

Social Presence in Synchronous CMC-based Language Learning: How does it affect the productive performance and consciousness of learning objectives?

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This study examines potential designs in the usage of synchronous computer-mediated communication (SCMC) for communicative language learning in learner-centered communication. In this study, we compared four types of SCMC: text-based chat with and without interlocutors' image, video conferencing, and audio conferencing, each supporting of the use of formulaic expressions concerning communication strategies. We investigated the effect of each type of SCMC on four features of language learning: perceived consciousness of social presence; perceived consciousness of language learning in communication; productive performance; and consciousness of learning objectives. The results showed that the interlocutor's image has a main effect for social presence as well as on some aspects of productive performance, and that the use of voice has a significant effect on perceived consciousness of language learning in communication, productive performance and consciousness of learning objectives. In addition, an interaction effect was confirmed on perceived consciousness of social presence and productive performance. It can be said that social presence aids second language communication in learner-centered communication; however, it can inhibit consciousness of learning context and learning objectives.

Introduction

As information and communication technology advances, interest has grown in using computer networks for second language learning. Lately, communication technology

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such as computer-mediated communication (CMC) is often used not only in the home, but also in educational settings such as in the classrooms. CMC allows second language teachers to offer Internet-based collaborative learning. It has been suggested that, in particular, SCMC is effective in the instruction of communication skills in second language acquisition (SLA), because SCMC—such as in the form of text chatting—can offer an environment similar to face-to-face communication; learners in SCMC exhibit behavior similar to that in face-to-face communication, such as the use of communication devices (Blake, 2000; Lee, 2002). The similarity to a real-time setting affects the motivation for learning; interlocutors perceive each others' presences in real-time, and modify some aspects of their communication behavior, such as speed of response and use of easily understandable words, accordingly. In particular, learners' perception of presence seems to be affected by 'social presence', suggested by Short, Williams and Christie (1976) as the "degree of salience of the other person in the interaction and the consequent salience of the interpersonal relationship" (p. 65), that is, the perceived proximity to real-time communication in face-to-face settings. Short *et al.* (1976) suggest that two factors which promote social presence are immediacy—the psychological proximity of the interlocutors—and 'intimacy'—the perceived familiarity caused by social behavior such as eye gazing, nodding, and smiling. Social presence is an important factor for promoting learning in distance learning (McIsaac & Gunawardena, 1996), and is said to be effective emotionally. Social presence seems to increase the learners' satisfaction with learning (Gunawardena & Zittle, 1997). In asynchronous CMC (email), social presence motivated learners and promoted interaction such as requests for help (Leh, 2001). Social cues such as nodding, smiling and gestures facilitated effective learners' learning in interactive television settings (Hackman & Walker, 1990).

In traditional text-based CMC, which lacks social cues (Levy & Stockwell, 2006), learners tend to raise social presence in continuous communication by expressing their emotions in ways such as typing emoticons. In some types of SCMC, such as audio conferencing and text chat, learners cannot use social cues such as eye gazing and nodding, and as a result "are not aware when one person starts to type a message and may continue with a topic, or else may change the direction of the discussion while a potential contributor to the discussion types his or her message" (Levy & Stockwell, 2006, p. 100). Learners can also raise social presence in text-based CMC through the community constructed by learners during communication or with the teacher's effort (Gunawardena, 1995). Broadband network technology is capable of offering a new type of SCMC using multimedia, audio conferencing and video conferencing; it seemed that such richer media might be more effective for learning, due to the availability of social cues (see Gunawardena & Zittle, 1997; Hackman & Walker, 1990; McIsaac & Gunawardena, 1996; Zähler, Fauverge, & Wong, 2000). However, it is unclear whether the nature of media leads to a change in communication behavior (Walther, 1992). In this paper, we compare four types of SCMC and discuss their effect on second language learning, with a particular focus on social presence perceived by learners and the effects of that perception on communication skill acquisition.

CMC and Communicative Language Learning

As we mentioned above, SCMC provides an environment similar to a real-time setting, which motivates learners to communicate with each other in a second language, interacting with socio-psychological factors such as consciousness of rapid response (see Blake, 2000; Hampel & Baber, 2003; Lee, 2002, 2004; Smith, 2003; Wang, 2004). Much previous research has reported its positive effect for language learning. CMC and other interactive media can be used for promoting learning (Furstenberg, 1997; Warschauer, 1997). Synchronous CMC promotes more equal participation than face-to-face communication in discussions in a second language (Chun, 1994, 1998; Warschauer, 1996). Language learners who have studied in synchronous CMC outperform learners who have studied in asynchronous CMC and without CMC in the amount of speech generated in face-to-face discussions (Abrams, 2003). SCMC would enhance task-based communication such as discussion, due to a combination of the rapid nature of communication exchange; linguistic effects, such as the amount of speech; cognitive effects, which promote continuous communication with communication strategy; and emotional effects, such as increased participation in discussion by shy learners compared to a regular classroom (Beauvois, 1998a, b). Language learners use communication devices in synchronous CMC, as well as in face-to-face communication (Lee, 2002; Smith, 2003), in particular, SCMC use in task-based communication is effective to promote the use of communication strategies such as negotiation of meaning (Smith, 2002) and feedback for repairing lexical and syntactic errors (Morris, 2005). CMC allows learners to speak with reduced anxiety (Kelm, 1992). In a similar study, learners who trained with SCMC performed better on an oral test than those who trained in regular classroom instruction (Beauvois, 1994). Beauvois (1994) suggested that a positive attitude to technology, a low-stress environment, and anonymity, allowing learners to hide personal information such as race, gender, and timidity, leads to a positive effect in oral performance in second language communication. These features facilitate the acquisition of communication skills in second language. These positive effects promote interaction between learners, which many researchers regard as one of the most important skills in communication (see Long, 1981, 1989; Gass, Mackey, & Pica, 1989).

Recent advances in technology have created a new type of SCMC which allows interlocutors to feel others' presence to a much greater degree than in text-based communication. Several studies have suggested the effects of such kinds of CMC in language learning. Video conferencing allows learners to eliminate physical barriers and motivates them to speak in the second language (McAndrew, Foubister, & Mayes, 1996). Video conferencing enables learners to use communication devices such as eye gazing and gestures for understanding each other (Bruce, 1996). In task-based language learning, video conferencing can improve performance in collaborative learning (Zähner *et al.*, 2000). However, it was suggested that practical use of IT-enhanced CMC in SLA has not yet been considered (Wang, 2004). In particular,

instructional design must take into account the features of IT-enhanced CMC, including face-to-face instruction, for effective learning.

SLA Theoretical Background

From the view of SLA, as mentioned above, previous work suggests that CMC is effective in communicative language learning, because CMC can promote social interaction such as negotiation of meaning between learners, and comprehensive input as well as output. Interaction, comprehensive input, and output seem to play an important role in language learning. The importance of these factors in classroom-based communicative instruction has been verified by many previous studies.

Comprehensive input means written or spoken information in the target language which the learner can comprehend (see Krashen, 1985; Gass, Mackey, & Pica, 1998). Interaction is based on comprehensive input. In SLA, communication skills, in particular, seem to be learned through communication between participants such as learners and teachers (see Long, 1981, 1989).

Interaction refers to meaningful communication to enable understanding, and drives comprehensive input. When people face problems such as misunderstanding each other, they prefer to repair the problems before continuing communication (Clark, 1994). For example, when a learner cannot understand his/her interlocutor's utterance, his/her interlocutor may modify or paraphrase for the learner's understanding, or the learner may ask his/her interlocutor to repeat. Learners seem to learn communication skills through the production of comprehensive input in interaction.

Output means learning activity in language education. Learners need to perform learning activities such as uttering, repeating or writing, because learners produce comprehensive input through interaction (Swain, 1985, 1995). Swain (1995) claimed that output has three functions: noticing the gap between what the learner can and cannot express; hypothesis testing such as the trial-and-error method; and metalinguistic functions such as reflective learning.

A communicative approach is effective in fostering communication skills by combining with three rationales above. However, in an interactive classroom setting, it is difficult to make learners aware of the learning objectives consciously. In general, learning objectives are not described clearly in communicative task-based instruction, because evaluation criteria are concerned with task accomplishment and outcome of communication, not fluency and accuracy of form of learners' utterances (Ellis, 2003).

Instructional Background

Japan has traditionally focused on grammatical competence in language learning. However, with globalisation, Japanese face the possibility of having to speak English anywhere, anytime, even in Japan. Thus, recently, the focus of instruction was shifted

from English as sophistication to English as a communication tool, and the development of practical communication skills has been clarified as the goal of English education in the official curriculum guideline of Japan (Ministry of Education, Culture, Science, Science and Technology, 2004). However, teachers need much time to teach communication skills, which consists of many basics which learners, in particular beginners, have to master.

Ideally, teachers would teach both fundamental and high level skills in every face-to-face lecture. However, this ideal is difficult to achieve, because the lecture time is so short that they may not be able to accomplish the learning objectives which they set. Therefore, one effective solution would be in the use of CMC; blended learning with CMC and face-to-face lectures would be practical and effective for second language learning.

In such blended learning, online learner-centered study is often offered, with the intent of motivating learners to study and review independently. It has been suggested that learner-centered instruction may promote negotiation of meaning and increase motivation in language learning (see Fernandez-Garcia & Martinez-Arbelaz, 2002; Pica & Doughty, 1985). Discourse in teacher-fronted instruction is more grammatical than that in learner-centered study (Pica & Doughty, 1985).

However, there are concerns that learners do not study accurate speech in such communication, because learners are not conscious of learning objectives; that is, they do not understand what they have to learn and what they have to do in learner-centered instruction with no teacher present. Some studies report that it can be difficult for learners to learn objectives without consciousness of these objectives in second language learning (see Schmidt, 1990, 1993, 2001). Many previous studies have compared the features of learner-centered communication performed with various communication media; however, the effectiveness of particular media with respect to consciousness of learning objectives, and the requirements for effective communicative language learning, have not been discussed. Making communication as realistic and natural as possible is a major challenge of CALL (Bax, 2003), but there is also a practical value in making learners conscious of learning objectives even in learner-centered communication. Learners should be provided with the opportunity to recognize their current skill level and to obtain assistance when necessary during learner-centered communication outside the classroom. It seems to be important to design instruction which raises consciousness of learning objectives and retains high motivation without having the teacher in front of the learner. Learner-centered SCMC for learner-centered communication seems to be potentially effective for learning when some support functions are integrated (Martin, 2005; Smyth, 2005).

Purpose of this Study

This study aims to explore the effect of interlocutors' presence on language productive performance and learners' perceived consciousness of learning objective

as an experimental research. To do this, we analyze the difference among four media from the following four viewpoints:

1. Perceived consciousness of interlocutor's presence (the proximity of each medium to face-to-face).
2. Perceived consciousness of language learning in communication.
3. Learning productive performance.
4. Performance concerning learning objective.

For this study, we first developed four types of web-based software which allow learners to be conscious of their SLA objectives through learning activities in learner-centered instruction: video conferencing software, audio conferencing software (video conferencing with no image), text-chat with image and plain text-chat. Using this software, we evaluate the effect of each system from four viewpoints above, and discuss the effectiveness of each medium, the most effective usage of SCMC, and required functions for communicative language learning from the view of education.

Research Design

This is an experimental design study. Learners were divided into four groups. In the first group, each learner communicated with his/her interlocutor through video conferencing. Learners in the second group used audio conferencing for the communication in the second language. The third group communicated with text-chat which included the interlocutor's image. The learners in the last group used plain text-chat, with no image. Learners in each group engaged in task-based communication with their interlocutors.

System Development

In SLA research, one common topic is how to raise learners' consciousness of target language forms in communication tasks as we mentioned above. Previous studies have suggested the effectiveness of grammar consciousness-raising tasks in communication (Fotos & Ellis, 1991; Fotos, 1994). The significance of these studies was based on the importance of learners' awareness in communicative instruction. Some studies report that learners cannot learn learning objectives without consciousness of these objectives in second language learning (Schmidt, 1990, 2001). Existing SCMC software seemed to have difficulty in promoting learners' consciousness of learning objectives in learner-centered communication, because such software did not display the learning objectives and context for communication. Therefore, in learner-centered communication, we considered the necessity to (a) provide context for communication; and (b) display the learning objectives at all times in order to raise learners' consciousness of learning objectives.

For this experiment, we developed four types of software systems—video conferencing, audio conferencing, text-chat with image, and text-chat without

image—that allow learners to be aware of and utter the target formulaic speech as a learning objective. Formulaic speech is an expression that consists of fixed and repeated words and is employed on particular situations. We chose the acquisition of formulaic speech as the learning objective because formulaic speech acquisition is employed commonly and accepted by learners of a wide range of age in the early stages of SLA (Ellis, 1986), and is a possible effective tool for social interaction (Wray & Perkins, 2000). The system allows learners to select a target expression from several formulaic speech patterns which the teacher has set and display it during communication in SCMC. We assumed that learners treat the target expression as a learning objective in communication.

System Architecture

This system is a client/server system. Clients consist of software allowing selection of expressions, display of target expressions and learning material in all the system types. In addition, the video conferencing system has a camera, headset with microphone, and display of interlocutor's image and voice-based communication; the audio conferencing system has a headset with microphone and audio conferencing software; the text-chat system with images has a camera and text-based communication software; and the text-chat system without image has text-based communication software. All client software for all system types was developed in Macromedia[®] Flash[™] and Action Script, and can be used on web browsers with the Flash[™] Player plug-in 7.0 or later installed. If the Flash[™] Player plug-in is not installed, or if the installed version is too old, most web browser software currently in common use (including Microsoft[®] Internet Explorer[™], Netscape[™], and Mozilla Firefox) will allow the user to download and install the plug-in automatically. The server side consists of software for management of learning material, management of target expressions, and storage of learners' selected expressions. The common functions in all types and the text-based communication software are implemented in PHP 5.0 and use the Apache 2.0 web server with the PHP module; the use the Macromedia[®] Flash[™] Communication Server MX 1.5 streaming server. All of the server software runs on the same computer. Table 1 shows the functions in each system.

System Functions

In these systems, SCMC software with learning material and functions for raising the consciousness of learning objectives, learners use cameras and/or headsets with microphones, or just text-based communication software, to work together in real-time. First, the client software reads in the target expression file, which contains target expression categories and individual target expressions, from the server and displays them. The display on the client then moves to the communication area. This area includes the selection and display of a target expression to help learners be conscious of the target expression as well as learning material for collaborative activity. In video conferencing and text-chat with images, the server distributes learners' video to each

Table 1. Client software in each system

System	Function				
	Selection and display of target expression	Display of learning material	Display of images (camera)	Voice-based communication (microphone)	Text-based communication
Video conferencing	*	*	*	*	
Audio conferencing	*	*		*	
Text-based chat with images	*	*	*		*
Text-based chat without images	*	*			*

learner using streaming; it also provides learning material documents and target expressions, which the clients read in and display via the web server. For video conferencing and audio conferencing, voice is distributed to each learner by the server. Messages typed in text-chat by learners are sent to the server, written into a log file on the server, then sent by the server to each client. The management functions on the server allow the teacher to easily register and edit expression categories and individual target expressions as well as links to learning material documents. This data is stored in XML files. The system reads this data in at the beginning of each section, as mentioned above.

Interface

Each system shows the target expression area, communication area and learning material. In the target expression area, target expression buttons are shown. When the learner clicks one of the buttons, the target expression display appears in a pop-up window. The learner can open multiple displays, and can move and close them. The format of the communication area changes depending on the system. Images are displayed for video conferencing and text-chat with images; a message display and typing area are shown for text-chat. For audio conferencing, only the learner's name area is shown. The interfaces for video conferencing and text-chat with images are displayed in Figures 1 and 2. The interfaces of the audio conferencing and plain text-chat systems are similar, except for the lack of a image display.

Methodology

Subjects

The subjects in this study were 40 university students (female: 9, male: 31, age range: 18–35, mean age: 22.1). Subjects did not know each other prior to the experiment. All subjects were non-native speakers of English. The subjects' proficiency in English

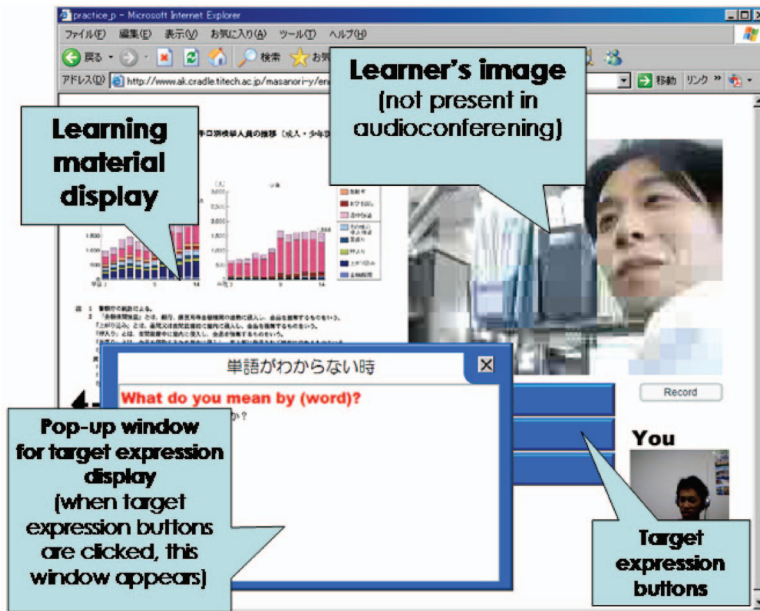


Figure 1. Video conferencing interface

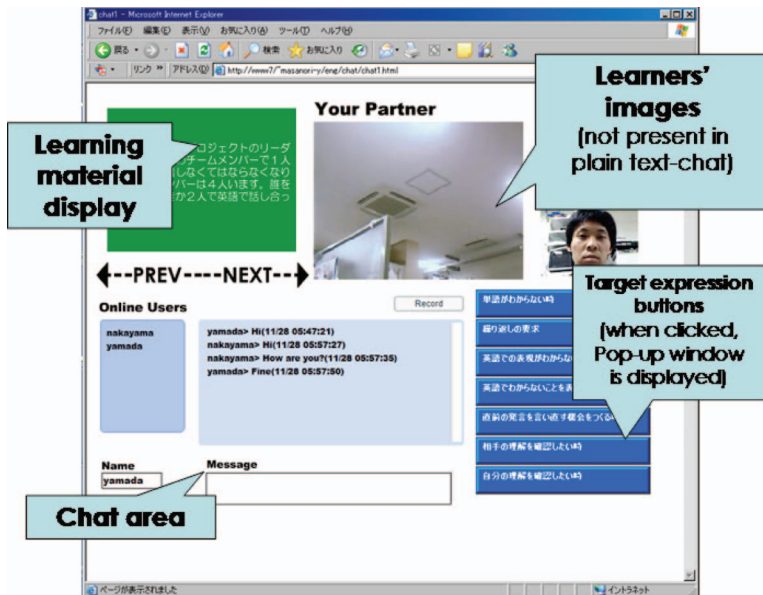


Figure 2. Text-chat interface with partner's image

varied from low–intermediate level students who had participated in some international conferences and had opportunities to talk with international student in their daily life to low level students who needed help to understand others' utterances, but

all had reached at least a high school standard level in grammar and vocabulary. Computer literacy among them was high; all used computers everyday for email, text-chatting, Internet, writing reports and so on.

Procedure

Subjects were randomly divided into four groups: the video conferencing group, the audio conferencing group, the text-chat with image group, and the plain text-chat group. After instruction on using the system and tasks prior to the experiment, each subject moved to his/her room. A laptop computer with a webcam and headset was set in each room, and all computers were connected to a LAN. Subjects were divided into pairs, and each pair performed a learner-centered discussion for 15 minutes; all pairs were given the same topic, that of choosing a new school teacher from four candidates, taking into consideration the given conditions. Information and background about the school and candidates were given in the learning material displayed in each system (see the explanation of the system interface above). As mentioned above, each pair consisted of subjects who had not met before, because familiarity between subjects may have an influence on the communication (e.g., falling back to their native language) and evaluation (e.g., a subject may be affected by his/her friend's thinking when they evaluate the system). From the educational view, familiarity is an important factor in educational performance, but we controlled this condition by eliminating this factor, because this study aims to investigate the effect of systems which enhance social presence on second language learning issues. Finally, subjects were asked to answer a questionnaire.

Data Collection

The aim of this study is to investigate the contribution of perceived social presence to the utterance of the target expression and language productive performance. Data was collected in two ways. The first is a questionnaire. All subjects were required to answer a questionnaire after the experiment. The questionnaire asked all subjects to rate the perceived presence of their interlocutor, the perceived ease of communication, and the perceived consciousness of second language communication while communicating in each type of SCMC from a six-point rating scale. The questions asked to subjects are listed in Tables 2 and 3.

The second data collection method is video-recording. In order to conduct objective research, all communication was video-recorded, and the items listed in Table 4 were counted for each subject.

Results

All data collected in this study were analyzed using two-way analysis of variance (ANOVA). We looked for significant effects on subjects' perception and behavior of the presence or absence of the partner's image and the use of voice *vs.* text.

Table 2. Questions about the perceived presence of interlocutor and ease of communication

#	Questions	Scale
1-1	Rate the frequency of your utterances while using SCMC	1: less than face-to-face – 6: more than face-to-face
1-2	Rate the perceived ease of starting communication from your side	1: not at all – 6: very much
1-3	Rate the perceived ease of understanding your partner’s utterances	1: not at all – 6: very much
1-4	Rate the perceived ease of saying what you want to say	1: not at all – 6: very much
1-5	Rate the perceived consciousness of your partner’s presence	1: not at all – 6: very much
1-6	Rate the perceived relief in communication in SCMC	1: not at all – 6: very much
1-7	Rate the perceived ease of communication in English	1: not at all – 6: very much
1-8	Rate the perceived feeling of the similarity between face-to-face and using SCMC	1: far from face-to-face – 6: very close

Table 3. Questions about he perceived consciousness of the second language communication

#	Questions	Scale
1-9	Rate the perceived consciousness of accuracy in English communication	1: not at all – 6: very much
1-10	Rate the perceived consciousness of responding as soon as possible	1: not at all – 6: very much
1-11	Rate the perceived consciousness of communicating the desired meaning in English, even if you make a grammatical mistake	1: not at all – 6: very much
1-12	Rate the perceived ease of reflecting on your utterances	1: not at all – 6: very much
1-13	Rate the perceived consciousness of the grammatical accuracy of your partner’s utterances	1: not at all – 6: very much
1-14	Rate the perceived consciousness of the response speed of your partner	1: not at all – 6: very much
1-15	Rate the perceived consciousness of the comprehension of your partner’s utterances	1: not at all – 6: very much

The Perceived Presence of Interlocutor and Easiness of Communication

A two-way analysis of variance (ANOVA) revealed a statistically significant effect of the presence or absence of the partner’s image in Items 1-1, 1-2, 1-4, 1-6, 1-7, and 1-8. However, we also confirmed an interaction effect between the presence or absence of the partner’s image and the use of voice versus text in Items 1-5, 1-6 and 1-7. Table 5 shows the average score, main effects and interaction effect for each item.

Table 4. Data collected through analysis of video records

#	Items
2-1	Total number of turns
2-2	Utterances of the target expression
2-3	Grammatical errors
2-4	Lexical errors
2-5	Self-corrections
2-6	Utterances in the native language (Japanese)
2-7	Interruptions
2-8	Mean interval between utterances

The Perceived Consciousness of the Second Language Communication

The use of voice *vs.* text seems to be an important factor in raising consciousness of learning in second language communication through SCMC; a significant effect was found in Items 1-9, 1-11 and 1-14. The presence or absence of the partner's image also had a significant effect on 1-9. The results are shown in Table 6.

Video Data

The use of voice versus text was found to have a significant effect on all questions, and the presence or absence of the partner's image was significantly effective on 2-1, 2-3, 2-5, 2-6 and 2-7. Also, an interaction effect was revealed in Items 2-1, 2-3 and 2-5. Table 7 shows the result in detail.

While the presence of the partner's image and the use of voice communication resulted in an increased number of utterances, more than half of the utterances were 'filler', utterances such as "uh" and "thuh" which seem to be either a sign of problems in communication or a communication strategy for expressing a tough situation (Clark, 1994; Smith & Clark, 1993). As shown in Table 8, subjects used filler utterances frequently in voice communication, particularly during video conferencing.

Qualitative Analysis: Utterances

Although the greatest amount of speech was confirmed in video conferencing, over half of this amount was filler. On the other hand, filler was rarely used in text-based communication. As subjects pointed out, learners have enough time to plan their communication; they make an opinion, choose the words and construct an accurate sentence. As shown in Table 7, fewer grammatical errors were confirmed.

However, filler was often used in voice communication. We considered the possible function of the filler used in this experiment as a feature of SCMC. Previous studies suggested that filler is a predictor of problems in communication (Clark, 1994; Smith & Clark, 1993). The filler "thuh", for example, is used for a "problem in formulating the current definite noun phrase" (Clark, 1994, p. 247). While cultural

Table 5. Mean scores and effects for questions on perceived consciousness of presence

#	Question	Image	Voice/ Text	Mean	Main effect of image	Main effect of voice/text	Interaction effect
1-1	Rate the frequency of your utterances in using SCMC	Yes	Voice	3.9	*		
		No	Voice	3.3			
		Yes	Text	3.7			
		No	Text	3.3			
1-2	Rate the perceived ease of starting communi- cation from your side	Yes	Voice	4.1	**		
		No	Voice	2.1			
		Yes	Text	3.6			
		No	Text	2.9			
1-3	Rate the perceived ease of understanding your partner's utterances	Yes	Voice	4.2			
		No	Voice	3.2			
		Yes	Text	4.3			
		No	Text	4.1			
1-4	Rate the perceived ease of saying what you want to say	Yes	Voice	3.6	*		
		No	Voice	2.8			
		Yes	Text	3.6			
		No	Text	2.5			
1-5	Rate the perceived consciousness of your partner's presence	Yes	Voice	3.9			+
		No	Voice	2.3			
		Yes	Text	3.1			
		No	Text	3.4			
1-6	Rate the perceived relief in communication in SCMC	Yes	Voice	4.3	**		*
		No	Voice	2.3			
		Yes	Text	3.1			
		No	Text	3.4			
1-7	Rate the perceived ease of communication in English	Yes	Voice	4.2	*		+
		No	Voice	2.4			
		Yes	Text	3.6			
		No	Text	2.6			
1-8	Rate the perceived feeling of the similarity between face-to-face and using SCMC	Yes	Voice	4.4	*		
		No	Voice	2.4			
		Yes	Text	3.7			
		No	Text	2.9			

Main effect: 1-1: *: $p < 0.05$, $F(1,22) = 4.787$; 1-2: **: $p < 0.01$, $F(1,22) = 9.288$; 1-4: *: $p < 0.05$, $F(1,22) = 4.857$; 1-6: **: $p < 0.01$, $F(1,22) = 10.195$; 1-7: *: $p < 0.05$, $F(1,22) = 5.006$; 1-8: * $p < 0.05$, $F(1,22) = 6.850$.

Interaction effect: 1-5: +: $p < 0.1$, $F(1,22) = 4.046$; 1-6: *: $p < 0.05$, $F(1,22) = 5.570$; 1-7: +: $p < 0.1$, $F(1,22) = 4.008$.

differences and features of the first language may reduce the applicability of such studies to our research, some tendencies after fillers in SCMC were found in this study, which are similar to those of face-to-face communication suggested by

Table 6. Mean score and effects for questions on perceived consciousness of second language learning in communication

#	Question	Image	Voice/ Text	Mean	Main effect of image	Main effect of voice/text	Interaction effect
1-9	Rate the perceived consciousness of accuracy in English communication	Yes	Voice	2.8	+	***	
		No	Voice	2.7			
		Yes	Text	4.8			
		No	Text	3.5			
1-10	Rate the perceived consciousness of responding as soon as possible	Yes	Voice	3.7			
		No	Voice	4.0			
		Yes	Text	4.5			
		No	Text	3.8			
1-11	Rate the perceived consciousness of communicating the desired meaning in English, even if you make a mistake in grammar	Yes	Voice	5.5		+	
		No	Voice	4.7			
		Yes	Text	4.5			
		No	Text	3.8			
1-12	Rate the perceived ease of reflecting on your utterances	Yes	Voice	3.9			
		No	Voice	3.3			
		Yes	Text	4.2			
		No	Text	3.9			
1-13	Rate the perceived consciousness of the grammatical accuracy of your partner's utterances	Yes	Voice	2.2			
		No	Voice	2.3			
		Yes	Text	2.3			
		No	Text	2.4			
1-14	Rate the perceived consciousness of the response speed of your partner	Yes	Voice	2.7		***	
		No	Voice	3.1			
		Yes	Text	4.5			
		No	Text	4.8			
1-15	Rate the perceived consciousness of the comprehension of your partner's utterances	Yes	Voice	5.1			
		No	Voice	5.3			
		Yes	Text	5.1			
		No	Text	5.1			

Main effect (image): 1-9: +; $p < 0.1$, $F(1,22) = 3.690$.

Main effect (voice/text): 1-9: ***; $p < 0.001$, $F(1,22) = 14.762$; 1-11: + < 0.1, $F(1,22) = 3.692$;

1-14: ***; $p < 0.001$, $F(1,22) = 18.044$.

previous studies. In particular, we found that the filler “uh” tended to be used for consideration of opinion, and the filler “ah” seemed to be used for constructing sentences, finding suitable words after consideration of opinion, or correcting errors in previous utterances. The following examples of discourse between subjects show this difference.

Table 7. Mean values and effects for language performance

#	Item	Image	Voice/ Text	Mean	Main effect of image	Main effect of voice/text	Interaction effect
2-1	Mean number of turns	Yes	Voice	65.30	***	***	**
		No	Voice	34.40			
		Yes	Text	10.80			
		No	Text	9.10			
2-2	Mean number of utterances of the target expressions	Yes	Voice	1.30		**	
		No	Voice	1.70			
		Yes	Text	0.60			
		No	Text	0.40			
2-3	Mean number of grammatical errors	Yes	Voice	8.90	+	***	*
		No	Voice	4.50			
		Yes	Text	1.10			
		No	Text	1.80			
2-4	Mean number of lexical errors	Yes	Voice	0.00		**	
		No	Voice	0.00			
		Yes	Text	2.10			
		No	Text	1.40			
2-5	Mean number of self-corrections	Yes	Voice	1.50	+	*	
		No	Voice	0.50			
		Yes	Text	0.40			
		No	Text	0.20			
2-6	Mean number of utterances in the native language	Yes	Voice	5.70	+	***	+
		No	Voice	3.75			
		Yes	Text	0.00			
		No	Text	0.00			
2-7	Mean number of interruption	Yes	Voice	3.30		***	
		No	Voice	1.80			
		Yes	Text	0.00			
		No	Text	0.00			
2-8	Mean interval between utterances (seconds)	Yes	Voice	1.31		***	
		No	Voice	11.85			
		Yes	Text	57.27			
		No	Text	49.57			

Main effect (image): 2-1: ***: $p < 0.001$, $F(1,22) = 12.969$; 2-3: +: $p < 0.1$, $F(1,22) = 3.690$; 2-5: +: $p < 0.1$, $F(1,22) = 3.927$; 2-6: +: $p < 0.1$, $F(1,22) = 3.644$.

Main effect (voice/text): 2-1: $p < 0.001$, $F(1,22) = 77.712$; 2-2: $p < 0.01$, $F(1,22) = 11.613$; 2-3: ***: $p < 0.001$, $F(1,22) = 29.717$; 2-4: **: $p < 0.01$, $F(1,22) = 11.569$; 2-5: *: $p < 0.05$, $F(1,22) = 5.345$; 2-6: ***: $p < 0.001$, $F(1,22) = 13.475$; 2-7: ***: $p < 0.001$, $F(1,22) = 38.007$; 2-8: ***: $p < 0.001$, $F(1,22) = 35.495$.

Interaction effect: 2-1: **: $p < 0.01$, $F(1,22) = 10.405$; 2-3: *: $p < 0.05$, $F(1,22) = 7.011$; 2-6: +: $p < 0.1$, $F(1,22) = 3.644$.

Table 8. Mean number of filler utterances and effect

Question	Image	Voice/Text	Mean	Main effect of image	Main effect of voice/text	Interaction effect
Mean amount of filler	Yes	Voice	46.70	***	***	***
	No	Voice	13.40			
	Yes	Text	0.10			
	No	Text	0.30			

Main effect (image) ***: $p < 0.001$, $F(1,22) = 12.429$.

Main effect (voice/text) ***: $p < 0.001$, $F(1,22) = 40.432$.

Interaction effect ***: $p < 0.001$, $F(1,22) = 12.731$.

Example 1 (Audio conference)

15. Subject 2 [S2]: *Ahmn* probably, we should talk about the one, Mr Toshikazu Miyake. *Ahmn* so . . .
16. How do you think about this person?
17. Subject 1 [S1]: He is clever, but, the other candidate is more, so I shouldn't . . .
18. S2: *Uhhmn* . . .
19. S1: Correct the teacher.
20. S2: [4 sec] Why do you think so?
21. S1: *Ahhh* he is smarter than *uhmn* . . . [3 sec] Candidate 2.
22. S2: OK . . . *ahhh* so but the good thing for him is . . . he . . . is that *ahhh* he . . . he . . . he has . . .
23. A great experience, *ahhh* he has taught at elementary school and junior high school.
24. S1: Yes.
25. S2: And also, and . . . he can work for a long term and also, he can lead to our school for 30 . . .
26. Minutes.
27. S1: *Ahhh* . . . [interruption]
28. S2: But you think he should be smarter. Right?
29. S1: *Ahhh* yes.
- [. . .]
41. S2: So we really need the teacher who can teach mathematics and science, and advance . . .
42. Mathematics and science.
43. S1: Yes.
44. S2: Probably we should ha . . . have . . . *ahhh* hire the Candidate 4.
45. S1: Yes.
46. S2: And then ah *ahh* wu . . . wu . . . we need the . . . the . . . *ahh* negotiate annnd [and] he can . . .
47. Work longer or we should look for another person during summer and after summer.
48. Right?
49. S1: Right.

In Example 1, the feature of each filler can be seen. Filler “ah” was used as a bridge between words; after “ah”, subject uttered the next word without interviewing silence. Lines 22, 44 and 46 display another function of “ah”: after the utterance of “ah”, Subject 2 repeated and modified his words. For example, in Line 44, Subject 2 intended to convey the meaning “employ” but first uttered “have” which is an incorrect word choice. However, the subject then modified the word “have” to “hire” after the filler “ah”. As for the filler “uh”, the subjects seemed to use “uh” for the construction of opinion. For example, in Line 18, Subject 2 said just the filler “uh”. A few seconds later, Subject 2 asked a question concerning construction of opinion. Moreover, in Line 22, Subject 2 expressed opinion. We can see the same situation in Line 21.

Example 2 (Video conferencing)

32. Subject 4(S4): But, it is ...
 33. Subject 3(S3): *Uhhnn* ...
 34. S4: How do you think?
 35. S3: But we don't need experience in teaching so... *ah* I...I think... *uhmmn*... No. 2 is ...
 36. OK.
 37. S4: OK... right. But it takes some cost to teach him how to teach.
 38. S3: *Uh? Uh?*
 39. S4: [2 seconds] *Ahhh* but, it costs us in teaching him how to teach right?
 40. S3: *Uhhnn* ...
 41. S4: Because he has no experience.
 42. S3: *Uhhnn* ...
 43. S4: But there are a lot of good things about No. 2. There are many good things. He is ...
 44. Close to school and work longer.
 45. S3: Yeah right, and ...

In Example 2, the fillers “uh” and “uhnnn” were used as signs of a problem in communication. In Line 33, Subject 3 seemed not to consent his partner’s opinion, and uttered “uhnnn”. Subject 4 guessed that Subject 3 has an opinion different from his own, and asked “How do you think?”. Subject 3 then expressed his opinion.

In Line 37, the filler “uh” was used as kind of communication strategy. Subject 3 asked Subject 4 to repeat his utterance by saying “Uh? Uh?”, Subject 4 repeated the previous utterance. It is not explicit that the filler “uh” in this line was a communication strategy, but intonation allowed Subject 4 to understand the problem in communication. For Subject 3, filler “uh” came to be a sign of the degree of comprehension.

Filler also seemed to be used as an indirect trigger for feedback, as shown in the following example.

Example 3 (video conferencing)

27. Subject 6(S6): *Ahh* [interruption] *ahh*...which person you have any opinion whether she or ...
28. ... he has no ability?
29. Subject 5(S5): *Ahhh yeah*, which person?
30. S6: *Ahh*... *ahhh* which person do you think there are no ability to teach?
31. S5: *Ahhh* I think...I think Number 2.
32. S6: Number 2
33. S5: Number 2 is the best person.
34. S6: Number 2? Horiike?
35. S5: Horiike, Horiike.
36. S6: Horiike is the best, you think.
37. S5: He...he has no experience, but he is good at math, and...the...his level is good I ...
38. Think.

In Lines 27, 28 and 29, Subject 6 asked Subject 5 a question, but Subject 5 could not understand his partner's utterance. Subject 5 gave unclear feedback to Subject 6, "ahhh yeah, which person?". It seemed that Subject 5 either understood some keywords and used "ahhh yeah" as confirmation of understanding, or failed to understand the latter part of his question, and used the filler "Ahhh" and positive word "yeah" to request clarification indirectly. The question "which person?" in Line 29 can be understood as either a request for repeating the statement or a negative feedback for the incorrect grammar. Subject 6 appeared to regard the question as a negative feedback for the incorrect grammar, and then corrected his question in Line 30. However, Subject 5 seemed to be asking for repetition, because he answered the question in Line 30, despite grammatical errors.

Qualitative Analysis: The presence of the partner's image

The effects of the presence of the partner's image in communication were revealed not only in perceived presence, but also in perceived consciousness of second language communication and in productive performance. The presence of the partner's image seemed to motivate learners to communicate, and served as a reinforcement medium for voice communication. The following example between Subject 7 and Subject 8 shows that subjects used non-verbal devices to indicate comprehension, which is regarded as a communication strategy (see Tarone, 1981a, b), and the emotional sign 'laughing' which indicates satisfaction and comfort. These allowed the subjects to communicate in a relaxed manner.

Example 4 (Video conferencing)

35. S7: Yes. Horiike is the best one for this work.
 36. S8: Hai ["yes" in Japanese, laughing].
 37. S7: *His life and ability is very good.*
 38. S8: [Nodding.]
 39. S7: And he can go to work *not take* long time.
 40. S8: Uhnnn [with nodding] [41 seconds], is our choice Miss Horiike [cocking the head]? [S8 mistook of the sex of the character Mr Horiike in the task.]
 41. S7: Yes.
 42. S8: Yeah. [Laughing.]
 43. S7: [Laughing.]
 44. S8: [12 seconds] What do you think the last one? Nakanishi-san [Miss Nakanishi in Japanese].
 45. S7: Short term. Ahh the best is...ahhh but he can't work long term [S7 mistook the sex of the character Miss Nakanishi" in the task].
 46. S8: Yes, and he... [S8 also mistook the sex of the character Miss Nakanishi in the task].
 47. S7: [interrupting] And he... and *he take long term* to go to work. 45 minutes.

In this example, non-verbal behaviors helped subjects to speak English without frustration due to grammatical and lexical errors. In this communication, we can see some errors in grammar (e.g., plural form and third person singular in Lines 37 and 47). However, behaviors such as nodding and laughing allowed them to relax and speak positively. In Line 40, Subject 8 seemed to be afraid that he could not understand the point in their communication, and said "Is our choice Miss Horiike?" with a non-verbal device (cocking the head) as a sign of lack of confidence in understanding. Then, Subject 8 asked Subject 7 to answer his idea in Line 44. As can be seen from this example, the partner's image seemed to play an important role in facilitating communication; however, in text-chat with image, such behaviors were not confirmed.

Example 5 (Video conferencing; subjects were the same as those in Example 3)

23. S6: So I...I think she has not ability to teach to them...so...I think Number 3 is not good.
 24. S5: Yeah I think so.
 25. S6: Uhnnn... let's think about 1, 2, 4.
 26. S5: Uhnnn [*inclining head*].
 27. S6: [*interrupting*] Ahh...ahh... which person you have any opinion whether she or he has ...
 28. No ability?

In Example 5, subjects uttered filler by noticing the partner's non-verbal response. In Lines 26 and 27, Subject 6 looked at Subject 5's image and suspected that Subject 5 had some problem or ideas; Subject 6 then interrupted with filler and asked a concrete question. Filler may facilitate more active participation in communication in this study, but it is also notable that non-verbal behavior promotes the use of such filler.

Opinions and Suggestions from Subjects

Opinions regarding the partner's image. Some subjects commented on each type of SCMC and other functions. Almost all who used SCMC with the partner's image commented on its positive effect on communication. Subjects who used SCMC without the partner's image, on the other hand, tended to have a negative opinion; for example, subjects felt stress while waiting for their partner's response, because they had no way to see their partner's behavior, and thus felt uncomfortable during communication.

For video conferencing:

It was similar to face-to-face. I felt comfortable during communication. (Comment 1)

I was able to feel my partner's presence, so I could enjoy communicating in English, but a larger image size would make it easier to feel the partner's presence. (Comment 2)

I could consider and speak after seeing my partner's non-verbal response. It was very useful for second language communication. (Comment 3)

When I made an error in grammar, I could see whether my partner understood what I meant through the image. I felt relaxed, even when I made a mistake. (Comment 4)

For text-chat with partner's image:

I could communicate with my partner, watching her image to see her behavior, so I could wait for her response.

For audio conferencing:

I felt difficulty in speaking using only voice. When I could not hit upon the right words, I wanted to use gestures for explanation. (Comment 1)

I could not find a chance to break the ice, because I could not see my partner's non-verbal response. (Comment 2)

I made my partner wait for my response a lot, because it took me a long time to find the right words to say. I was afraid that he thought I wasn't serious. (Comment 3)

For text-chat without partner's image:

I could not voice my thoughts and feelings without seeing my partner's image.

Opinions regarding the use of Voice vs. Text. Most opinions expressed about the use of voice *vs.* text were negative. Comments about voice communication generally reflected the subject's ability in the second language, while comments about text communication tended to focus on the nature of text-based communication.

For video conferencing and audio conferencing:

I did not have enough time to consider what to say, because I felt compelled to respond rapidly, so I could not speak accurate English. (Comment 1)

I could not hit upon suitable vocabulary in communication, and I felt bad for making my partner wait for my response. (Comment 2)

For text-chat with partner's image or without image:

I could not use gestures with explanation, and gestures alone did not let my partner understand what I meant. (Comment 1)

I felt a sense of discomfort on the mixture of text and image. I prefer to speak. It allows me to respond rapidly. (Comment 2)

I felt compelled to respond rapidly when a message from my partner was displayed while I was typing. (Comment 3)

I had to change my message depending on my partner's response while I was typing. (Comment 4)

Discussion

Perceived Consciousness of Interlocutor's Presence

In this study, we found that the presence or absence of the partner's image affected the perceived consciousness of the partner's presence. The results for Items 1–5, 1–6 and 1–7 show an interaction effect between image and voice, showing that the combination of these elements raises the learners' consciousness of presence in the same way as face-to-face communication. However, text-chat without image overwhelmed audio conference in almost all questions concerning consciousness of presence. This may be due to the high load of second language communication. Ease of understanding in communication is very important for learners; text-chat enabled low level subjects to understand their partners' utterances without listening ability, and seemed to lessen the load of second language communication, which is an uncommon task in their daily life.

The ability of learners to see their partners' images helped them to understand each other by allowing the use of non-verbal devices. As we see from subjects' comments, subjects using non-image systems tended to feel anxiety in communication, because of the lack of social cues such as nodding. This finding concerning the presence or absence of the partner's image follows the findings from previous studies (Gunawardena, 1995; Hackman & Walker, 1990; Short *et al.*, 1976).

Perceived Consciousness of Language Learning in Communication

Voice communication seemed to be effective in raising the consciousness of language learning. In the context of language learning, not only the emotional side but the consciousness of learning should be raised in learner-centered communication. As we mentioned above, voice communication seemed to be a high load on learners when communicating in the second language. In text-chat, subjects had a high consciousness of accuracy such as grammar in communication, because in text messages, errors are easily seen as well.

Moreover, subjects seemed to be more conscious of response speed when using text-chat. Because of the limited view of the partner's situation, it is hard to verify the partner's comprehension. Subjects are also conscious of their response when answering by typing in text-based communication, since they can take much time to consider their opinion in English. In voice communication, subjects can respond unconsciously by voice using filler such as "ah" and "uh"; as can be seen from the subject's comments, it seems to be easier to respond rapidly using voice communication, which will reduce anxiety in communication. The result of Item 1–10 shows that the average score in each medium is greater than 3.5, the middle score on the six-point scale, and there is no significant difference due to either the presence or absence of the partner's image or the use of voice versus text. It is suspected that subjects wanted to respond rapidly in all media, but the second language communication overloaded them.

The partner's image affects the accuracy slightly. The partner's image is an effective medium for understanding the partner's comprehension. When subjects faced problems in communication, they tended to rely on the images for understanding the situation, as we confirmed above in the subjects' free comments. Also, the video records show that subjects tried to correct the previous utterance or repeat it. In this process, subjects raised the consciousness of accuracy somewhat.

Language Productive Performance

Video conferencing, which uses voice communication function and includes the partner's image, had the greatest average number of turns (2–1), grammatical errors (2–3), self-corrections (2–5), utterances in the native language (2–6), and interruptions (2–7), as well as the shortest average interval between utterances (2–8) by a significant margin. As we discussed above, the presence of the partner's image seems to affect the perceived consciousness of successful communication including comprehension. It may be suggested that the presence of the partner's image motivates the subject to communicate in the second language and offers a way to understand the partner's situation through non-verbal devices. Also, we can see an interaction effect on the average number of turns (2–1), grammatical errors (2–3) and self-corrections (2–5). These findings suggested that video conferencing facilitates communicative language learning from the view of SLA. A large amount of input, as well as many opportunities for trial and error and reflection for possible

negotiation of meaning are offered in communication through video conferencing (Krashen, 1985; Long, 1981; Swain, 1995). A notable point is that the partner's image seems to work well as a reinforcement for voice communication, but not for text-chat, because of the difference between voice and text in terms of the load of second language communication. In text-chat, subjects do not need to concentrate on listening to the partner's utterance, but can understand other's utterance by reading the text message. This feature lessens the load on subjects of second language communication. Moreover, subjects tended to concentrate on the text message display, rather than partner's image. Thus, the effect of the presence of the partner's image seemed to be unconscious in text-based second language communication. Previous studies report that communication in text-chat resembles face-to-face communication in the usage of communication strategies (see Chun, 1994, 1998; Lee, 2002; Warschauer, 1996). These studies claimed that an environment similar to face-to-face promotes meaningful communication such as negotiation of meaning. From this point of view, video conferencing offers an environment closer to face-to-face than text-chat, and should be effective for communicative language learning.

From the viewpoint of performance, about half of the utterances in video conferencing were filler, as well as about a third of those in audio conferencing. The large amount of filler and the use of native language indicate the existence of communication problems such as misunderstanding, difficulty in finding suitable words, and low fluency. In this study, many deadlocks and grammatical errors were confirmed. Voice communication seemed to overload subjects, particularly those with a low level of proficiency in English. In text-chat, we found few types of filler, few grammatical errors, little use of native language, and no native code switching.

However, previous studies reported that filler triggered self-correction and indicated communication problems (Clark, 1994; Smith & Clark, 1993). In this study, we found that filler had positive effects on learner-centered communication. As we explained in the qualitative analysis, filler promoted consciousness of learning such as correcting grammatical errors, significant communication such as the exchange of opinion, and question and answer in voice communication tools like video conferencing and audio conferencing.

A main effect for the presence or absence of the partner's image was also found; the partner's image affected emotional behaviors such as laughing and promoted understanding through non-verbal devices. In the unique situation of video conferencing, fillers were also uttered with non-verbal devices and emotional behaviors, as in Example 5 in the qualitative analysis.

Performance Concerning Learning Objectives

A significant difference was found in learning objective performance between subjects who used voice communication and those who used text-chat. Subjects seemed to rely on the target expression display in voice communication, because the load of voice communication prevented subjects from speaking fluently. Subjects often faced communication problems such as difficulty in comprehending their partner's

utterances and communicating their thoughts, as shown by the use of much filler in communication. Subjects in video conferencing and audio conferencing often uttered target expressions concerning the communication strategy *the request for help*, such as “Would you repeat that please?”. In text-chat, where listening ability is not needed, only expressions concerning the communication strategy *clarification request*, such as “What do you mean by X?”, were used. However, target expressions were used only infrequently in all media, although subjects often faced communication problems. These may be two reasons for this. The first is that, due to the immediacy of SCMC, subjects felt pressured to produce language quickly (Levy & Stockwell, 2006), resulting in the use of short sentences and simple words to make it easy for their partners to understand. For example, subjects relied on one-word questions (e.g., simply saying “mountain?” to ask the meaning of the word *mountain*) and fillers to communicate with their partners. The second is that, generally, performance in task-based instruction tends to involve high cognitive load in immediate processing of speech (Skehan, 1998). In this study, learners communicated with their partners about a decision-making task, which seems to enhance the interaction between learners (Ellis, 2003); however, task familiarity and task complexity can influence the performance concerning learning objectives (Foster & Skehan, 1996). In contrast, there is one perspective that high cognitive load can promote the concentration, leading to high performance as a result (Robinson, 2002). In fact, in this study, some subjects considered that they could use communication strategies without the formulaic expressions, while others were worried that it would take too long to reply because they took time to find a suitable target expression. Some subjects commented that they had no chance to use the target expression window:

I could not use the target expression display. I know it would be useful when I have trouble in communication in the second language, but I did not have any chance to use it, because I had to concentrate on considering my opinion and translating it into English. (Audio conferencing, Comment 1)

I didn't want to use the target expression display, because it would take too long to find the target expression and then respond, and the conversation would not sound natural. (Video conferencing, Comment 2)

Target expressions, which were regarded as the learning objective in this study, seemed to be considered optional by subjects. Some subjects were highly conscious of natural conversation as in face-to-face situations, rather than the learning context, despite facing many communication problems which were opportunities to use the target expressions.

Voice communication can be said to help subjects be conscious of the learning objective; however, the results suggest that ability problems prevented some subjects from paying attention to the objectives. In addition, the presence of the partner's image causes some subjects to focus on conversing naturally, rather than the learning objectives.

Conclusion

This study aimed to investigate four points with respect to the use of SCMC in second language learning: perceived consciousness of the interlocutor's presence, perceived consciousness of the second language in communication, language productive performance, and performance concerning language learning.

The interlocutor's image was found to have been most effective in promoting consciousness of presence, while voice has no main effect on consciousness of presence. However, an interaction effect was found between the use of voice communication and the presence of the partner's image. Many previous studies have reported the proximity of SCMC to face-to-face communication from the view of response speed, but these results suggest that the partner's image plays an important role in the perceived presence. Subjects were comfortable communicating with their partner visible, because subjects can see the partner's personality and non-verbal behaviors. Interestingly, the use of voice as opposed to text had little effect, despite the ability to respond rapidly when speaking; voice seemed to serve more as a reinforcement to the image. With no image present, subjects seemed to primarily feel the difficulty of second language communication instead, with the result that subjects felt more relaxed and comfortable in second language communication when using text-chat as compared to audio conferencing.

The perceived consciousness of the second language in communication seemed to be affected by the method of communication (voice or text). In text-chat, all messages from subjects are written out; this gives them enough time to form an opinion and construct a sentence with grammatical and lexical accuracy. Since errors were also apparent to both subjects, they seemed to be afraid of making mistakes in grammar and spelling. Therefore, subjects seemed to be conscious of accuracy in communication. Also, we found a higher consciousness of response speed in text-chat than in voice communication. In text-chat, it takes time to type out messages even filler such as "ah", which is spoken unconsciously in voice communication. For this reason, subjects could not respond rapidly, though rapid response is required in real-time communication. On the other hand, subjects were able to respond rapidly in voice communication. However, communication in the second language overloaded some subjects, and subjects uttered filler frequently as they tried to construct accurate sentences while speaking, making some mistakes nevertheless. In this situation, the presence of the partner's image raises subjects' consciousness of accuracy because the image allows subjects to easily see their partner's level of understanding.

As for the video data, we found that while the method of communication affects language production performance, the presence of the partner's image also has a significant effect. The partner's image enabled subjects to use non-verbal communication devices such as laughing and nodding, and motivated them to participate in the second language communication; this potential of video conferencing to engage the learner more fully, intellectually and emotionally, has been noted in other studies as well (Smyth, 2005). Of course, we found many

grammatical and lexical errors and a large amount of filler in the communication, but rapid feedback provided by the filler and partner's image helped them to see each other's situation and raised the consciousness of accuracy, promoting self-correction.

Subjects relied on the target expression display in voice communication, because voice communication overloaded subjects as we mentioned above. However, little use of the target expressions was seen in any medium. Two factors seemed to cause this situation. One is that subjects did not have time to select target expressions because they concentrated on forming opinions and constructing sentences. The other reason is that subjects were afraid of the unnaturalness in conversation caused by delayed response while selecting the target expression. It seems that subjects faced many problems such as mishearing and unknown words in second language communication, as can be seen from the amount of filler, which is a measure of difficulty in second language communication. However, subjects tended to use simple words for solving their problems without resorting to the target expressions. This seemed to lessen the load of second language communication and raise the consciousness of keeping natural conversation.

Considering each medium from an educational standpoint, it can be said that text-chat helps learners be conscious of grammatical and lexical accuracy. On the other hand, voice communication such as audio conferencing and video conferencing provides many chances to study through negotiation of meaning (Jepson, 2005). While we could not find many actual occurrences of negotiation of meaning, the amount of speech, number of errors, and use of target expressions seen in this study suggest that communication in particular, when integrated with functions to draw attention to learning objectives, can offer many opportunities for language learning. It must be noted that the partner's image can lessen the value of such a second language learning system, as it enables the use of non-native devices to resolve communication problems, which may decrease the amount of speech. However, we cannot deny the positive effects of the partner's image from the viewpoint of fostering practical skills in settings similar to face-to-face and promoting positive behavior such as laughing and nodding; these positive effects, along with the rich nature of the medium (Kock, 2001), enhance distance learning, increasing learners' motivation and leading to continued participation in learning (Koenders, 2002; Smyth, 2005). We do not deny the educational value of each medium, but it is essential to understand the features of each medium with respect to second language communication and make effective use of them, such as blending text-chat and video conferencing; it is also important to take into consideration the learner's language proficiency, learning objectives, computer literacy, and computer environment.

This study suggests the grounds for the use of SCMC for second language communicative learning. However, this study has limitations; this study was designed within an experimental setting, the results may not be directly applicable to practical environments. Long-term investigation in classroom settings will be needed to extend the examination of the effectiveness of SCMC.

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