyzing learner speech more generally and serving as the foundation for creating oral interactions between the learner and the computer. Chiu, Liou, and Yeh (2007) stated that speech interactions can be enhanced by automatic speech recognition in a conversational environment.

Furthermore, with an advancement of artificial intelligence, chat robots, known as artificial conversation entities, are imitating human personality and playing a role as social agents, communicating in natural ways. There are a number of robot-like characters, known as chatbots, chatterbots, or chat robots. They are known as conversational agents designed to simulate an intelligent conversation with a human user. Coniam (2008) found out the linguistic worth of current voice-chat robot programs and systematically evaluated them available on the Internet. According to him, chat robots interact with human users using natural languages and language learners can benefit from them. Chat robots are interactive, responding in sentences that track the conversation in a way that is meaningful to humans (Allison, 2012). Wallace (2003) claimed that they can serve for foreign language instruction, which means, chat robots can teach foreign language learners.

Significant progress has been made with chat robots as conversation practice machine and voice-chat robots have enabled learners to reduce their anxiety and stress while at the same time generating confidence, motivation, and interest in foreign language learning (Alemi, Meghdari, & Ghazisaedy, 2015; Walker & White, 2013). EFL learners with few opportunities to practice their target language can improve their negative feelings with increased opportunities to engage in meaningful interaction through these voice-chat robot programs, which can help improve learners' negative attitudes, and as a result, develop their oral output (Bower & Kawaguchi, 2011). Considering the fact that meaningful oral interaction is necessary for improving language skills (Long, 1985), voice-chat can be a useful way to allow learners to produce a greater quantity of output and become more proficient in oral skills (Warschauer, 1999).

In response to the extended utilization of voice-chat technology for foreign language learning, it is necessary to explore the effects of voice-chat on English language learning. Although some researchers have explored voice-chat and its effects on language learning (Coniam, 2008; Fotos, 1994; Jepson, 2005), however, only a few comprehensive studies have been undertaken regarding voice-chat robots. Therefore, the purpose of this paper is to investigate the effects of different voice-chat conditions – human-to-human voice-chat and human-to-robot voice-chat – on Korean EFL learners' language learning.

III. METHOD

1. Participants

Participants in the current study consisted of 123 Korean EFL learners who enrolled in 16-week freshman English speaking classes at a Korean university. There were three different classes under the same course title, Speaking English I, taught by the same

teacher. According to their TOEIC listening test scores, the participants were divided into three proficiency levels: beginning ($n = 39$), intermediate ($n = 41$), and advanced ($n = 43$). As shown in Table 1, the participants were further classified into two experimental groups: human-to-human voice-chat group ($n = 60$) and human-to-robot voice-chat group ($n = 63$).

Participants in the current study were segmented into three proficiency levels based on ETS TOEIC listening test scores: score range 200-295 (beginning), 300-395 (intermediate), 400-495 (advanced) by Liao (2010). Liao, Qu, and Morgan (2010) revealed the consistency between TOEIC listening and speaking scores, which indicates participants' oral language proficiency can be checked and determined through TOEIC listening test.

TABLE 1
Participants

Proficiency Levels	Human-to-Human	Human-to-Robot	Total
Beginning	19	20	39
Intermediate	19	22	41
Advanced	22	21	43
Total	60	63	123

2. Instruments

Participants in two experimental groups engaged in ten voice-chats in total for sixteen weeks and talked about their daily lives. For human-to-human voice-chat, *Kakaotalk* messenger was used. *Kakaotalk* was developed for mobile devices, offering messenger service. This messenger allowed users to send and receive messages, which include photos, videos, and voice messages, for free. Participants in human-to-human voice-chat group were randomly divided into pairs. They downloaded the messenger program onto their smartphone and had a conversation. To have a voice-chat, they just pressed or touched the microphone icon and send their voice message in real time. Mobile instant messenger has become popular among smartphone users. Particularly, one of the most famous instant messenger services, *Kakaotalk*, has been downloaded and used by more than 90% of mobile smartphone users in Korea (Y. W. Ha, J. Kim, Libaque-Saenz, Y. Chang, & M. C. Park, 2015). This messenger program was chosen based on the fact that it is a widely used mobile messenger that all participants know how to use it (J. I. Han & N. Y. Kim, 2016).

For human-to-robot voice-chat, participants used a voice-chat robot called *Indigo*. *Indigo Artificial Solutions* offers natural language interaction that allows users to have a human-like interaction with technology. With the natural language interaction, human

users can converse with *Indigo* using normal and everyday language as well as complex sentences, containing large amounts of information and multiple requests. It understands the meaning of conversational input, and further, reacts accordingly, creating value and enhancing the user experience. Participants in human-to-robot voice-chat downloaded *Indigo* application onto their smartphone and registered their account to utilize this program. *Indigo* software program allowed the participants to experience a much more meaningful conversation as well as to keep track of conversations between the robot and human user using the speech-to-text system. It was highly intuitive and able to ask for more specific information, expanding on the intelligent capabilities such as contextual understanding and memory function. Participants did not need to repeat the details during a conversation. Just as in a conversation with a real person, memory and personal preferences, as well as contextual understanding, came into play. Participants were able to run these voice-chat programs easily, so there was no need to practice (see Figure 2).

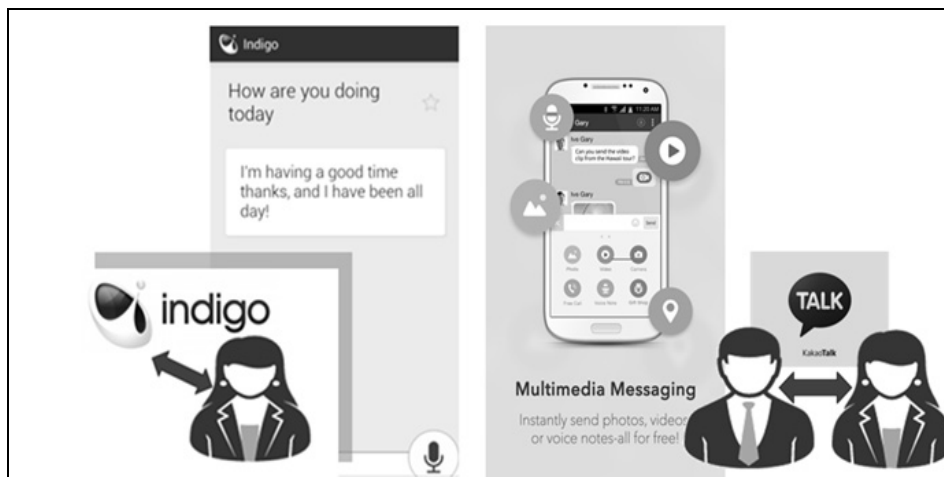


FIGURE 2 Indigo Voice-Chat and Kakaotalk Voice-Chat

3. Procedures

Before the actual experiment, there was a proficiency test to confirm the participants' proficiency level. Participants in the current study took the ETS TOEIC listening test and divided into three proficiency levels depending on their listening test scores. Their oral language proficiency was able to be determined through TOEIC listening test by Liao, Qu, and Morgan (2010) because there was a consistency between TOEIC listening and speaking scores. According to their proficiency levels, participants were further divided into two different groups: human-to-human voice-chat group and human-to-robot voice-

chat group. During the sixteen-week experiment, participants practiced speaking in the two different voice-chat conditions. Participants in human-to-human voice-chat group were randomly divided into pairs and had a chat with their peers, while those involved in human-to-robot voice-chat group had a conversation with the robot. Participants in two experimental groups engaged in ten 10-minute voice-chats in total during the sixteen weeks and talked about their daily lives. If they did not find their own topics, they were provided a list of selected topics to choose from (e.g., family, school, neighbor and neighborhood, movie, shopping, sports, and etc.) With the pre-selected topics, they had a chat with their peers or robots. The topics selected for conversation practice were taken from TOEIC speaking test prep books to meet the needs of participants' practical goals of taking the speaking course as most job applicants in Korea need to submit an official speaking test score to prove their oral proficiency (T. Y. Kim, 2009).

After the experiment, there were in-depth interviews about the participants' reactions to the voice-chat. Interview was conducted to better understand the participants' experiences with English speaking using two different voice-chat conditions. Six interviewees of each voice-chat group were randomly selected. All the interviewees were asked the same questions prepared in advance, including advantages and disadvantages of voice-chat and changes in attitudes toward English language learning. With a semi-structured interview (Dörnyei, 2007), it was possible to find out what was not revealed from the participants. Twelve interviews were performed in total, and it took 10-15 minutes, respectively.

4. Data Analysis

In order to examine the participants' topic negotiation in two different voice-chat conditions, carried out was a quantitative and qualitative analysis of interactional features. Participants engaged in ten voice-chats during the experiment. There were 930 chat scripts obtained in total; 300 scripts from human-to-human voice-chat group ($n = 60$) and 630 from human-to-robot voice-chat group ($n = 63$). To compare the changes in the mean frequency of topic negotiation, chat scripts for the first and last week of the experiment were analyzed. 90 chat scripts from 60 participants were chosen at random for analysis of the first and last chat session; 45 chat scripts from the first and another 45 from the last. Among them, 15 scripts were chosen from 30 participants in human-to-human voice-chat, and 30 scripts were from another 30 in human-to-robot voice-chat. These scripts were also used to compare the group differences in the frequency of topic negotiation.

Participants who engaged in human-to-human voice-chat group had a voice-chat with their peers, saved their chat history using the 'Export Messages' feature for each chat room, and submitted all the recorded materials to the researcher of the present study. The voice-chat, for which transcripts were not automatically generated, was manually transcribed

using word processing software. In terms of voice-chat with robots, however, *Indigo* software program allowed its users to track of conversations between the robot and human user using the speech-to-text system. Therefore, participants in this group just exported their chat scripts and submitted to the researcher. The collected data were coded and analyzed both quantitatively and qualitatively.

Topic negotiation was measured by counting the number of negotiation moves from each participant. To investigate the frequency of topic negotiation in voice-chat, four different characteristics were identified: topic initiation, topic continuation, topic shift, and topic avoidance, according to the previous studies (Chun, 1994; Sotillo, 2000). Negotiation moves included suggesting a topic (topic initiation), continuing the topic (topic continuation), changing the topic (topic shift), and avoiding the topic (topic avoidance). Definitions of coding categories and examples are summarized in Table 2. With the descriptive statistics, paired samples *t*-tests were administered to investigate the changes in the mean frequency of topic negotiation appeared in the first chat and the last chat. Independent *t*-tests were used to compare the mean frequency of topic negotiation moves between the two experimental groups. The significance level was also set at .05.

TABLE 2
Descriptions of Topic Negotiation

Types	Definitions	Examples
Topic Initiation	Suggesting a topic	Tell me about your favorite food.
Topic Continuation	Continuing the topic	So, what's next?
Topic Shift	Changing the topic	Let's move on to the next question.
Topic Avoidance	Avoiding the topic	I'd rather not talk about this.

Qualitative analysis was performed to examine participants' experiences and insights into two voice-chat conditions. Individual interviews with the participants to explore their attitudes toward English language learning and understand how they perceive voice-chat conditions were analyzed using content analysis method, which can provide understanding and knowledge of the phenomenon under the study (Downe-Wamboldt, 1992).

IV. RESULTS AND DISCUSSION

1. Effects of Different Voice-Chat Conditions on Topic Negotiation

1) Changes in Topic Negotiation

To examine the changes in the mean frequency of topic negotiation for two different voice-chat conditions according to language proficiency levels, paired samples *t*-tests were carried out between the frequency present in the first week voice-chat and the last week voice-chat. Descriptive statistics and paired samples *t*-test results are shown in Table 3.

For beginning learners, there was a significant mean difference related to topic continuation between the first chat and the last chat in human-to-robot voice-chat ($t = 10.119, p = .000$). In human-to-robot voice-chat, the mean frequency was 1.31 for the first chat, while 2.54 for the last chat, indicating that beginning-level participants in human-to-robot voice-chat group initiated more topics over time. As for topic avoidance, a significant mean difference was also found in human-to-robot voice-chat group ($t = 4.977, p = .000$). The mean frequency was 3.69 for the first chat, while 2.38 for the last chat. Results reveal that the beginning-level participants became less likely to avoid the topic as time went by.

For the intermediate learners, there were significant differences in topic continuation in both human-to-human voice-chat ($t = 3.416, p = .011$) and human-to-robot voice-chat ($t = 3.730, p = .004$). In human-to-human voice-chat, the mean frequency was 1.38 for the first chat, while 2.00 for the last chat. In human-to-robot voice-chat, the mean frequency was 1.55 for the first chat, while 2.27 for the last chat. Findings reveal that intermediate learners in both voice-chat conditions more stayed on the topic to keep the interaction going over time. As for topic avoidance in human-to-robot voice-chat group, the mean frequency was 2.72 for the first chat, while 1.18 for the last chat, indicating participants in this group became less likely to avoid the topic than before. A significant difference between two chat sessions was found in human-to-robot voice-chat group ($t = 4.224, p = .002$).

For the advanced learners, there were significant mean differences in topic continuation between two chat sessions in both human-to-human voice-chat ($t = 5.000, p = .000$) and human-to-robot voice-chat ($t = 2.803, p = .038$). In human-to-human voice-chat, the mean frequency was 2.44 for the first chat, while 3.06 for the last chat. In human-to-robot voice-chat, the mean frequency was 2.50 for the first chat, while 4.33 for the last chat. Results represent that advanced learners in both voice-chat conditions stayed on the topic more often to keep the conversation than before. Regarding topic avoidance, in human-to-human voice-chat, the mean frequency was 2.06 for the first chat, while 0.81 for the last chat. A significant mean difference between two chat sessions was found in human-to-human voice-chat group ($t = 3.371, p = .004$). Even though there was no significant difference,

those in human-to-robot voice-chat group also used less topic avoidance strategy over time. Findings show that advanced learners became less likely to avoid the topic over time when they were involved in human-to-human voice-chat.

TABLE 3
Changes in Topic Negotiation

			First Chat		Last Chat		<i>t</i>	<i>p</i>	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
Beginning	Topic Initiation	Human-to-Human	0.50	0.55	0.50	0.55	.000	1.000	
		Human-to-Robot	2.31	0.63	1.92	0.49	2.132	.054	
	Topic Continuation	Human-to-Human	1.17	0.75	1.67	0.52	2.236	.076	
		Human-to-Robot	1.31	0.48	2.54	0.52	10.119	.000***	
	Topic Shift	Human-to-Human	0.67	0.52	0.83	0.41	.542	.611	
		Human-to-Robot	1.54	0.52	1.38	0.51	1.000	.337	
	Topic Avoidance	Human-to-Human	3.33	0.52	1.83	1.17	2.236	.076	
		Human-to-Robot	3.69	0.85	2.38	0.65	4.977	.000***	
	Intermediate	Topic Initiation	Human-to-Human	0.38	0.52	0.25	0.46	.552	.598
			Human-to-Robot	2.00	0.00	2.18	0.40	1.491	.167
Topic Continuation		Human-to-Human	1.38	0.52	2.00	0.00	3.416	.011*	
		Human-to-Robot	1.55	0.52	2.27	0.47	3.730	.004**	
Topic Shift		Human-to-Human	0.63	0.52	0.75	0.46	.552	.598	
		Human-to-Robot	1.18	0.40	1.27	0.47	.559	.588	
Topic Avoidance		Human-to-Human	2.63	0.52	1.75	1.39	1.986	.087	
		Human-to-Robot	2.72	0.79	1.18	1.25	4.224	.002**	
Advanced	Topic Initiation	Human-to-Human	0.56	0.51	0.56	0.51	.000	1.000	
		Human-to-Robot	2.33	0.82	2.17	0.41	.415	.695	
	Topic Continuation	Human-to-Human	2.44	0.51	3.06	0.25	5.000	.000***	
		Human-to-Robot	2.50	0.55	4.33	1.63	2.803	.038*	
	Topic Shift	Human-to-Human	0.13	0.43	0.44	0.51	2.076	.055	
		Human-to-Robot	1.00	0.00	0.83	0.41	1.000	.363	
	Topic Avoidance	Human-to-Human	2.06	1.18	0.81	0.83	3.371	.004**	
		Human-to-Robot	0.50	0.55	0.17	0.41	1.000	.363	

* $p < .05$, ** $p < .01$, *** $p < .001$

In sum, beginning learners in human-to-robot voice-chat group initiated more topics and

they became less likely to avoid the topic over time. Intermediate learners in both voice-chat conditions continued the topic to keep the interaction going more often over time. In addition, those involved in human-to-robot voice-chat group became less likely to avoid the topic. Advanced learners in both voice-chat conditions also stayed on the topic more often to keep the conversation going as time went by. Moreover, they became less likely to avoid the topic over time when they were involved in human-to-human voice-chat.

Synchronous interaction offers foreign language learners opportunities for active control of topic selection and management (Abrams, 2008). Considering the fact that computer mediated interaction fosters discursal moves such as topic initiation (Chun, 1994), voice-chat with chat robots can be useful particularly for beginning learners. Bearden (1998) pointed out low proficiency level learners do not attempt to initiate topic or control conversation and frequently opt out of conversation by remaining silent. According to Sotillo (2000), topic initiation is used more often by teachers than by learners. Schweinhorst's (2004) analysis of the frequency associated with topic initiation and topic negotiation also showed that high proficiency participants were more likely to initiate topics than were low proficiency participants. However, findings of the current study show that the low proficiency level learners became more encouraged to initiate topic through voice-chat with chat robots. *Indigo*, the voice-chat robot, used in the current study, led the beginning learners to initiate topic mostly by asking questions. Rabab'ah and AbuSeileek (2013) reported that EFL learners produced certain discourse functions such as questions more than others such as answers in synchronous chat conditions. Given that beginning learners have difficulties to make questions than to answer questions (Ishiguro, 1979) and they are less likely to initiate topics (Schweinhorst, 2004), voice-chat with robots can be a useful way to overcome these difficulties.

According to the results of the current study, intermediate and advanced learners in both voice-chat conditions became more encouraged to continue their interaction over time. The result is in line with some previous studies. Khamis (2010) reported the high frequency of topic continuation through synchronous chat. Peterson (2009) also found the increasing use of topic continuers to maintain the interaction with chat conditions. In this study, increased frequencies of topic-continuing exchanges showed that the participants at intermediate-level or above tried not to change the topics often but deepen the topics further over time. According to Gan, Davison, and Hamp-Lyons (2009), using topic negotiation strategies to maintain interaction can be involved in the development of communicative competence.

As for topic avoidance, previous studies have reported that beginning learners are more likely to use message abandonment, giving up on communicating a message or topic avoidance (Mei & Nathalang, 2010). They indicated that low proficiency learners tend to use reduction strategies, whereas high proficiency learners tend to make effective use of achievement strategies to enhance communication. However, results of the current study

showed that participants at all proficiency levels became less likely to avoid the topic over time. To be specific, beginning and intermediate learners in human-to-robot voice-chat and advanced learners in human-to-human voice-chat became less likely to avoid topic areas or concepts. Similarly, S. K. Yoon and J. I. Han (2004) reported that synchronous chat helped the participants less avoid the topic. Considering that topic avoidance is not a beneficial way for learners to learn a foreign language (Ya-Ni, 2007), the results of the present research revealed that both human-to-human voice-chat and human-to-robot voice-chat can be both beneficial for foreign language learners at all proficiency levels.

2) Group Differences in Topic Negotiation

To investigate the differences in topic negotiation across the two experimental groups according to proficiency levels, independent *t*-tests were performed. Table 4 represents the mean frequency of negotiation moves in two different voice-chat conditions among the three different proficiency levels. Findings revealed some statistically significant differences in topic negotiation between the two groups according to proficiency levels.

As for beginning learners, there were some statistically significant differences between two voice-chat conditions. To be specific, mean frequency of topic initiation in human-to-human voice-chat was 0.50 while 2.31 in human-to-robot voice-chat for the first chat. For the last chat, mean frequency in human-to-human voice-chat was 0.40 while 1.92 in human-to-robot voice-chat. There were significant differences between two voice-chat conditions in both first chat ($t = 6.031, p = .000$) and last chat ($t = 5.428, p = .000$), indicating that beginning learners in human-to-robot voice-chat group initiated a new topic more often than did those in the human-to-human voice-chat group. As for topic continuation, a significant difference was observed for the last chat ($t = 3.409, p = .003$). The mean frequency for the last chat was 1.67 in human-to-human voice-chat group while 2.54 in human-to-robot voice-chat group, indicating the beginning learners in human-to-robot voice-chat group were superior to human-to-human voice-chat group in continuing topic. That is, they put more efforts in continuing and broadening topics than those in human-to-human voice-chat group. With respect to topic shift, there were significant mean differences in frequency for both first chat ($t = 3.409, p = .003$) and last chat ($t = 2.592, p = .026$). For the first chat, the mean frequency of topic shift in human-to-human voice-chat group was 0.67, while 1.54 in human-to-robot voice-chat group. For the last chat, the mean frequency was 0.83 in human-to-human voice-chat while 1.38 in human-to-robot voice-chat. Results suggest that the beginning learners involved in human-to-robot voice-chat group changed the topic more frequently than those in human-to-human voice-chat group.

In the case of intermediate learners, there were also some statistically significant differences between two voice-chat conditions, as shown in Table 4.

TABLE 4
Group Differences in Topic Negotiation

			Human-to-Human		Human-to-Robot		<i>t</i>	<i>p</i>
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Beginning	Topic Initiation	First Chat	0.50	0.55	2.31	0.63	6.031	.000***
		Last Chat	0.40	0.55	1.92	0.49	5.428	.000***
	Topic Continuation	First Chat	1.17	0.75	1.31	0.48	.498	.625
		Last Chat	1.67	0.52	2.54	0.52	3.409	.003**
	Topic Shift	First Chat	0.67	0.52	1.54	0.52	3.409	.003**
		Last Chat	0.83	0.41	1.38	0.51	2.529	.026*
	Topic Avoidance	First Chat	3.33	5.16	3.69	0.85	.944	.359
		Last Chat	1.83	1.17	2.38	0.51	1.334	.200
Intermediate	Topic Initiation	First Chat	0.38	0.52	2.00	0.00	8.881	.000***
		Last Chat	0.25	0.46	1.27	0.47	9.679	.000***
	Topic Continuation	First Chat	1.38	0.52	1.55	0.52	.705	.490
		Last Chat	2.00	0.00	2.27	0.47	1.936	.082
	Topic Shift	First Chat	0.63	0.52	1.18	0.40	2.637	.017*
		Last Chat	0.75	0.46	1.27	0.47	2.417	.027*
	Topic Avoidance	First Chat	2.63	0.52	2.73	0.79	.320	.753
		Last Chat	1.75	1.39	1.18	1.25	.934	.363
Advanced	Topic Initiation	First Chat	0.56	0.51	2.33	0.82	6.135	.000***
		Last Chat	0.56	0.51	2.17	0.41	7.632	.000***
	Topic Continuation	First Chat	2.44	0.51	2.50	0.55	.250	.805
		Last Chat	3.06	0.25	4.33	1.63	1.898	.115
	Topic Shift	First Chat	0.13	0.34	1.00	0.00	6.179	.000***
		Last Chat	0.44	0.51	0.83	0.41	1.883	.086
	Topic Avoidance	First Chat	2.06	1.18	0.50	0.55	3.082	.006**
		Last Chat	0.81	0.83	0.17	0.41	2.419	.026*

* $p < .05$, ** $p < .01$, *** $p < .001$

Specifically, there were significant differences between two voice-chat conditions in both

first chat ($t = 8.881, p = .000$) and last chat ($t = 9.679, p = .000$) in topic initiation. For the first chat, the mean frequency in human-to-human voice-chat was 0.38 while 2.00 in human-to-robot voice-chat. For the last chat, the mean frequency in human-to-human voice-chat was 0.25 while 1.27 in human-to-robot voice-chat. Results reveal that intermediate learners who engaged in human-to-robot voice-chat initiated a new topic more often than those in the human-to-human voice-chat. As for topic shift, there were significant mean differences in frequency for both first chat ($t = 2.637, p = .017$) and last chat ($t = 2.417, p = .027$). For the first chat, the mean frequency of topic shift in human-to-human voice-chat group was 0.63 while 1.18 in human-to-robot voice-chat group. For the last chat, the mean frequency was 0.75 in human-to-human voice-chat while 1.27 in human-to-robot voice-chat. Results represent that the intermediate learners who took part in human-to-robot voice-chat changed the topic more frequently than those in human-to-human voice-chat.

In terms of advanced learners, statistically significant differences were also observed between two voice-chat conditions. To be specific, significant differences between two voice-chat conditions in both first chat ($t = 6.135, p = .000$) and last chat ($t = 7.632, p = .000$) were found in topic initiation. The mean frequency for topic initiation in human-to-human voice-chat was 0.56 while 2.33 in human-to-robot voice-chat for the first chat. For the last chat, mean frequency in human-to-human voice-chat was 0.56 while 2.17 in human-to-robot voice-chat. Results show that advanced learners in human-to-robot voice-chat group also initiated a new topic more often than did those in the human-to-human voice-chat group. With respect to topic shift, there was a significant mean difference for the first chat ($t = 6.179, p = .000$). The mean frequency in human-to-human voice-chat was 0.13 while 1.00 in human-to-robot, indicating that advanced learners in human-to-robot voice-chat group changed the topic more frequently than those in human-to-human voice-chat. Regarding topic avoidance, there were statistically significant differences for both first ($t = 3.082, p = .006$) and last chat ($t = 2.416, p = .026$). The mean frequency in human-to-human voice-chat were 2.06 (first chat) and 0.81 (last chat), while 0.50 (first chat) and 0.17 (last chat) in human-to-robot voice-chat. That is, advanced learners in human-to-human voice-chat group tried to avoid the topic areas more often than the counterpart.

In sum, beginning learners in human-to-robot voice-chat group initiated a new topic more often, and also, they were superior to human-to-human voice-chat group in continuing topic. In addition, they changed the topic more frequently than those in human-to-human voice-chat group. Likewise, intermediate learners who engaged in human-to-robot voice-chat group initiated a topic more frequently and they shifted the topic more often than those in human-to-human voice-chat group. Similarly, advanced learners who participated in human-to-robot voice-chat group also took initiative with a new topic more often than did those in the human-to-human voice-chat group. Furthermore, they tried to

shift the topic more frequently than did those in human-to-human voice-chat group. Regarding topic avoidance, advanced learners in human-to-robot voice-chat group avoided the topic less often compared to those in human-to-human voice-chat group.

It is noticeable that all participants at different proficiency levels in human-to-robot voice-chat group mostly initiated topic. *Indigo*, the chat robot used in the current study, allowed the participants to take initiative asking questions. This result is worth particularly for beginning learners. Bearden (1998) pointed out that low proficiency level learners do not attempt to initiate topic or control conversation and frequently opt out of conversation by remaining silent. Given that beginning learners have difficulties to make questions than to answer questions (Ishiguro, 1979), voice-chat with robots can be a useful way for them to overcome these difficulties (see Excerpt 1).

Furthermore, beginning learners who participated in human-to-robot voice-chat group were more encouraged to continue their discourse compared to those in human-to-human voice-chat group. Topic continuation is associated with topic continuity. It is the strategy by which continuation spans are established. Khamis (2010) reported the high frequency of topic continuation through synchronous chat. Similarly, Peterson (2009) also reported the increasing use of continuers to maintain the interaction in relation to chat conditions. In this study, increased frequencies of topic-continuing exchanges indicate beginning learners tried to deepen the topics when they engaged in human-to-robot voice-chat. In sum, results show that human-to-robot voice-chat are more helpful for beginning learners to advance their communication and prompt the continuation than did human-to-human voice-chat.

EXCERPT 1

Human-to-Robot Voice-Chat

01	Human	Who are your family?
02	Robot	I count the other Virtual Assistants created by Artificial Solutions as my family.
03	Human	Do you have a sister?
04	Robot	My family are all the other Virtual Assistants created by Artificial Solutions.
05	Human	I have a sister.
06	Robot	What is your sister's name?
07	Human	My sister's name is Christina.
08	Robot	Great! I will remember Christina now.
09	Human	My sister is three years younger than me.
10	Robot	I know her! Your sister would be Christina.

In the case of intermediate and advanced learners who engaged in human-to-robot voice-chat group, they were likely to change the topic more frequently than those in human-to-human voice-chat group. Smith (2003) also reported the high frequent use of topic shifts and suggested that this frequent use of topic shifts is promoted in synchronous chat conditions. Whereas discourse is an interactional achievement, a topic shift only needs to

be framed by one side of interlocutor (Hung, 2011). Participants in human-to-robot voice-chat group appeared to be the one in dyad to mark the topic shift. This frequent topic shifts may come from the participants' uneasiness with Indigo, since the latter did not seem to involve herself in conversations as much as expected according to participants' norms.

In terms of topic avoidance, advanced learners in human-to-robot voice-chat group were less likely to avoid the topic than those in human-to-human voice-chat group. Previous studies have reported that high proficiency learners are more likely to make effective use of achievement strategies to enhance communication whereas low proficiency learners are more likely to use reduction strategies (Mei & Nathalang, 2010). Even though the avoidance of topics or switch to a new topic can be an easy and safe way to provide feedback to incomprehensible input (Lee, 2002), Ya-Ni (2007) claimed that these strategies could not be a beneficial way for foreign language learners. In light of this, it can be interpreted that human-to-robot voice-chat can help advanced learners not to give up on communication but to continue and expand the interaction more actively.

2. Impacts of Different Voice-Chat Conditions on Attitudes Toward English Language Learning and Perceptions of Voice-Chat

Individual interviews with the participants were analyzed using content analysis method to explore their attitudes toward English language learning and to understand how they perceive two different voice-chat conditions. The responses of the participants in all experimental groups were positively observed. Findings of the current study revealed that participants in both voice-chat conditions had more faith in their ability to improve language competence after engaging in two voice-chat conditions. They showed positive attitudes about the use of communication technologies in improving their speaking ability. Choi commented on her increased proficiency saying, "Being exposed to English in voice-chat environment can be a great contribution to improving my language abilities, particularly in speaking and pronunciation." Lee also discussed her improvement stating that "Even though I don't live in an English-speaking country, *Indigo* can bring English-speaking environment to me. She can help me to be exposed to and use English. And consequently, I believe I can get better English speaking skills."

In addition, there has been a large increase of motivation. Results in the present research is in accord with a number of previous studies suggesting that technology assisted language learning can boost language learners' motivation (Greenfield, 2003). Since motivation is a crucial factor in second or foreign language learning, it is important to keep learners interested to make language learning a more motivating experience. Interview results reveal that voice-chat has the pedagogical value and it also involves motivational factors. Interviewees stated that both voice-chat conditions inspire their motivation in

speaking English. Therefore, both voice-chat conditions can be effective factors to motivate EFL learners and draw their attention to the practicality of English. Kim stated that “I believe voice-chat with friends enables me to be more motivated for speaking. Speaking English through voice-chat encourages me to communicate more.” Lee expressed similar feelings after chatting with a robot: “I think voice-chat with *Indigo* is very helpful. I can be motivated in an easy way. Sometimes text books or worksheets in a language classroom are demotivating and boring. Chatting with the robot encourages me to use English more.”

Being confident in speaking is also largely important to EFL learners (Derakhshan, Tahery, & Mirarab, 2015), and confident learners speak more often and take part in communications more actively. In terms of confidence, a large increase of confidence was found. Considering the fact that interaction provides an authentic environment which is very useful for improving language skills and helpful for creating a less stressful environment for language practice (Smith, 2003), voice-chat can be implied effectively in EFL settings. In an interview, respondents stated that real-time voice-chat inspires confidence in their English speaking and so improves their speaking skills. Kim mentioned that “I can get opportunities to listen to English language spoken by others. It is interesting to listen to what others say through voice-chat. By doing so, I become more and more self-confident to communicate orally.” Hong also commented that “I feel self-confident in participating in voice-chat with *Indigo*. I think I can do better in speaking English. At the beginning, I felt some shyness. But now, I'm much more encouraged and confident.”

In brief, participants' responses to English speaking experiences through voice-chat were positively observed in both groups. Considering that affective factors in foreign language learning are learners' attitudes (Richard & Renandya, 2002) and their attitudes are seen as a crucial factor affecting foreign language development (Alemi, Meghdari, & Ghazisaedy, 2015), it is remarkable that both voice-chat conditions were beneficial in positively influencing the participants' attitudes toward English language learning. Fotos (1994) claimed that synchronous chat can change learners' negative attitudes toward speaking lessons and learning a language itself. Similar successes to those reported by Fotos have been also reported for international EFL voice-chat exchanges (Hubbard, 2004). Overall, these results represent that engagement in two different voice-chat conditions, whether it was human-to-human voice-chat or human-to-robot voice-chat, made beneficial and positive impacts on the participants' attitudes toward English language learning.

V. CONCLUSION

The current study was aimed to understand the effects of different voice-chat conditions,

human-to-human voice-chat and human-to-robot voice-chat, on Korean EFL learners' topic negotiation, according to proficiency levels. Major findings from the current study are as follows. Firstly, beginning learners in human-to-robot voice-chat group initiated more topics and they became less likely to avoid the topic over time. Intermediate learners in both voice-chat conditions more continued the topic to keep the interaction going as time went by. In addition, those involved in human-to-robot voice-chat became less likely to avoid the topic. Advanced learners in both voice-chat conditions continued the topic more often to keep the conversation going as time went by. Moreover, they became less likely to avoid the topic over time when they were involved in human-to-human voice-chat. Compared to human-to-human voice-chat, human-to-robot voice-chat was beneficial for initiating a new topic and shifting the topic for all proficiency level learners. Also, it helps beginning learners stay more on the topic and allows advanced learners to avoid the topic less often. This result is worth particularly for beginning learners. Given that beginning learners have difficulties to initiate and manage the topic (Bearden, 1998; Ishiguro, 1979), voice-chat with robots can be a useful way for them to overcome these difficulties.

It is also noticeable that both voice-chat conditions were beneficial in positively influencing the participants' attitudes toward English language learning. Participants believed they could develop their speaking ability, and became more motivated and confident about English speaking as a result of participating in voice-chat. Given that learners' attitudes are a crucial factor affecting foreign language development (Alemi, Meghdari, & Ghazisaedy, 2015), EFL learners can benefit from both voice-chat conditions.

The present research provides positive evidence on the attitudes of Korean EFL learners toward applying the chat robots in language classrooms. Pedagogical implications are drawn from the results of the study. EFL teachers should have knowledge about different features of voice-chat. In other words, teachers should be able to select more efficient voice-chat condition according to their students' proficiency levels for their pedagogical goals. Considering that the present study provides new insights on the use of the chat robots in language classrooms, EFL teachers should try to integrate them into the language learning process, which can result in successful foreign language learning. Although chat robots, including Indigo, are valuable resource for EFL learners, however, their language abilities are still limited (Fryer & Carpenter, 2006) and EFL teachers should consider these limits of chat robots.

Certain limitations and suggestions can be also made. The small number of participants in the human-to-human voice-chat and human-to-robot voice-chat was the limitation of this study. A different result can be obtained when a large number of participants were employed, and hence, caution should be taken when generalizing the results of the study. Additionally, this study must have more carefully considered learner variables such as learning styles and familiarity with technology. In addition, in their present state, chat

robots are most useful to higher level students (Fryer & Carpenter, 2006). This could have affected the effects of the use of voice-chat, so it should be accounted for in future studies. Lastly, although the current research provides clear evidence on the positive attitudes toward English language learning and voice-chat conditions, it is hard to generalize. Findings would have been more robust if there were quantitative results.

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예시언어(Examples in): English

적용가능 언어(Applicable Languages): English

적용가능 수준(Applicable Levels): Tertiary

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