A Study On Enhancing Simultaneous Second Language Speaking Skill : Strict Turn-Taking in A Half-duplex Dual-lingual Video Chat

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Abstract: This paper examines the improvement of users using BiTak that is assessed objectively by certified language teachers following the scoring tool named Rubric. We created a video chat system named BiTak, which employs strict turn-taking dual-lingual communication using recording function. BiTak aims to motivate the dual-lingual conversation between Japanese and International students as well as to identify the mutual benefits through this kind of conversation for the need of improving simultaneous bilingual acquisition. We conducted experiments to evaluate the effectiveness of BiTak as well as the improvement of learners through using it and found that the system brings about the sense of language learning and favorably boost students' speaking skills.

1. Introduction

Due to the growing influence of international mass media, global communication through Internet, it is crucial for many people to learn to speak other languages in addition to their first language. Apart from many ways of learning a second language, people tend to find chance to practice speaking second language with native speakers through informal communication to better improve their speaking skills. It is the most popular way to learn a language as well as effective way most people use when they live in the country where the language is spoken. However, it is not always easy to get an opportunity of speaking with native speakers face-to-face. In the previous study [1], we suggested a virtual environment for students to freely practice second languages with supporting elements. Specifically, the study proposed a video chat system named "BiTak" to facilitate strict turn-taking dual-lingual communication for language speaking practice. The system is equipped with a recording function that can discretely record each utterance of all speakers and strictly asks users to take turn to talk. In particular, this study is designed to examine the improvement of users using BiTak that is assessed objectively by certified language teachers following the scoring tool named Rubric.

2. Background

Some conventional ways of learning languages have been applied such as attending classes, group discussion and learning, self-study. Apparently, there is not the most appropriate method, people learn in different ways at different paces, and the most effective way may involve not one but a mixture of different techniques. Moreover, there have been no methods that satisfy both requirements that meet the demand of both Japanese and internationals. The ordinary methods satisfied only either requirement. Since there are complementary requirements, there should be a method that satisfies both requirements at the same time. Kimber, L. [2] recommends providing more opportunities for *interactions* between Japanese and internationals to satisfy both.

Being inspired by that recommendation, our study suggests building an online environment for both Japanese and internationals to talk freely using both English and Japanese. We propose a video chat system named BiTak that employs strict turn-taking dual-lingual communication using Recording function [1].

Dual-Lingual Communication

The concept of Dual-lingual Communication in this research is defined as two languages being spoken in the conversation and understood by respective participating parties. Namely, Japanese students will use English while foreign students will speak Japanese though they can switch to his or her mother tongue at any time. This is different from bi-/multilingual communication. Myers-Scotton [3] defines bi-/multilingual as "the ability to use two or more languages to sufficiently carry on a limited casual conversation".

During the conversation, Japanese and internationals will have chance to speak second language. They will help each other correct speaking mistakes by using their native language (in this case internationals using English). It will be a good opportunity for both parties to learn from each other to make comfortable communication.

Strict Turn-taking

Talking naturally without caring overlapping usu-

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ally brings about the comfort of expressing ideas in an informal conversation. Smooth turn-taking is an essential aspect to coordinate one's communicative actions and interact successfully with others. However, it is not always good for learning a language. You may hardly recognize your speaking mistakes by yourself although the listeners can understand clearly. In many researches of second language learning, the fact that turn-taking in communication may affect the quality of group discussion between non-native and native speakers has been taken into consideration. According to Mynard, J. [4], foreign students seemed "to be overwhelmed and even lost in parallel and fast discussion, especially students who have slow keyboarding skills, slow reading/writing skills, or different cultural backgrounds."

Hence, our system would like to strictly apply the turn-taking approach by using Recording function. In our system, users are asked to entirely obey the turn-taking rule and they are not allowed to overlap or interrupt another speaker while turning on the recording button. We suppose that the unfamiliar way of strict turn-taking will bring about unexpected but possible outcomes.

The rest of this paper is organized as the followings. Section 3 reviews related works and correlates them with our proposed system. The description of our prototype system is mentioned in Section 4. Section 5 describes the experiments to estimate the proposed system as well as mentions its results which is assessed objectively by language teachers using Rubric scoring scale. The effectiveness of the system is also discussed in Section 5 by comparing two experiment groups, one using "strict turn-taking" with the recording button and one without using it. Section 6 concludes the paper.

3. Related Works

Online systems support language learning

Recent researches have shown that computer-mediated communication tools are considered as potential source for students to enhance their language proficiency. In Freiermuth, M., & Jarrell, D. [5], their research of second language learning asserted that when compared with face-to-face communication, online chatting provided a more comfortable environment for foreign students to make conversations. In spite of facing the pressure of immediacy that is typically expected by speakers in face-to-face communication, students found it less burden when communicating or discussing through text chat.

Besides, research in computer-mediated communication has also inferred that a student's willingness to communicate may be positively affected by computer. Specifically, Freiermuth [6][7] claimed that when assigned a group task or presentation, group language learners seemed more eager to communicate using computer-mediated communication tool than using spoken language. They felt more freedom in expressing their ideas without being hindered from the teacher or other students or a plethora of other elements that might minimize the effect of the experience [8]. After making interviews about preference of media use of non-native speakers, Setlock, L. D., & Fussell, S. R. [9] also showed that non-native speakers preferred online chatting tools because these tools reduced the risk of misunderstandings that often caused by language problems.

The potential of computer-mediated communication tools in facilitating second language acquisition has been mentioned in various current researches. Angelova, M., & Zhao, Y. [10] conducted a collaborative online project between students from China and United States of America. They were paired up to communicate using the discussion board and e-mail tools for tutoring and learning different aspects of English grammar and developing culture awareness. The American students tried to correct mistakes of their Chinese partners in writing introduction essays or cultural lessons. The Chinese students used e-mail as well as Skype to communicate with their American partners. Apart from the benefits collected from different aspects, the study concluded that computer-mediated communication are used as a bridge to connect students from two different countries and two different programs to improve the teaching skills of the American as well as to enhance non-native speakers' language skills. Another research proposed a mobile system called Xpress to support second language learners gain colloquial expressions by crowdsourcing native speakers [11]. The results of the study indicated firmly Xpress's potential in helping the second language learners effectively learn colloquial expressions by their design ideas.

In addition, videoconferencing that has been called visual collaboration is becoming noticeable in the benefits of online language learning. Hampel, R., & Stickler, U. [12] conducted research about videoconferencing in supporting multimodal interaction in an online language classroom. The study concentrated on the use of videoconferencing in the context of a larger exploratory study

to find out how language-learning interaction was influenced by the virtual learning environment. The findings demonstrated how an online videoconferencing environment can be applied in language teaching as well as how teachers and learners collaborate in online environment.

Nevertheless, few studies have aimed to utilize video chat applications for supporting simultaneous learning of multiple languages. Our study proposes a video chat system as a virtual turn-taking face-to-face environment for users to practice dual-lingual conversation. Instead of choosing one partner's language over the other, they practice "dual-lingual" pattern. It is a communication pattern in which each partner actively uses his or her second language and receives the partner's second language in response. This video chat system will support group turn-taking conversations speaking Japanese and English in which their voices and images will be intentionally recorded so that they can re-listen to utterances again at anytime.

Assessment of Second Language Speaking Proficiency

According to James E.Purpura [13], the term *Language Assessment* refers not only to formal tests like TOEFL, IELTS or an end-of-chapter evaluation, but also to other methods of obtaining information about knowledge, skills, and ability of students such as observing second language performance during pair work or by asking learners to report their understandings and uncertainties. In this paper, we would like to use Rubric: a scoring guide used to evaluate the quality of students' constructed responses to assess their second language speaking proficiency. The usefulness of Rubric has been recognized in the field of assessment for many decades [14]. When utilizing a Rubric, evaluators use an analytic rating system whereby each component is scored individually or performance is rated holistically on the basis of an overall impression [15]. We create our Rubric for Speaking Skill Test based on four criteria: "Relevance & Content", "Fluency", "Vocabulary & Word Choice", and "Interviews: Does interviewee understand question?"

4. BiTak System

We developed a web application called "BiTak" using the open source from WebRTC [16], which is a free, open project that provides browsers and mobile applications with real-time communications with simple APIs. Fig.1 shows the user interface of BiTak. The most prominent features of BiTak is following two functions: 1) a strict turn-taking function by discretely recording each utterance and 2) a text chat function related to each recorded utterance. In the following sections, these two functions are described in detail.

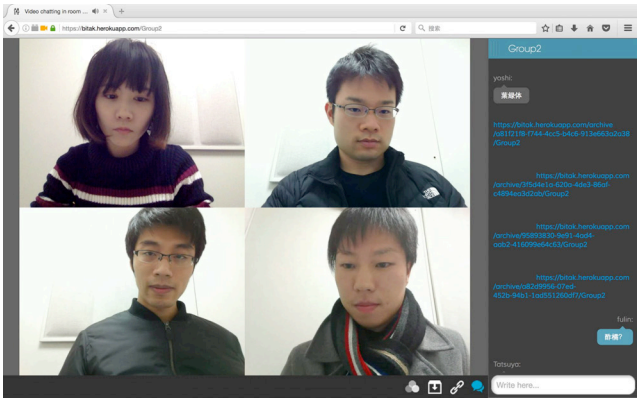


Figure 1 User Interface of BiTak

4.1 Strict turn-taking function by discretely recording each utterance

Each utterance in BiTak is recorded in order to give participants a chance to watch the video again to fully understand the dual-lingual situation, not to realize multi-threaded communication. When a person wants to talk, he/she just needs to click on the Recording button then his/her voice will be automatically recorded. At the same time, others' microphone will be off; they can do nothing but listen to the speaker. After the speaker finishes talking, he/she clicks the Recording Button again, the blue recording link will appear in the right pane of the main window chat (See Fig.1). The next person will take turn to talk by repeatedly clicking the Recording Button. Therefore, the communication style with using BiTak is in a half-duplex manner similar to that of a transceiver. The users can download all the recording videos for further reference.

4.2 Text chat function related to each recorded utterance

The recording link will lead users to another tab where they can re-watch the video (See Fig.2). Meanwhile, the main chat will be still facilitated without any interruption. If, for example, an utterance in English from a Japanese participant includes some errors or unsuitable expressions, it should be corrected immediately. In order to readily achieve it, we provide a text chat function to each recording link, not to all recording links. The users can chat, ask or point out any unclear points by typing text in the chat bar right beside the recording video. This feature is designed not only for each recording link but also for the main chat to achieve deeper understanding.

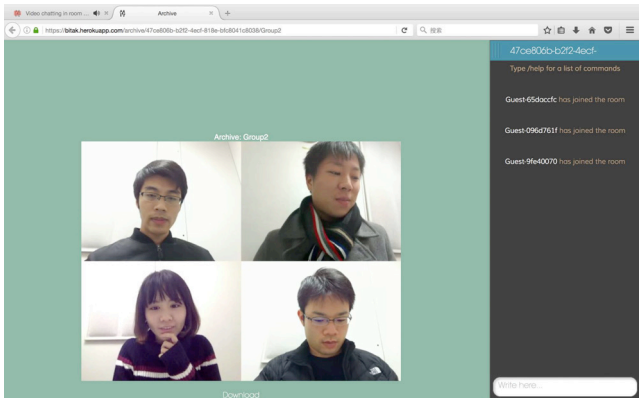


Figure 2 An example of the recording link

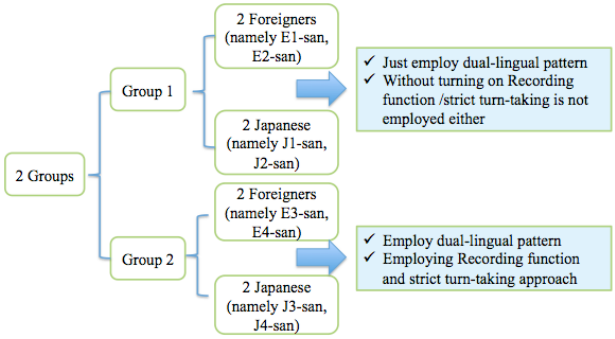
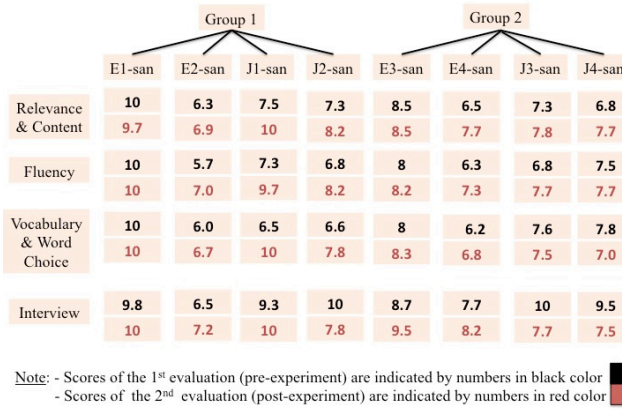


Figure 3 Experiment Description



	Group 1				Group 2			
	E1-san	E2-san	J1-san	J2-san	E3-san	E4-san	J3-san	J4-san
Relevance & Content	10 / 9.7	6.3 / 6.9	7.5 / 10	7.3 / 8.2	8.5 / 8.5	6.5 / 7.7	7.3 / 7.8	6.8 / 7.7
Fluency	10 / 10	5.7 / 7.0	7.3 / 9.7	6.8 / 8.2	8 / 8.2	6.3 / 7.3	6.8 / 7.7	7.5 / 7.7
Vocabulary & Word Choice	10 / 10	6.0 / 6.7	6.5 / 10	6.6 / 7.8	8 / 8.3	6.2 / 6.8	7.6 / 7.5	7.8 / 7.0
Interview	9.8 / 10	6.5 / 7.2	9.3 / 10	10 / 7.8	8.7 / 9.5	7.7 / 8.2	10 / 7.7	9.5 / 7.5

Note: - Scores of the 1st evaluation (pre-experiment) are indicated by numbers in black color
- Scores of the 2nd evaluation (post-experiment) are indicated by numbers in red color

Figure 4 Result of Rubric

5. Experiment and Discussion

5.1 Experiment Procedure

In order to achieve objective results of Bitak, we compared the experiences of the two 4-member groups using just the interface of Bitak (i.e., a simple video conferencing system without the recording function) with whom used all the functions of Bitak. Meanwhile, both of the two groups will apply dual-lingual communication to discuss. Each group consists of 2 foreign students who speak English as a second language and 2 Japanese as specifically described in Fig. 3.

To measure the improvement of speaking skill after using Bitak, all subjects were supposed to attend pre-experiment evaluation and post-experiment evaluation. Specifically, the Japanese students were interviewed their English speaking skills by a certified English teacher and the foreign students were interviewed their Japanese speaking skills by a certified Japanese teacher. The interview questions during the two evaluations remain unchanged and their improvement is assessed followed a rubric for Testing Speaking Skill specially designed for the task.

Each group was required to participate in a series of six experiments in which they could discuss intensively the topics given in the evaluation interview. Each experiment lasted about 90 minutes. While Group 1 held their discussion using BiTak without turning on Recording function which also means strict turn-taking is not employed either, Group 2's discussions used BiTak with employing Recording function and strict turn-taking approach. To ensure unbiased improvement, all subjects were requested not to use any other kinds of language learning tools during the period of experiments.

In addition, each subject was asked to attend a 30-minute individual semi-structured interview with the first author. The individual interview questions were guided by the general themes which aims to gain thinking about Dual-lingual communication and Strict turn-taking with Recording function. Besides, the questions were also open-ended enough for us to be able to pursue new topics raised by the participants. Each interview was recorded and transcribed to text then the transcripts were informally analyzed.

5.2 Results analysis:

5.2.1 Result of Rubric:

The speaking performance of all subjects in the evaluations were assessed by four criteria: "Relevance & Content", "Fluency", "Vocabulary & Word Choice", and "Interviews: Does interviewee understand question?" as summarized in Fig. 4.

As can be seen from the Fig. 4, all participants showed sufficient improvement between the pre-experiment and post-experiment evaluation. The distinctions also varied from small to big proportion in both groups. Interestingly, all subjects received positive feedbacks from the two examiners for their progress during experiment period and subjects in group2 slightly received more appreciation for their improvements. For

Japanese students (J1, J3, and J4), they were highly praised in gaining confidence of speaking. As most of them were seen to reluctant to answer the questions in the first evaluation, their attitude remarkably changed after the series of six experiments. The certified English teacher was amazed at their fluency in the second evaluation and all of them got better score in this criteria. Besides, the foreign students (E3 and E4) were considerably appreciated by the certified Japanese teacher about their changes in expressing ideas and choosing words. While they often answered in short phrases and simple words in the first interview, they managed to answer the same question in full sentences and more complicated phrases in the second one. It could be possibly explained that thanks to helping each other revising the mistakes they made (as they stated in the individual interview), group 2 showed better enhancement in the second evaluation.

The unexpected direction was indicated in the fourth criteria. This criterion assesses the ability of understanding the interview questions without asking for repetition. While the majority of subjects showed their improvement in this measure, some of them (J2, J3 and J4) unanticipatedly lost concentration and used the repetition clues as “Pardon, please”, “Could you please repeat the question?”. Thus, there was no wonder in the decrease of their score in this criteria in the second interview.

5.2.2 Result from individual semi-structured interviews:

We held a 30-minute individual semi-structured interview with every member to obtain an insight of their feeling during the time of using BiTak. The open-questions related to dual-lingual communication and functions of BiTak.

- **Group 1**
  - ✓ *Usability of BiTak*

All users reported to be able to use BiTak easily because they did not use any specific function. The feature of logging in without creating ID gave them the comfort of access when they sometimes just want to join the chat immediately and do not have to care about the nuisance of making nicknames. The text-chat is highly evaluated because it is convenient for them to type any words or sentences to make it more clear for the others to understand.

- ✓ *Dual-lingual communication*:

Although all the subjects found this kind of communication weird and hard at first, they gradually recognized it really helps people from beginner to intermediate level. The more familiar they get with BiTak, the more motivated they are to speak.

- ✓ *Hesitate to correct friends’ mistake while in the middle of conversation.*

When being asked about helping to correct others’ mistakes, most of subjects in the group revealed that they hesitate to do that due to they were in the middle of conversation. They sometimes recognized their friends’ mistakes but neglected them to wait for the conversations to finish then unintentionally forgot the errors.

- **Group 2:**
  - ✓ *Usability:*

For the first time, it is really difficult for this group to use strict turn-taking. Interestingly, they deliberately discuss the way to communicate in Bitak without any instructions of the authors to make the communication went smoothly: applying dual-lingual conversation with strict turn-taking for presentation, using recording link for realizing mistakes and normal conversation for correcting mistake and discussion.

The members steadily reported that this system aim to learn language, not merely for chatting. When they do the presentation in the recording part, only one person have to talk. They felt that it is a good challenge for them because they can do a lot of presentation to train their speaking skill.

- ✓ *Dual-lingual communication*:

They all agreed with the idea of dual-lingual communication can help them learn languages. Japanese students normally do not have chance to speak English much and vice versa for foreign students so it has mutual benefits. They can gain some new words and correct the mistakes they usually make before. In their opinion, this kind of communication may not be comfortable for chatting but effective for learning languages.

- ✓ *Strict turn-taking*

All group members pointed out that strict turn-taking feature give them time to think carefully before raising their voice. They consequently have confidence in expressing their ideas.

- ✓ *Recording link*

One more interesting point the subjects found is recording link. They all felt this feature is really important because they can listen again their friend’s presentation all the time to recognize and correct mistake for each other.

In summary, dual-lingual pattern proves its efficiency in both groups. However, it is easily to find out the

difference in the performance of two groups. The communication in Group 1 is merely normal chatting; they do not care much about others' mistakes. It is alright as long as they understand then they gradually forget to correct mistakes for each other. It is not good for language learning. Meanwhile, members in Group 2 took all of recording link into serious consideration. They want to make sure their friends know their mistake and willing to correct for them. All of them gradually have sense of learning, not simply gossiping on the account of the proposed features of BiTak.

6. Conclusion

In this paper, we recommended a method of assessing the improvement of users of BiTak for second language speaking. The learner's progress is positively evaluated by language teachers using a Rubric scoring framework. Based on the experiments, it was suggested that BiTak has changed the notion of users from an ordinary video chat application to a language supporting system thanks to its two prominent features: Strict turn-taking and Recording function.

Due to limitation of time and effort, we recognize that our observations come from a relatively small number of subjects. It is not appropriate to apply quantitative analyses for small samples such as this. A more extensive study would be needed for proving the solid efficiency of all characteristics we have mentioned.

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