

Dual-role Collaborative Learning in Simultaneous Second Language Acquisition

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Abstract. This paper is designed to propose a theoretical model of collaborative learning in simultaneous second language acquisition. In order to achieve the model, 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 second language learners 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 collaboration of learners through using it, and found that the system brings about the sense of language learning and favorably boost students' speaking skills. The learners unintentionally take roles in helping each other practicing second language as facilitators and receivers.

1. Introduction

As we are living in a hyper-connected and fast-paced world, it is becoming increasingly obvious that knowing more than one language is beneficial for many reasons. The demand of choosing a good method of learning second language is also increasing. Apart from many traditional ways, 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. We conducted experiments to evaluate the effectiveness of BiTak as well as the collaboration of learners through using it and found that the system brought about the sense of language learning and favorably boosted students' speaking skills. The learners unintentionally took roles in helping each other practicing second language as facilitators and receivers. From the obtained experiment results, this paper is designed to propose a theoretical model of collaborative learning in simultaneous second language acquisition.

2. Term Definitions

(1) Simultaneous Second Language Acquisition

The term is normally used to mean the learning of

another language available in the sociolinguistic environment at the same time as the learner acquires the first language or mother tongue [2]. However, this term in this paper is used in the context of people of different first languages simultaneously acquiring their second languages during their communication with each other. More specifically, this paper focuses on learners' second language speaking skill during the conversation between Japanese and foreign students through dual-lingual communication.

(2) 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. For instance, 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.

(3) Strict Turn-taking

Talking naturally without caring overlapping usually 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

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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, we attempted to strictly apply the turn-taking approach. BiTak system requires users to entirely obey the turn-taking rule and does not allow to overlap or to interrupt another speaker.

3. Related works

(1) Collaborative Learning (CL)

Collaborative Learning is defined as a situation in which two or more people learn or attempt to learn something together[5]. More specifically, Mitnik, R. et al [6] claimed that CL is based on the model that knowledge can be created in a population where members actively interact by sharing experiences and take on asymmetry roles. CL involves the mutual engagement of all participants in a coordinated effort to solve the problem together [7], which can be inferred everyone may get the same output experience.

(2) Computer-Supported Collaborative Learning (CSCL)

Since Collaborative Learning theory has been well applied in standard, classroom-based groups, it opens up expectation of how well the benefits of CL will bring to the electronic environment [8]. The connection of CL and CMC (computer-mediated communication) technology has been proved to be mutually beneficial by several researchers. CL helps structure the on-line environment while CMC technology removes many barriers of CL [9]. Hence, CSCL is about how technology can be used to support CL [10]. Literally, it is a pedagogical approach where in learning takes place via social interaction using a computer or through the Internet. This kind of learning is characterized by the sharing and construction of knowledge among participants using technology as their primary means of communication or as a common source.

(3) Computer-Supported Collaborative Learning (CSCL) in Second Language Acquisition (SLA)

Recent researches have shown that CSCL has been considered as potential source for students to enhance their language proficiency. In language learning, current studies in the computer-assisted language learning (CALL) field suggest that the computer provides material and feedback for learners to practice the target language in and outside the classroom and has been seen as a positive tool for language learners in their individual study. CSCL in Language Learning offer the potential for interaction between the computer and the language learner which refers to the learner’s responding questions and

receiving correct answers. Hence, the computer is also seen as a potential language tutor by providing assessment for students’ responses [11]. In addition, students’ autonomous language learning and self-assessment can be widely available through the web rather than being tied to a particular class [12].

Nevertheless, few studies have aimed to utilize CSCL 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. We believe that the collaboration of learners through the unfamiliar way of strict turn-taking and dual-lingual communication will deliver unexpected but possible outcomes to help them simultaneously improve their second language speaking skills.

(4) 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 created our Rubric for Speaking Skill Test based on four criteria: “Relevance & Content”, “Fluency”, “Vocabulary & Word Choice”, and “Interviews: Does interviewee understand question?”.

4. Brief Overview of BiTak System and Experiments

In our paper presented in Interaction 2017 symposium[16], we already described our system named “BiTak” and experiments conducted by using BiTak. However, for the readers’ convenience, we would like to describe briefly them again.

4.1 BiTak system

BiTak is a web application using the open source from WebRTC, 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.

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.

The recording link will lead users to another tab where they can re-watch the video. 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 separately designed for each recording link with the hope of achieving deeper understanding.

4.2 Experiment and Discussion

4.2.1 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 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 the figure 2.

To measure the improvement of speaking skill after using Bitak, all subjects were supposed to attend pre-experiment

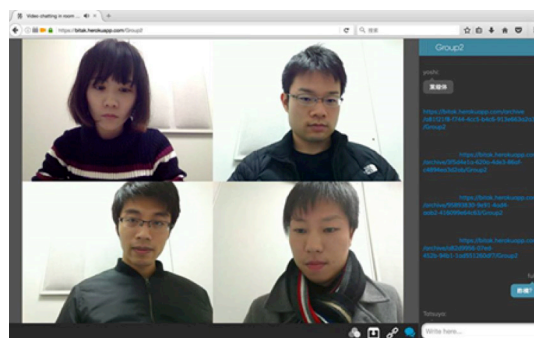


Figure 1 User Interface of BiTak

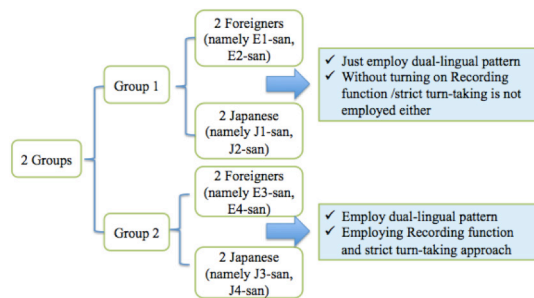


Figure 2: Experiment Description

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 aimed to gain thinkings 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.

4.2.2 Results analysis:

(1) Results 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 Figure 3.

As can be seen from the figure 3, significant differences across levels in the expected direction were found for the first three measures. All participants showed sufficient improvement between the pre-experiment and post-experiment evaluation. The distinctions also varied from small to big proportion (0.1 point to 3.5 points respectively). Interestingly, all subjects received positive feedbacks from the two examiners for their progress during experiment period. For Japanese students, 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 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. As a result, all of them received good score.

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,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.

(2) Results from individual semi-structured interviews:

We held a 30-minutes 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

Group 1 members communicated using BiTak, but the recording function was not available. They were required to obey the strict turn-taking rule, but it was not systematically forced by BiTak.

Although all the subjects found that dual-lingual communication weird and hard at first, they gradually recognized it really helps people from beginner to intermediate

	Group 1				Group 2			
	E1-san	E2-san	J1-san	J2-san	E3-san	E4-san	J3-san	J4-san
Relevance & Content	10	6.3	7.5	7.3	8.5	6.5	7.3	6.8
	9.7	6.9	10	8.2	8.5	7.7	7.8	7.7
Fluency	10	5.7	7.3	6.8	8	6.3	6.8	7.5
	10	7.0	9.7	8.2	8.2	7.3	7.7	7.7
Vocabulary & Word Choice	10	6.0	6.5	6.6	8	6.2	7.6	7.8
	10	6.7	10	7.8	8.3	6.8	7.5	7.0
Interview	9.8	6.5	9.3	10	8.7	7.7	10	9.5
	10	7.2	10	7.8	9.5	8.2	7.7	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 3: Result of Rubric

level. The more familiar they get with BiTak, the more motivated they are to speak.

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

Group 2 members communicated using BiTak with using the recording function. Therefore, they were required to obey the strict turn-taking rule that was systematically forced by BiTak.

For the first time, it was 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.

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.

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.

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.

5. Dual-role Collaborative Learning

In addition to the above mentioned basic analyses that were already reported in our previous paper [16], we carried out an in-depth analysis of the transcript in order to achieve a deeper insight into the process of improvement of learners. Based on this analysis, we will propose a dual-role collaborative learning as a novel learning style that is naturally emerged in the dual-lingual communications where the BiTak is used.

● Group 1

Here are some examples from the transcript:

- ✓ E1: let's start wa nan desu ka?
J1: Hajimemasho
E2: Accomodation wa nan desho?
J2: In Japanese... "Shukuhaku shisetsu"
- ✓ J1: When did you go to Japan?
E1: kotoshi, shigatsu...san nichi??
J1: Mikka.
E1: ah, shigatsu no mikka, arigatou
- ✓ J1: If I have money, I want to go to Germany.
E1: Germany? Doko?
J1: Eh?
E1: Germany wa doko?
J1: Doitsu no doko?
E1: Ah...
- ✓ J1: How about winter in Japan?
E2: Samui desu. Arerugi ga arimasu.
J2: What is arerugi written in English?
E2: It's allergic.
- ✓ E1: yasumijikan wa nani o shi masu ka?
J1: I sleep. Hmm.. I feel sleepy...
E1: "I often feel sleepy."
J2: In my case, for relax, for example, walking or swimming...hmm...
E2: Ah, you usually go swimming or walking in your freetime?..
J2: Oh, yes, yes...
J1: I usually driving around ... the town.
E1: Driving license wa nihongo wa nan desu ka?
J1: Unten menkyoshō desu.
E1: Ah... arigatou.
- ✓ E1: Tomi no hito wa ..not always..How to say "not always"?

J1: (write in the text chat) ..itsumo..dewanai

E1: Ah, tomi no hito wa itsumo shiawase dewa nai.

As mentioned in 4.2, Group 1 were required to use Bitak as a normal video chat application without using the recording function and to communicate with each other through dual-lingual pattern. The result from transcript revealed that they had good experience with dual-lingual communication. However, they did not notice the intention of language learning. They followed our requirement to talk in group with various topics provided. If one member had difficulty in finding the suitable word, they mostly raised their voice to ask for help, otherwise the others just ignored the member's mistakes. From some typical examples above, it is clear to realize that they usually asked for unknown vocabulary, no more getting deeper in word using and keep continuing the conversation topic by topic. They easily finished discussing the topic questions in the time limit as normal chatting. They did not care much about others' mistakes. It was alright as long as they understood and then they gradually forgot to correct mistakes for each other. It is not good for language learning. It was difficult to realize the facilitator in this collaborative group because their roles were not clearly identified.

● Group 2

Here are some examples from the transcript:

- ✓ J1: Modern lifestyle gives us so many time to relax... in the past has to do many thing, for example, do laundry...But now we don't need to do in many time.
E2: shabete no toki wa Subject wa arimasen ne. You should say "in the past people had many thing to do.."
J1: Ah, I see.
- ✓ E1: (misused between ippai and isogashi)
J1: Shigoto ga ippai means I have a lot of work
Shigoto ga isogashi means I am very busy.
So it's different.
E1: naruhodo. Sorekara, Shigoto ga ippai na no de, isogashi desu.
J2: Oh yes.
E2: Hai, arigatou...
- ✓ E1: Saigo no bun no imi wa chotto wakarimasen.
J1: Ah I said "I travel to foreign country about one time a month"
E1: You said "one time", I think "once" is better.
E1: Ryokou wa suki desu.
J2: I think instead of saying "wa", you should say "(Watashi wa) ryokou ga suki desu."
E2: Hai.

Different from requirements of Group 1, Group 2 was asked to use all the function of Bitak: strict turn-taking and

recording function. Therefore, it took them longer time to finish one question compared to that of Group 1. They hardly finished half of the topic questions in the time limit. Each member had three or four times to present ideas through presentation phase. Since they had to listen again the recording, they had more time to consider and find out mistakes for each other. The content of correction was more specific than that of Group 1, focusing on not only vocabulary but also grammatical mistakes. They unintentionally helped each other as facilitators and receivers. Japanese members became Japanese facilitators who recognized and gave feedbacks of Japanese mistakes of foreign members while foreign members were English facilitators who help correct mistakes of Japanese members. In other words, they became both facilitators and receivers in this kind of collaborative learning, which we named dual-role collaborative learning. (See Fig.4)

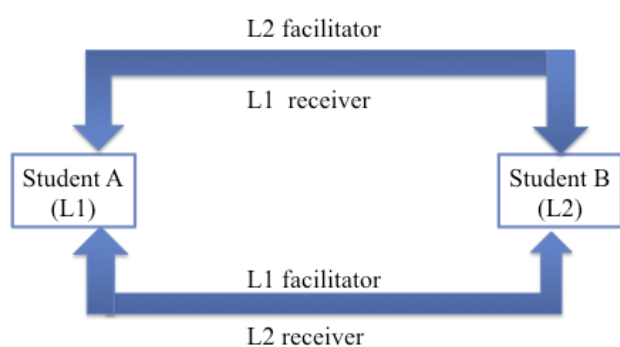


Figure 4: Dual-role Collaborative Learning

As a matter of fact, by employing dual-lingual communication, dual-role collaborative learning naturally happens in most cases. However, the crucial difference between both groups which made this dual-role collaboration more efficiently and clearly utilized is the usage of strict turn-taking and recording link. Members in Group 2 took all of recording link into serious consideration. They wanted to make sure their friends know their mistakes and were willing to correct for them. All of them gradually had sense of learning, not simply gossiping on the account of the proposed features of BiTak.

6. Conclusion

In this paper, we proposed a theoretical model named dual-role collaborative learning in simultaneous second language acquisition using tools as strict-turn taking method and dual-lingual communication. 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 and learners play their roles as facilitators and receivers

to support each other's speaking skill.

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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