

# Presenting Information to Assist Learners in Learner-Centered Communicative Language Learning Using Videoconferencing

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**Abstract:** This study examines the potential design of a Synchronous Computer-Mediated Communication (SCMC) system for raising awareness of learning objectives that would result in appropriate exchange of discourse in learner-centered communicative language learning. In this study, we developed videoconferencing systems which are blended with classroom-based instruction. Two types of SCMC were compared: one videoconferencing system which allows learners to select the learning objectives before communication and another which allows this during communication. In this experiment, each system aids learners in being aware of and uttering the target formulaic speech as a learning objective. We investigated the effect of each type of SCMC on three features of language learning: perceived ease of communication in English, perceived consciousness of language learning during communication, and productive performance. The results showed that the system in which learners select learning objectives during communication has a statistically significant effect on the perceived ease of communication in English and perceived consciousness of language learning during communication, as well as some aspects of productive performance, in comparison to the other system.

**Keywords:** CALL (Computer Assisted Language Learning), Synchronous Computer-Mediated Communication, Second Language Acquisition, Videoconferencing, Awareness of learning objective

## 1. Introduction

### 1-1: Technology in second language instruction

As information advances, interest has grown in using computer networks for Second Language Acquisition (SLA). With the development of network technology, Computer-Mediated Communication (CMC) has been often used in collaborative learning, including synchronous CMC (SCMC) such as chat and asynchronous CMC such as e-mail and BBS. CMC and other interactive technology can be used to promote students' learning<sup>(16), (40)</sup>. Also, in task-based CALL, it has been suggested that SCMC in SLA can offer an environment similar to oral communication<sup>(2)</sup>. SCMC promotes more equal participation than face-to-face communication in discussion<sup>(39)</sup>. Language learners use communication devices in SCMC, as well as in face-to-face communication<sup>(22)</sup>. Language learners who have studied using SCMC outperformed learners who have studied using asynchronous CMC or without CMC in the amount of speech in face-to-face discussion<sup>(1)</sup>. SCMC promotes more equal participation than face-to-face communication in discussions in a second language<sup>(7), (39)</sup>. These positive effects promote interaction between learners, which many researchers regard as one of the most important skills in communication<sup>(17), (23), (24)</sup>.

The emergence of broadband communication networks allows the use of a new type of CMC using multimedia, videoconferencing, and audioconferencing. Several studies have suggested the effects of this type of CMC. Videoconferencing allows learners to eliminate physical barriers and motivates them to speak in the second language<sup>(25)</sup>. In videoconferencing, learners use communication devices such as eye-gazing and gestures for understanding each other<sup>(4)</sup>; these encourage them to consider future language skill use<sup>(28)</sup> and motivates them to participate in communication<sup>(27)</sup>. In task-based language learning, videoconferencing can improve performance in collaborative learning<sup>(42)</sup>.

However, it has also been pointed out that practical use of IT-enhanced CMC in SLA has not yet been considered<sup>(38)</sup>. In addition, instructional design must take into account the features of IT-enhanced CMC for a videoconferencing system to be used effectively in SLA. It seems to be necessary to implement not only a method to communicate using image and voice, but also functions to support the accomplishment of learning objectives.

### 1-2: Communicative instruction

From the view of SLA, as mentioned above, previous work has suggested that CMC is effective in communicative language learning, because CMC can promote social interaction such as negotiation of

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meaning between learners, comprehensive input, and 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 (e.g., (17), (18), (23)).

Comprehensive input is defined as written or spoken information in the target language which the learner can comprehend (17), (18), (21). 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 (23), (24).

Interaction refers to meaningful communication to enable understanding, and drives comprehensive input (23), (24). For example, when a learner cannot understand his/her interlocutor's utterance, his/her interlocutor tries to modify or paraphrase for the learner's understanding. In another case, a learner can ask his/her interlocutor to repeat. Learners seem to learn communication skills through the production of comprehensive input in interaction.

Output is defined as a learning activity in language education. Learners need to perform learning activities such as uttering, repeating or writing, because learners produce comprehensive input through interaction (33), (34). Swain (34) claimed that output has three functions: noticing the gap between what the learner can and cannot express; testing of hypotheses, such as in the trial-and-error method; and metalinguistic functions, such as reflective learning.

A communicative approach incorporates all three of these factors, and is effective in fostering communication skills. 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 accurate form of learners' utterances (11). An effective method for teaching linguistic features such as grammatical accuracy is a particularly important topic in communicative language learning (12).

### 1-3: Instructional background

Japan has traditionally focused on grammatical competence in language learning. However, with internationalization, we 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 guidelines of Japan (26). However, teachers need many time to teach communication skills, which consist of many

basics which learners, particularly 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. The use of CMC can be an effective solution; blended learning with CMC and face-to-face lectures can 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 (13), (30). However, there are concerns that learners do not study accurate speech in such communication; because learners are not conscious of learning objectives, they do not understand what they have to learn and what they have to do in learner-centered instruction. Discourse in teacher-fronted instruction is more grammatical than that in learner-centered study (30). Therefore, it is important to design instruction which raises consciousness of learning objectives and retains high motivation without having the teacher present.

### 1-4: Viewpoints of Cognitive Psychology and SLA

In recent years, interactive media based on interactive instructional design has been applied in classrooms. This has led many researchers and instructors to pay attention to performance in learning. Attention to and consciousness of learning objectives in learning and acquisition is essential in designing effective instruction. However, the learning environment itself may place a high cognitive load on the learner, reducing the effectiveness of such instruction. Cognitive load theory assumes that environmental factors such as task, material, and ambient noise as well as learners' mental state affect the cognitive load of their learning, due to limitations of working memory and information processing (20), (35). This theory is concerned with the ease of understanding of learning material, interactivity with learning materials in learning, the presentation of information which promotes learning activities, and evaluation of the complication of learning material. Thus, cognitive load theory can be a guideline for conducting effective learning environment. Many researchers (6), (19), (36) suggest that cognitive load theory facilitates the construction of effective learning material, and that management of cognitive load is important in learning.

The other viewpoint of cognitive psychology is the instruction method by which learners acquire new learning objectives through effective use of knowledge. Knowledge will be fossilized, if the situation which a learner can use it effectively is not given. Bransford (3) and CTGV (8) (9) suggested that actual problem-solving

situation in which learners can use knowledge enhance the learning performance and outcome through suitable use of such knowledge. This instruction method proposes anchored instruction, in which setting world-related situations activates learnt knowledge, motivates learners and contributes to the acquisition of new knowledge effectively.

One of the unique features of SCMC is that it encourages participants to respond to their interlocutors quickly<sup>(2), (39)</sup>. This motivates learners to participate and promotes interactivity, as mentioned above; however, it also increases the cognitive load of learning, since learners are forced to load the desired expressions and vocabulary immediately. One way to reduce this load is to present learners with additional material to assist in second language acquisition. Providing information to assist learners in raising consciousness of learning objectives while the learners are performing second language communication may further increase cognitive load; however, such material can also facilitate communicative learning, because it helps learners resolve communication problems such as unknown meaning<sup>(5)</sup>. From the view of anchored instruction as mentioned before, connecting the learnt knowledge and fact to world-related situations appears to be effective on the enhancement of learning. On the other hand, from the viewpoints of both cognitive psychology and SLA<sup>(11), (14), (15)</sup> attention to learning objectives such as linguistic forms can be improved during second language communication by showing the target form prior to communication. Thus, in order to design the system functions and architecture, both SLA theories and cognitive load should be considered, and then the effect of the functions and architecture on the learners' perception and the learning performance need to be clear.

### 1-5: Purpose of study

This study examines the potential design of a SCMC system for raising awareness of learning objectives that would result in appropriate exchange of discourse in learner-centered communicative language learning. To do this, we analyze the differences between two systems from the following three viewpoints:

#### 1: Perceived ease of communication in English

Learners were asked to answer four items regarding the ease of English communication, such as the usefulness of the system when communication is deadlocked and the perceived confidence when one faces trouble in communication. Often, in learner-centered English communication, learners fail to communicate in English because they lack of proficiency in the language. These items should be evaluated to get a clear idea of the contribution of the system in providing assistance to learners when they face communication problems.

#### 2: Perceived consciousness of language learning during communication

This point is concerned with the consciousness of the grammatical accuracy, comprehension of learners' desired meaning in English communication and self-efficacy. SCMC in the second language communication promotes the interaction as mentioned in 1.1. However, as pointed out in 1.3, one of common problems in the second language learning is how to raise learners' consciousness of target language forms in communication tasks. This leads to the need to evaluate the effect of the systems on the consciousness of language learning in communication.

#### 3: Language productive performance

In addition to subjective data such as learners' consciousness, objective data such as learners' utterance itself are helpful in order to evaluate the effect of the system. The effect of the differences between the two systems on language performance can be evaluated by objective data, not subjective data.

It is important to examine the perceived consciousness of the ease of communication, and language learning, and the performance for the provision of the effective design of language learning system<sup>(29)</sup>. For this study, we first developed two SCMC systems allowing learners to be conscious of their SLA through learning activities in learner-centered communication: one videoconferencing system which allows learners to select concrete items for the achievement of the learning objective prior to communication (the IAO system), and one which allows this during communication (the DUR system). In this paper, we evaluate the effectiveness of each system from three viewpoints above, and discuss the distinctive features of each medium.

## 2. System Development

In SLA research, one common topic is how to raise learners' consciousness of target language forms in communication tasks<sup>(12)</sup>, as we mentioned above. Previous studies have suggested the effectiveness of grammar consciousness-raising tasks in communication<sup>(14), (15)</sup>. 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 being conscious of these objectives in second language learning<sup>(31), (32)</sup>. Many previous studies reveal the feature of SCMC and its effect on language learning as referred above (e.g., (22), (25), (42)). However, SCMC in these studies were plain text-chat or plain videoconference

which displays only the partner's image. For example, Lee <sup>(22)</sup> used plain text chat and suggested that SCMC can be similar to face-to-face settings, focusing on the interaction for modification. Zähler et al <sup>(42)</sup> suggested that videoconference can be an effective tool for task-based language learning from the view of efficiency of task achievement. However, plain videoconference was applied to this practical experiment and its effect on the language learning and performance is not clear. 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 (1) give context for communication and (2) display learning objective at all times in order to raise learners' consciousness of learning objectives.

For this experiment, we developed two types of software systems 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 in 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 age range in the early stages of SLA <sup>(10)</sup>, and is a possible effective tool for social interaction <sup>(41)</sup>. The system allows learners to select a target expression from several formulaic speech patterns which the teacher has selected and displays it during communication in SCMC. We assumed that learners use the target expression as a learning objective in communication.

### 2.1. System Architecture

Both systems are a client/server system. Clients consist of a computer, with a camera and headset with microphone attached, running software that allows the learner to select expressions and displays the target

expressions, learning material, and the interlocutor's image and voice. All client software 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. In the case that an older version or no Flash Player is installed, web browsers will inform the users about it, and then they would download and install the plug-in automatically with the user's permission. The server side consists of software for the management of learning material, management of target expressions, and storage of learners' selected categories (for the DUR system and the IAO system) and expressions (for the IAO system only). The software is implemented in PHP 5.0, and uses the Apache 2.0 web server with the PHP module and the Macromedia® Flash™ Communication Server MX 1.5 streaming server. All of the server software runs on the same computer. Generally, in most cases, learners may be required to install some particular videoconferencing software, and such software may not function correctly in some operating environments. However, these systems allow learners the ease of use without having to install those particular software.

### 2.2. System Functions

The systems are SCMC software with learning material display, partner's image, target expression, and learner's image. The systems use workbooks in XML format, displaying each part of the workbook. All

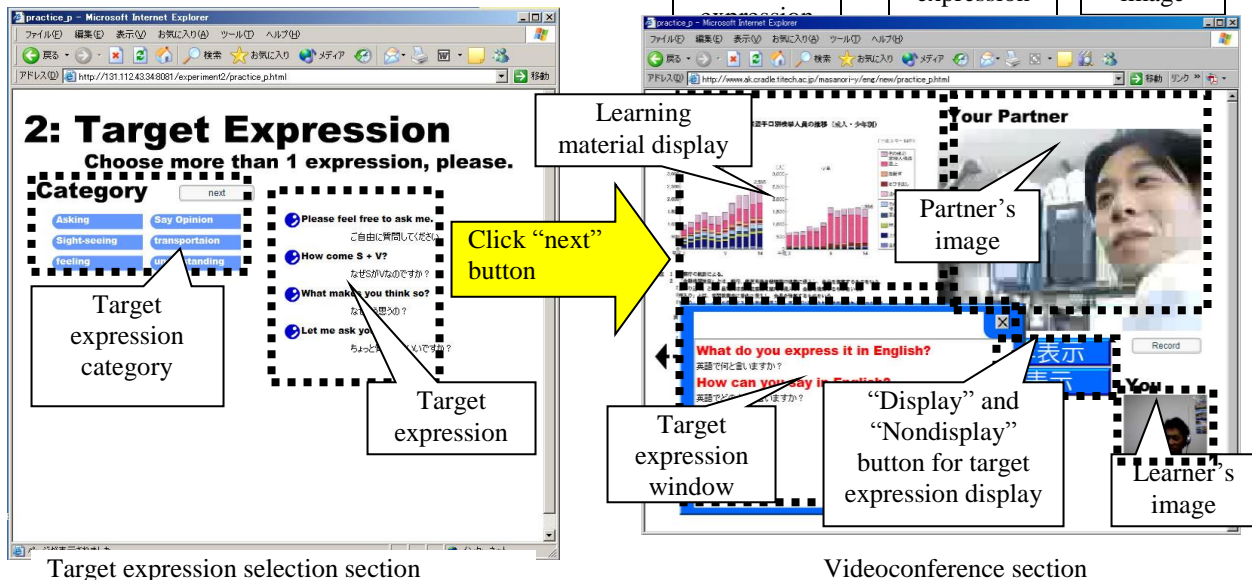


Figure 1 Interface and sequence of IAO system

functions were component-based developed. This means that systems administrators or instructors can add or delete each function, depending on their necessity, by editing the xml setting. In other words, the systems allow them to add or delete each function, target expression and their meaning, as well as change the learning materials.

The difference between the two types of systems is when learners select the target expressions, following the theories mentioned in 1-4. For the IAO system, the system first displays the target expression selection 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. After selection, the system moves to the videoconference section. In this area, target expressions selected in the target expression selection area are displayed in the target expressions window. The “Display” and “Nondisplay” buttons in this area enables learners to display and hide the target expressions window. Learners can drag the target expressions window within the Flash Player area embedded in HTML.

For the DUR system, the display on the client immediately moves to the communication area after reading the target expression file. 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. Learners can control the target expressions window in the same way as that in the IAO system.

### **2.3. Interface**

For the IAO system, the client interface consists of the target expression selection section and videoconferencing section. In the target expression section, the system displays the categories of expressions; after selection, expressions in the category are displayed with the meaning of each expression. In the videoconferencing section, the system shows the target expressions, video from each client and learning material. The flow of use is as follows: Learners select one or more target expressions which they want to practice in videoconferencing, from each target expression category. After selection, the display on the client then moves to the videoconferencing section. This section includes a target expression display to help learners be conscious of the target expression and learning material for collaborative activity.

For the DUR system, the system shows the target expression area, communication area and learning material. Target expression buttons are shown in the target expression area. 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. Figures 1 and 2 show the interface of each system.

### **2.4. System feature of usage**

The system developed in this study assists communicative learning while uttering target expressions, which learners have selected as learning objectives. We hypothesized that learners cannot often understand each other’s utterance in learner-centered communication. Such difficulty for continuous communication offers frequent opportunities for the negotiation of meaning, which is the resolution of difficulties in communication. In particular, this system helps learners to use the target expressions in the negotiation of meaning for understanding each other. The typical use flow of IAO system is as follow:

- 1: Learner first selects the target expressions in the Target Expression Selection Section. For example, when a learner wants to refer to the useful expression which is often used in the situation where one does not understand the meaning of word, the learner clicks the target expression category button named “When I could not understand the meaning of the word”, and then a learner can select the expression.
- 2: After the learner has selected the target expressions, he or she can click the “next button” to move to the videoconference section.
- 3: The learner is then engaged in the task of communicating in English, with reference to the target expressions selected in the Target Expression Selection Section.
- 4: The learner can display or hide the target expression window.
- 5: The learner can click the “NEXT” or ”PREV” button to control the learning material slides. He or she learner can communicate with the partner based on the themes given in the learning materials.

A learner uses the DUR system through the following process:

- 1: A learner communicates about the given task with a partner.
- 2: The learner refers to target expression. For example, when a learner cannot understand the meaning of the word “ambassador” in the explanation of word “embassy”, the learner can choose the target expression category, and then he or she can use the target expression for asking the partner the meaning of “ambassador” (e.g., A learner can use the target expression “What do you mean by “ambassador”?”, an expression for asking the meaning of unknown word), referring to the target expression window.
- 3: As for the learning material, the learner can control it in the same way as in the IAO system.

## **3. Method**

### **3.1. Subjects**

The subjects in this study were 28 university students. The subjects did not know each other prior to the experiment. All subjects were non-native speakers.

The subjects' proficiency in English varied from intermediate level students who had participated in some international conferences 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. The frequency of speaking English in his or her life depended on each subject.

Computer literacy among the subjects was high. All used computers everyday for e-mail, Internet, writing reports, programming, and so on.

### 3.2. Procedure

The purpose of this experiment is to evaluate the effect of time of selection of the target expression in videoconferencing. In order to do this, we compared the DUR system with the IAO system. All subjects used both types of system; however, in order to minimize the effect of the order in which the systems were used, we divided the subjects into two groups. The first group

photograph of a pencil, the learner may explain some feature of a pencil such as its shape and material without using the word "pencil". The learner's partner's photographs are not displayed on the learning material display. In this experiment, five photographs are given to one learner. Figure 3 shows the example of the photographs.

### 3.4. Target expression

The target expressions used in the experiment were topic-related; thus, we selected target expressions based on task design and communication strategies, which were used for the avoidance of communication trouble<sup>(37)</sup>. For example, a learner cannot understand the meaning of the word "Diet" when the partner uses the word "Diet" in the explanation of the photo displayed as "Parliament".. Therefore, the learner utters the suitable target expressions categorized "When I could not understand the meaning of the word" such as "What do you mean by (word)?". These target expressions are closely related to the learning objective "Learners can use communication strategies" in this



Figure 3 The samples of photographs in an explanation task

used the IAO system first, followed by the DUR system. We called this group the D-I group (14 subjects). The second group used the systems in the opposite order. We called this group the I-D group (14 subjects).

Subjects participated in learner-centered communication about pre-selected topic as a pair task. Each pair consisted of subjects who had not met before, because familiarity between subjects may have an influence on communication (e.g. falling back to their native language) and evaluation (e.g. they may be affected by their friend's thinking when they evaluate the system). The subjects participated in each task for 15 minutes. After each task, subjects were required to answer a questionnaire within five minute. Each subject in each pair connected to the systems from separate locations.

### 3.3. Task

The task used in this experiment is an explanation task. In such a task, a learner explains photographs of objects to his/her partner without using the objects' names, and the partner guesses what the objects are. The same photographs are not shared between the subjects. For example, when a learner explains a

experiment. Table 1 shows the categories and the number of target expressions that belonged to each category in this experiment.

Table 1 Categories and number of target expression

Category	Number of target expression	examples
Request for teaching the meaning of word and expression	3	"What do you mean by (word)?" "What do you express it in English?"
Request for repetition	5	"Would you say that again, please?"
Using circumlocution when you don't hit upon suitable word	8	"I don't know what it is in English, but I explain its feature"
Making chance of self-repairing	5	"I didn't mean that,..." "Let me rephrase it"
Confirm your understanding of your partner's utterance	4	"Let me make sure your saying", "I'm afraid of misunderstanding you"
Confirm your partner's	4	"Would you follow me?"

understanding of your utterance		“Would you realize what I am saying?”
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**Table 2** Perceived ease of communication in English

#	Questions	Scale
1-1	Rate the usefulness of the system when communication is deadlocked	1: not at all-6: very much
1-2	Rate the perceived relief in using this system when you cannot understand each other	1: not at all-6: very much
1-3	Rate the perceived confidence when you face trouble in communication	1: not at all-6: very much
1-4	Rate the perceived relief in the display of target expressions	1: not at all-6: very much

### 3.5. Data collection

The aim of this study is to investigate the contribution of time of selection of target expression to the perceived ease of communication in English, and the perceived consciousness of language learning during communication, as well as language productive performance such as the utterance of the target expression. Data was collected in two ways. The first is a questionnaire, which all subjects were required to answer after the experiment. The questionnaire asked all subjects to rate the perceived ease of communication in English and the perceived consciousness of language learning while communicating in each videoconferencing system on a 6-point scale. The questions asked to the subjects are shown in Tables 2 and 3. Finally, all subjects were asked their opinions and suggestions regarding these systems. The second data collection method is video recording. In order to conduct an objective research, all communication was recorded, and the ratio of native language utterances to total utterances, the number of uses of the target expression and number of uses of communication strategies were measured for each subject.

## 4. Result

The data for four subjects were eliminated before the analysis because of the system trouble which occurred when they were using the system. Therefore, twenty-four sets of data were collected in this experiment.

### 4.1. Perceived ease of communication in English

A two-way analysis of variance (ANOVA) revealed a main effect for DUR system in 1-2 (\*:  $p < 0.05$ ,  $F(1,22) = 4.905$ ) and 1-4 (\*:  $p < 0.05$ ,  $F(1,22) = 5.569$ ). Figure 4 shows the average scores, and main effect for each item.

**Table 3** Perceived consciousness of language learning during communication

#	Questions	Scale
2-1	Rate the perceived consciousness of	1: not at all-

	grammatical accuracy of your utterances due to the target expression display	6: very much
2-2	Rate the perceived consciousness of communication of the desired meaning in English due to the target expression display	1: not at all-6: very much
2-3	Rate the perceived consciousness of the comprehension of your partner's desired meaning	1: not at all-6: very much
2-4	Rate the perceived consciousness of the grammatical accuracy of your partner's utterances	1: not at all-6: very much
2-5	Rate the perceived suitability of the time of selection of the target expressions	1: not at all-6: very much
2-6	Rate the perceived consciousness of long retention of the selected target expressions in communication	1: not at all-6: very much
2-7	Rate the perceived consciousness of frequent use of the target expressions	1: not at all-6: very much
2-8	Rate the perceived efficacy of being able to speak English when you talk with foreigners	1: not at all-6: very much
2-9	Rate the perceived efficacy of being able to solve problems in communication with foreigners	1: not at all-6: very much

### 4.2. Perceived consciousness of language learning during communication

Selecting target expressions during communication seems to be an important factor in raising the consciousness of language learning in communication; a significant effect was found on 2-1 (\*:  $p < 0.05$ ,  $F(1,22) = 5.303$ ), 2-2 (\*:  $p < 0.05$ ,  $F(1,22) = 4.905$ ), 2-5 (\*\*:  $p < 0.01$ ,  $F(1,22) = 10.355$ ), 2-6 (\*\*:  $p < 0.01$ ,  $F(1,22) = 9.706$ ), 2-7 (\*\*\*:  $p < 0.001$ ,  $F(1,22) = 16.965$ ), 2-8 (+:  $p < 0.1$ ,  $F(1,22) = 3.143$ ) and 2-9 (+:  $p < 0.1$ ,  $F(1,22) = 4.115$ ). These results are shown in

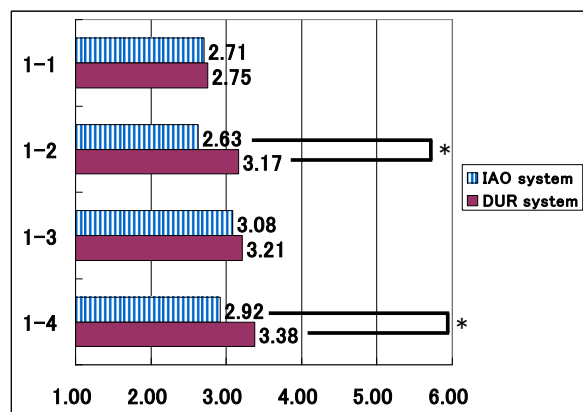


Figure 5.

**Figure 4** Mean scores of perceived ease of communication in English

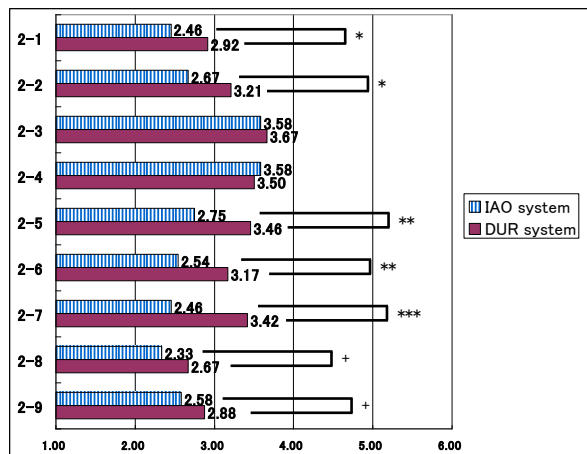


Figure 5 Mean scores of the perceived consciousness of language learning during communication

Table 4 Mean value for language production

	IAO system	DUR system	Significant effect
Average ratio of native language	22.42%	26.94%	
Average use of target expression	0.54	2.04	***
Average uses of communication strategies	2.71	3.21	+

\*\*\*:  $p < 0.001$ ,  $F(1,22) = 14.975$ . +:  $p < 0.1$ ,  $F(1,22) = 4.062$

#### 4.3. Video data

If the target expression display assists the utterances of target expressions when learners face communication problems, the use of native language should decrease in second language communication. The DUR system has no significant effect on the ratio of native language utterances to total utterances, but it does have a significant effect on the number of uses of target expressions and the uses of communication strategies. Selecting target expressions during communication raised the consciousness of target expression use and allowed learners to utter them. However, learners still tended to utter their native language in English communication. Table 4 shows the results in detail.

#### 4.4. Opinions and suggestions from subjects

Some subjects commented on both types of videoconferencing system. Some opinions confirmed the positive effects of the DUR system and the IAO system; for example, for the DUR system, subjects feel relieved to be able to select the target expressions in communication, which allows subjects to fix communication problems. Positive comments from many subjects included the following:

Subject 1: I felt relaxed, because I could say that I

could not understand my partner's utterance while watching the target expression display selected in communication. (The DUR system)

Subject 2: I felt relief because I could refer to the target expression when I faced difficulty in saying my desired meaning. (The DUR system)

Subject 3: I think it is very useful, because it is very practical. I often face troubles in communicating with foreigners. When in such a situation, I feel relief if I have such help. (The DUR system)

Subject 4: If I focus on some expressions, I can enjoy natural communication without having to select target expressions during communication. (The IAO system)

However, we found some negative opinions. Subjects felt it was time consuming to select target expressions during communication, and felt sorry for making their partners wait. Negative comments are shown as follows:

Subject 1: I felt very sorry that I made my partner wait as I take the time to select the target expression. (The DUR system)

Subject 2: When I selected the target expressions in communication, I had to stop the natural communication. (The DUR system)

Subject 3: Once I had chosen the target expressions in advance of videoconferencing, I could not change them. (The IAO system)

Subject 4: I could not use the target expressions, because I concentrated on considering what I should say. I needed time to recall the vocabulary. (The IAO and the DUR systems)

## 5. Discussion

The findings from this study suggest that raising consciousness of learning objectives, in particular a function to select the target expressions during communication, is effective not only on learners' mental state but also language productive performance. The DUR system assisted learners' production and interaction by displaying the target expressions, which gave learners the assistance needed in solving communication problems, thus, providing an important learning opportunity<sup>(5)</sup>. In such situations, learners seemed to recognize the gap between what they could and could not express, as shown by their consideration of target expressions which they needed. As revealed by subjects' comments, some subjects felt relief in using the DUR system, because of the assistance it provided when they had trouble in communication. However, there was no significant difference between the two systems in the use of native language, which is one of the communication strategies for avoiding communication in the target language. It is suggested



that the time of selection of the target expressions, an environment factor to cognitive load, does not affect the cognitive load in English communication.

However, target expression selection and display during communication could be also an emotional obstacle for the facilitation of learning, because some subjects preferred to avoid unnatural communication and were, thus, reluctant to select suitable expressions during communication, as we can see in their comments. While the DUR system seemed to provide learners some assistance, load such as searching for suitable expressions in highly-interactive media such as video-conferencing seemed not to be reduced. In this respect, it is suggested that the IAO system, in which subjects did not need to select the target expression during communication, promotes subjects' concentration on the communication, though subjects rated the suitability of the time of selection of the target expressions less positively than for the DUR system. DUR system seems to be effective on increasing the use of target expressions. However, subjects could significantly use simple words (e.g., "Pardon?", "Sorry?") as communication strategies without using the function of target expression in DUR system.

Consciousness of natural communication also prevented subjects from selecting target expressions during communication, despite the high rating given to the selection of target expressions during communication. SCMC is very similar to a face-to-face environment <sup>(2)</sup>. Moreover, this study applied the context of learner-centered communicative learning. These features motivate learners to participate in the second language communication <sup>(39)</sup>, therefore, promoting high inter-activity <sup>(22)</sup>. However, from this study, it can be said that these features may prevent learners from being conscious of the learning context.

The number of target expression in DUR system was significantly more than that of IAO system. However, not all subjects were aware of the learning objectives and could use the target expression. Subjects used target expressions an average of 2.04 times in 15-minute communications. It seems that subjects tended to use simple and easy word for communication strategies without using target expression function in DUR system, which causes the unnatural communication, as mentioned above.

## 6. Conclusion and Future Work

This study aims to investigate three points with respect to the time of selection of learning objectives in videoconferencing-based learner-centered language learning: the perceived ease of communication in English, the perceived consciousness of language learning in communication, and language productive performance.

Selecting learning objectives during communication was found to have been effective on some aspects of subjective evaluation and in the

number of uses of the target expressions.

Raising the consciousness of learning objectives during communication seems to be more effective than doing so in advance of communication; however, when selecting objectives during communication, some problems may arise which prevent learners from learning effectively. Attempting to select objectives while using highly-interactive media such as videoconferencing seems to increase the cognitive load in learning, as previous study <sup>(20)</sup> has reported. Also, the interactivity of this type of media increases awareness of the naturalness of communication much as in face-to-face communication which can cause learners to tend to avoid unnatural interruptions due to objective selection.

Future work towards the design of an effective videoconferencing system for learner-centered communicative learning is suggested as follows:

### (1) Raising the consciousness of learning context

In this study, the subjects positively evaluated the system which allows them to select learning objectives during communication. However, it seems that they felt difficulty in communicating with their partner using that function in videoconferencing, because of the cognitive load and the consciousness of communicating naturally. Learners seem to need to recognize the learning context, though it is also important for learners to be aware of natural communication. This suggests a modification allowing learners to know when another learner is using the assistance function; such a modification may reduce reluctance to interrupt conversation, since the learner's interlocutor would know the reason for the delay.

### (2) System development and instructional design approach for the promotion of target expression use

In this study, DUR system outperformed IAO system in the subjective evaluation and learning performance. However, average rate and learning performance seem not to be high overall. This evaluation suggests the necessity to design effective instruction and develop functions on the frequent use of target expressions, taking into consideration the comments from subjects. Formative evaluation of functions based on a sound instructional design approach will be needed.

### (3) Long term investigation in classroom settings

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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