

Web-based Collaborative Environments with a Virtual Member for Developing EFL Students' Writing Skills

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Abstract

The objective of this study is to see if an online writing system developed by our team is helpful for improving EFL students' writing skills. An online discussion forum was set up as a platform for writing with the aid of CSCL (computer supported collaborative learning) technologies. The use of online discussion forums leads to a student-centered model on the basis of social constructivist approaches. Students create a learning community in the online forum, where they explore ideas, provide content expertise and feedback, and share feelings among participants. To put it another way, students play active roles in their own learning process, while the role of teachers is to facilitate and be supportive within the environment. In this study, a virtual member (a bot), who participated in the online discussion forum, automatically presents model writing in order to lead students to follow steps properly in their writing processes as a scaffolder. Additionally, some expressions are presented based on the analysis of the British National Corpus and the Corpus of Contemporary American English when students want to refer to them for hints. Consequently, students can learn from production created within the online writing system in a student-centered environment. This study will show how our online writing system works under the Web-based collaborative environment, and suggest how to use a new way of ICT (information and communications technology) in English education so that students can develop their writing skills.

1. Introduction

Learning through an online discussion forum is a kind of collaborative learning on the basis of social constructivist approaches. Learners can gain many things from other learners and artifacts which are created in the community through an online discussion forum (Ferry, Kiggins, Hoban, & Lockyer, 2000; Harasim, 1993; Scardamalia & Bereiter, 1994).

There has been much discussion regarding online discussion forums. Scardamalia & Bereiter (1994) shone a new light on the way of building knowledge among members

within a learning community, what is called a knowledge building community. Over the last few decades, research concerning online discussion forums has focused on the nature of the community created in the online forum and products through interaction within the online community (Chen and Chiu, 2008; Hammond, 2000; Salmon, 2002; Yang & Tang, 2003). In addition, some researchers have reported that asynchronous online discussion forums were effective for professional learning (Kushima, Obari, & Nishihori, 2008; Kushima, 2008; van Weert & Pilot, 2003). These communities draw on the concept of a community of practice (Lave & Wenger, 1991; Wenger 1998). Within a community of practice, a new member draws close to veterans through interaction among members and artifacts formed within the community, where veterans play a role as a scaffolder (Bruner, 1960/1977) in the community¹.

On the other hand, very little has been reported about the quality of writing in EFL activities (Pramela, 2011). Kushima (2010, 2012) used online discussion forums for an English writing course in a Japanese university. She adopted an online discussion forum as a platform for English composition. The students were asked to post their own writing on the forum according to the instructions instead of discussing a theme. After posting their own writing, they engaged in peer response activities. They posted comments on peer writing on the forum, and then they shared their comments face to face in class. She reported that the students were inspired by peer writing or comments and were more motivated in their studies. They were asked to answer the questionnaire about a set of activities at the end of the course. Over 90 percent of the students, who engaged in the activities, made positive assessments of the activities with the use of an online discussion forum. From analysis of data or their free description, a number of students gained knowledge of expressions, discourse organization, and hints for ideas from peer writing. In peer response activities, students at lower and intermediate levels were motivated to write English and learnt things from peer writing. Students at advanced levels could develop their writing skills by examining peer writing and giving comments in English. On the other hand, the same errors were observed in the writing of a few students who are friends, and such things were recognized in pencil-and-paper assignments. Since there is a possibility that such students gain incorrect knowledge from peer writing, giving feedback to them is indispensable. In order to lead a proper way of learning within an online or offline learning community, a facilitator is expected to play a crucial role, especially, in asynchronous learning² (Anderson, Rourke, Garrison, & Archer, 2001; Baran & Correia, 2009, Nandi, Hamilton, Chang, & Balbo, 2012; Pramela, 2011; Maor, 2003). The facilitator is supposed to keep the students on the right track.

However, it is difficult to allocate a facilitator for a learning community because of

cost and time. Moreover, there might be cases where there are no proper facilitators to support learners' studies. To solve this problem, we have developed an online discussion forum equipped with a virtual member or a bot, with the intention to encourage students to post their own writing. In this study, the role of the bot was designed to provide model writing as a scaffolder, or a veteran member. Specifically students can learn proper writing process and some useful knowledge for their composition from the bot under a student-centered environment.

2. System Design for the Online Discussion Forum

The design for our online discussion forum is based on the collaborative space ontology (Takeuchi, Hayashi, Ikeda, & Mizoguchi, 2006). According to the collaborative space ontology, collaborative space is classified into two areas: one for practice to create community knowledge, and the other for education to pass it on to the next generation. Our system was designed to integrate both of these functions. First, an online discussion forum was built on the client-server architecture, and then a program, in which part of the bot's writing was automatically presented at a regular interval, was incorporated into it. The online writing system was named *Coconut* (Kushima, Y. Kishi, Tajika, N. Kishi, & Sonoda, 2014). Figure 1 shows the top page of the *Coconut*. The right column is for practice in writing English composition. The left one is for collaborative learning, where participants learn from the peer writing or the bot's writ-

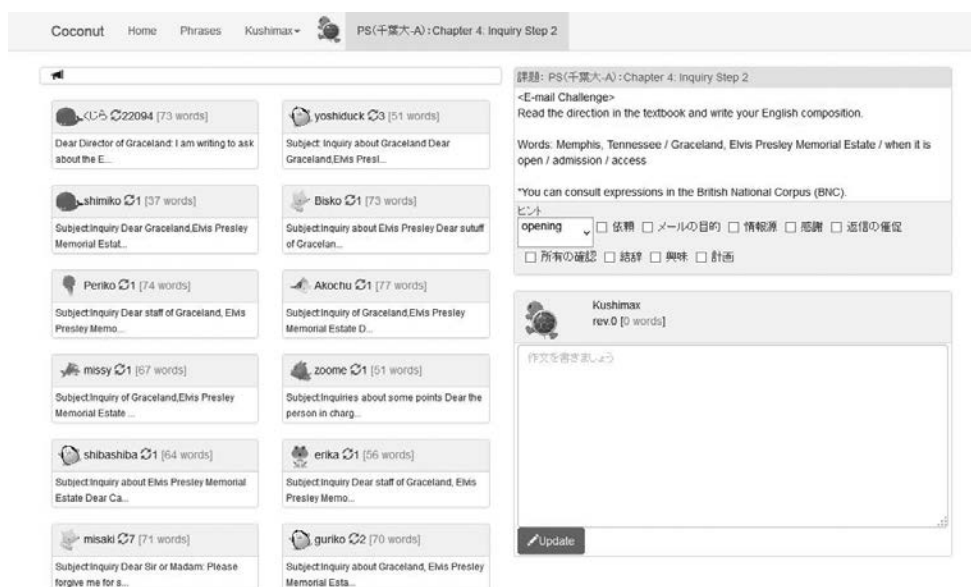


Figure 1. The Top Page of the *Coconut*

ing. A participant inputs his/her own writing into the entry field in the right column. Part of all the participants' writing appears in the left column, where a participant's nickname, his/her icon, and the number of words and versions of each participant's writing can also be seen. Unlike a usual online discussion forum, we cannot scroll through writing posted by all the participants to see the whole of their work. When a participant's nickname is clicked, the whole of his/her writing can be seen. Therefore, learners refer to others' writing if needed within the online writing system. The design of the *Coconut* was based on our intent that we would like students to first work on the assignment on their own.

The online writing system *Coconut* is also equipped with the following unique features. One is that a virtual member (bot) automatically presents writing. In this study, the bot was intended to offer model writing. Model writing leads to an increase in learners' consciousness of how text is organized (Hyland, 2003; Swales and Feak, 2000). In the composition course, the students were asked to work on e-mail writing, but most of them had little knowledge of how to write an e-mail. Hence, model writing presented by the bot was expected to have the students raise their consciousness of the key lexical and grammatical features of a text and the discourse organization. It means that the bot plays a role of an advanced member, or a kind of a facilitator. In an online learning community, especially in asynchronous learning, a facilitator's role is considered important (Anderson, Rourke, Garrison, & Archer, 2001; Baran & Correia, 2009; Nandi, Hamilton, Chang, & Balbo, 2012; Pramela, 2011; Maor, 2003). The bot in the *Coconut* has considerable potential to raise autonomous learners, by giving the proper process of writing like an advanced member or a facilitator, based on the student-centered approach.

Figure 2 shows how a bot's writing works. As previously mentioned, part of the bot's writing is designed to automatically appear at a regular interval as one of a members' writing in the left column. In the study, a bot's writing that is intended to be the model is inputted into the system by a faculty member in advance. Before online writing activities, the students learned expressions for e-mail for certain occasions by using the textbook (Asaki & Knight, 2003), and they posted writing of a practical exercise in the second step on the online system. The students were told that a virtual member joined the community as a bot, and the bot was introduced to them, but they were not told that the writing presented by the bot was model writing (Asaki & Knight, 2003), until after posting their own writing. The students were expected to raise the consciousness of some knowledge from the bot's writing spontaneously.

Moreover, learners can access the example sentences from BNC (the British National Corpus), COCA (the Corpus of Contemporary American English), and an online

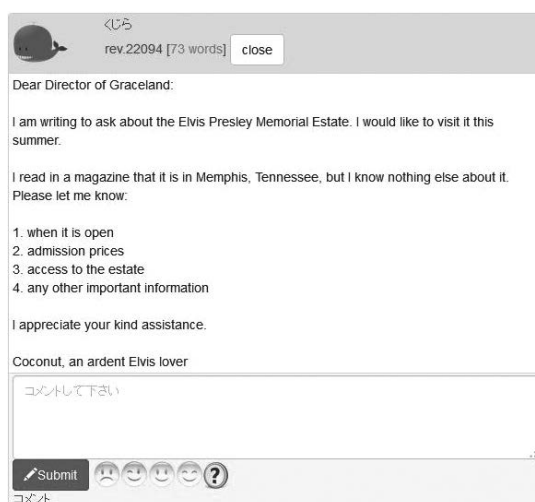


Figure 2. A Bot's Writing

dictionary. Figure 3 shows example sentences from BNC, COCA, and an online dictionary. When students click a key phrase (in the left column in Figure 3), example sentences including the phrase will appear (in the right column in Figure 3). The database has been created by the faculty members and inputted into the system beforehand. Key phrases and example sentences shown in Figure 3 are related to expressions of a *request*.

The additional feature is the peer response activities with the use of emoticons, or

ヒント

opening 依頼 メール目的 情報源 感謝 返信の催促

所有の確認 結核 興味 計画

opening body 依頼 can you BNC COCA

opening body 依頼 could you BNC COCA

opening body 依頼 could you possibly BNC COCA

opening body 依頼 do you think you could BNC COCA

opening body 依頼 メール目的 I am writing to request BNC COCA

opening body 依頼 メール目的 I am writing to request * information BNC

COCA

opening body 依頼 I request BNC COCA

opening body 依頼 I request that BNC COCA

opening body 依頼 I was wondering if you could BNC COCA

opening body 依頼 I wonder if you would mind BNC COCA

opening body 依頼 I would appreciate it if you could BNC COCA

opening body 依頼 I would be grateful if you could BNC COCA

opening body 依頼 I would like to know BNC COCA

opening body 依頼 I would like to know more about BNC COCA

opening body 依頼 is there any way you could BNC COCA

opening body 依頼 we request BNC COCA

opening body 依頼 will you BNC COCA

opening body 依頼 would it be possible for you to BNC COCA

opening body 依頼 would you BNC COCA

opening body 依頼 would you be so kind as to BNC COCA

opening body 依頼 would you mind BNC COCA

opening body 依頼 you are requested no to do BNC COCA

ヒント

opening 依頼 メール目的 情報源 感謝 返信の催促

所有の確認 結核 興味 計画

opening body 依頼 can you BNC COCA

opening body 依頼 could you BNC

1. Could you please let me know where you would like the cheque sent, and to whom we should make it out?

2. Could you please let me know whether this would be possible?

3. Could you please let us know this too?

4. Could you therefore please let me know?

5. Could you, therefore, please send us prints of the 59 slits used in the manuscript of the Student's Activity Book?

6. Could you therefore please telephone me at your earliest convenience?

7. Could you return your comments by Monday 10 November, please don't trouble to reply if you are happy with your leaf as we will assume no reply means that it is satisfactory.

8. Could you please let me know if there are any planning or highway constraints on the size and design of gates that can be put up in this area and if planning consent is required.

9. Could you sort them out for me?

10. Could you possibly help us out?

COCA

1. Could you please describe your perceptions, feelings, thoughts, or responses with regard to ...?

2. Could you disclose without quain your decision or action to your boss, your CEO, ...?

3. Could you find our way back?

4. Could you explain it to us?

5. Could you tell me something about field trips you took part in K-12 grades?

6. Could you also tell us a little bit more about your own education and the kinds ...?

7. Could you talk more about that?

8. Could you describe your experiences in that regard?

9. Could you separate them?

Figure 3. Example Sentences From BNC, COCA, & an Online Dictionary

smileys. The entry field under the writing shown in Figure 2 is used for peer response. For the activities, emoticons are also available, and learners can also write comments using emoticons.

3. Research Questions

In the environment of the online writing system *Coconut*, students can learn things from writing given by real or virtual members and expressions from some corpora, that is, BNC, COCA, or an online dictionary. On the other hand, students can work on their composition on their own without referring to them. To make the *Coconut* effective for developing students' writing skills, it is significant to find out which factors, namely, the textbook, peer writing, the bot's writing, the link to the online dictionary, the example sentences from BNC or COCA, and their own dictionary, affect students' writing and to what extent. Also, the *Coconut* can be used under both synchronous and asynchronous learning environment. The bot in the *Coconut* has the potential to promote collaborative learning or raise autonomous learners, and therefore it is significant to investigate how a virtual member works in a Web-based collaborative environment. Consequently, two research questions were raised.

1. Which factor affects students' writing most?
2. How does the virtual member work in an online learning community?

4. Method

4.1 Participants

Three Classes (Class A, Class B, and Class C) in the writing course used our writing system. Class A consists of 29 first-year education students, Class B is 24 first-year engineering students, and Class C is 16 students regardless of departments and years. The students in each class were divided into three learning communities (Community X, Y and Z) respectively, so that students could take a view of all the participants' icons without scrolling on the screen. The students in Class A and Class B used the system for two weeks in the middle of the course, while the students in Class C used the system for 14 weeks. With regard to the English proficiency of the participants, the TOEIC score of one student in Class C was between 650 and 729, those of ten students in Class B and three students in Class C were between 550 and 649. Those of the other students in the three classes were less than 549, except for unclear scores of six students (Class A: three, Class B: one, and Class C: two). The participants also declared their knowledge and writing skills level of e-mails in the questionnaire survey. According to their self-reported levels (Table 1), nobody in the three classes was confident in writing e-mails. There were also a small number of the students in

each class who said that they knew how to write e-mails, but that they made some mistakes.

Table 1. Self-reported Knowledge and Writing Skills of E-mails

Self-reported knowledge and writing skills	Class A (n=28 ³)	Class B (n=24)	Class C (n=16)
I am confident in writing e-mails.	0	0	0
I know how to write e-mails, but I make some mistakes.	3	1	2
I know how to write e-mails, but I am not confident in writing well.	8	10	8
I have some knowledge of writing e-mails, so I am not confident in writing well.	9	8	3
I have little knowledge of writing e-mails.	8	5	3

4.2 Writing Tasks

This paper covers one common task in the three classes⁴. The students were required to write and post an inquiry e-mail after they learned the expressions and format of an inquiry e-mail through the textbook. Japanese directions and some words as hints were presented on the *Coconut*. The writing task is to inquire about the Graceland of Elvis Presley Memorial Estate in Memphis, Tennessee; about when it is open, the admission, and the access, by e-mail. The words given as hints were *Memphis*, *Tennessee*, *Graceland*, *Elvis Presley Memorial Estate*, *when it is open*, *admission*, and *access* (Asaki & Knight, 2003). The students were engaged in peer response activities after posting their own writing, but this study limits the discussion to the activities until posting it.

4.3 A Questionnaire Survey

A questionnaire survey (Appendix 1) of the students was carried out after obtaining informed consent just after they finished working on the *Coconut*. The questionnaire comprised of multiple-choice and open-ended questions, and the question items were categorized into three sections: the students' background information, the writing activities with the use of the online discussion forum, and the online writing system. The number of valid responses was 28 in Class A, 24 in Class B, 16 in Class C. This study performed quantitative and qualitative analysis of the responses.

4.4 A Comparative Analysis of Students' Writing and the Bot's Writing

Each writing of the students was analyzed and compared with peer writing and a bot's writing, or a model on:

- (1) The number of words, sentences, DC/C (dependent clauses per clause), and VPs (verb phrases)
- (2) 4-gram

An n -gram is a contiguous sequence of n items from a sentence, and a 4-gram is a four-word sequence of words. For example, we can extract, *It will rain in, will rain in this, rain in this district*, and *in this district tomorrow*, as 4-grams of the sentence, *It will rain in this district tomorrow*. By observing 4-grams of students' writing text, we can compare what kind of sequences are frequently used by the students. 4-grams from the students' text were extracted by running a program written in the Perl programming language in this study.

5. Results and Discussions

5.1 The Factors Which Affect Students' Writing

Table 2 showed what the students focused on in the online writing activities. The item with the highest response rate was "the perfection level of English writing" in all the classes, but the item with the second highest response was "working on the activities on my own" in Class A, "collaborative learning" in Class B, and "working on the activities on my own" in Class C. Interestingly, there was nobody who selected "collaborative learning" in Class C. The possible reason is that the participants in Class C belong to different departments, and it was difficult for them to develop a feeling of belonging to the online community. However, the response rates of the students in other classes were comparatively higher (Class A: 21.3%, Class B: 25.0%).

Table 2. What the Students Focused on in the Online Writing Activities (%)

	Class A ($n=28$)	Class B ($n=24$)	Class C ($n=16$)
The perfection level of English writing	31.9	46.9	55.0
The contribution to the members	6.4	3.1	5.0
Collaborative learning	21.3	25.0	0.0
Working on the activities with friendly competition	17.0	6.3	0.0
Working on the activities on my own	23.4	15.6	40.0
Other (Please specify)	0.0	3.1	0.0

Note. Multiple answers are permitted.

Table 3. What the Students Often Referred to in the Writing Activities (%)

	Class A (n=28)	Class B (n=24)	Class C (n=16)
The textbook	20.8	31.9	33.3
Peer writing	22.6	12.8	6.1
The bot's writing	20.8	14.9	12.1
The example sentences from an online dictionary	3.8	14.9	15.1
The example sentences from BNC	3.8	4.3	6.1
The example sentences from COCA	7.5	0.0	3.0
Your dictionary	20.8	21.3	24.2
Other (Please specify)	0.0	0.0	0.0

Note. Multiple answers are permitted.

Table 3 shows what the students often referred to while they wrote. The response rates for the textbook were the highest in Class B and Class C, and it was the second highest in Class A. It was assumed that the expressions the textbook presented could be applicable to the task. With regard to reference to peer writing⁵, the rate in Class A was 22.6%, and the rate in Class B was 12.8%, but the rate in Class C was comparatively lower, 6.1%. It is thought that Class C consisted of students of different departments and they had little sense of belonging to the community. As for the bot's writing, the students in Class A referred to it as much as the textbook, and the students in Class B and Class C looked at it almost as much as the example sentences from an online dictionary, 14.9% and 12.1% respectively. In addition, the students in Class B and Class C consulted an online dictionary as much as the bot's writing, although the students in Class A did not look in an online dictionary as much. On the other hand, only a few students in all the classes referred to the authentic materials of the example sentences from BNC and COCA. Some authentic sentences from the two corpora were regarded as unfamiliar to the students. The use of authentic materials helps learners be exposed to real language, and then leads them to increase motivation and strategies (Clarke, 1989; Hyland, 2003; Tamo, 2009). However, Hyland (2003) pointed out that authentic material texts are not always good models because some are poorly structured and incoherent. Tamo (2009) states that the use of authentic materials may cause learners at lower levels to feel de-motivated and frustrated since they lack many lexical items and structures used in the target language. In addition to that assumption, it seemed that the expressions in the textbook were enough for the students as hints in this task. Consequently, there is room for reconsideration of how to show the example sentences from the corpora depending on the kinds of tasks.

Table 4. The Functions of the Online Writing System the Students Thought Helpful (%)

	Class A (<i>n</i> =28)	Class B (<i>n</i> =24)	Class C (<i>n</i> =16)
Referring to peer writing and comments	28.6	30.4	32.1
Seeing the numbers of words and versions of writing	17.1	28.3	21.4
Referring to the bot's writing	21.4	21.7	10.7
Using the link to the online dictionary	8.6	17.4	21.4
Seeing the example sentences from BNC	5.7	0.0	7.1
Seeing the example sentences from COCA	5.7	0.0	7.1
Seeing the emoticons for peer response	12.9	2.2	0.0
Other (Please specify)	0.0	0.0	0.0

Note. Multiple answers are permitted.

The students were also asked which functions of the online writing system were helpful to them (Table 4). The highest response rate was “referring to peer writing and comments” in all the classes (Class A: 28.6%, Class B: 30.4%, Class C: 32.1%). The second highest response rate was “referring to the bot’s writing” in Class A (21.4%), and “seeing the numbers of words and versions of writing” in Class B (28.3%) and Class C (21.4%). The response rate for “referring to the bot’s writing” was the third highest in Class B (21.7%) and Class C (10.7%). With regard to referring to authentic materials, the rates were low. As mentioned before, we need to consider how to present the example sentences from authentic materials depending on the kinds of tasks.

Table 5 indicates the extent to which the students referred to peer writing. Most of the students in all the classes answered, “I referred to peer writing and incorporated part of it into my writing.” However, there were some students who answered that they did not consult peer writing. Table 6 indicates the extent to which the students referred to the bot’s writing. Overall, we can see the similar tendency of the student’s responses to that of the student’s responses to the question about the degrees of reference to peer writing. The highest response rate was “I referred to the bot’s writing and incorporated part of it into my writing.”

Table 5. The Extent to Which the Students Referred to Peer Writing (%)

	Class A (n=28)	Class B (n=24)	Class C (n=16)
I referred to much of peer writing and incorporated it into my writing	24.1	4.2	12.5
I referred to peer writing and incorporated part of it into my writing	55.2	62.5	50.0
I referred to all the peer writing, but I did not incorporate it into my writing	3.4	4.2	6.3
I referred to a few of the peer writing, and I did not incorporate it into my writing.	0.0	16.7	18.8
I hardly referred to peer writing	17.2	12.5	12.5
Other (Please specify)	0.0	0.0	0.0

Table 6. The Extent to Which the Students Referred to the Bot's Writing (%)

	Class A (n=28)	Class B (n=24)	Class C (n=16)
I referred to much of the bot's writing and incorporated it into my writing	13.8	4.4	6.3
I referred to the bot's writing and incorporated part of it into my writing	51.7	43.5	43.8
I referred to the bot's writing, but I did not incorporate it into my writing	13.8	21.7	12.5
I hardly referred to bot's writing	20.7	30.4	37.5
Other (Please specify)	0.0	0.0	0.0

Figure 4 shows the comparison of the degrees in the use of between peer writing and the bot's writing. The students in each class referred to peer writing a little more than the bot's writing, although both writing was frequently consulted. Some students answered in the free description that they were interested in seeing peer writing because they had had few opportunities to see it before. Some students answered that they learned expressions from peer writing they did not come up with. Several students answered that they gained confidence in their writing because their peers pointed out good things in their writing. From the descriptions, it seems reasonable to suppose that peer writing worked as scaffolding. On the other hand, there were students who did not consult others' writing, and in particular almost half of the students of Class B and Class C answered that they did not use the bot's writing.

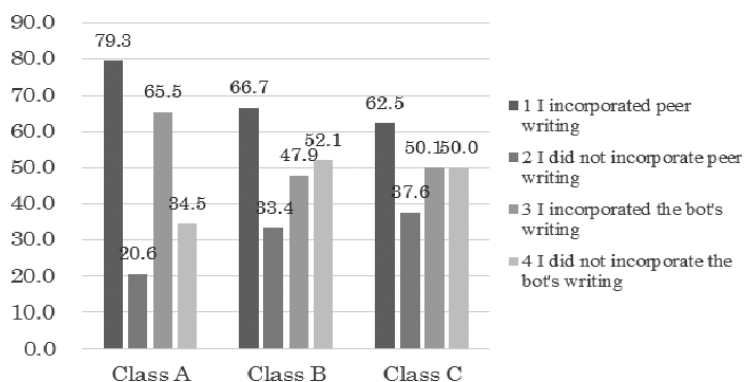


Figure 4. Comparison of the Degrees in the Use of Between Peer Writing and the Bot's Writing (%)

5.2 Analysis of the Data

Table 7 shows the number of words, sentences, clauses, DC/C (dependent clauses per clause), and VPs of each writing of the participants in all the classes. The data of the students who did not meet the deadline were eliminated. From Table 7, we can see a similar tendency among the numbers of the above factors (the number of words, sentences, clauses, DC/C, and VPs) of the participants' writing in the communities. The possible reason for this is that the basic organization of the text is almost the same because the students worked on the same topic under the same condition for an inquiry e-mail. However, there were some differences in discourse structures or expressions depending on communities. For example, in Community X in Class A, 50% of the members used "Thank you for your consideration" in the closing part, although it was not used in other communities. In Community Y in Class A, 70% of the members conducted inquiries using an itemized form, while in other communities there were only a few who did so. The itemized form did not appear on the textbook but appeared on the bot's writing.

Table 7. The Number of Words, Sentences, DC/C, and VPs of Each Writing

		Students' ID	Words	Sentences	Clauses	DC/C	VPs	
Class A (n=28)	Community X (n=12)	101	51	6	3	0.3	8	
		102	37	4	3	0.3	6	
		103	73	5	7	0.4	12	
		104	74	7	5	0.2	11	
		105	77	7	5	0.2	11	
		106	67	6	6	0.2	9	
		107	51	3	4	0.3	9	
		108	64	5	6	0.2	9	
		109	56	4	6	0.2	9	
		110	70	8	7	0.1	13	
		111	70	5	7	0.3	11	
		112	47	3	4	0.5	8	
		<i>M</i>	65.5	5.0	4.0	0.2	9.0	
		<i>SD</i>	12.69	1.60	1.48	0.11	1.97	
		Community Y (n=10)	113	51	3	5	0.6	9
			114	62	4	6	0.2	7
			115	72	5	8	0.4	11
			116	87	8	12	0.3	18
			117	96	9	7	0.1	16
			118	56	4	6	0.2	9
			119	87	8	10	0.4	16
			120	106	8	11	0.3	18
			121	79	8	8	0.3	16
			122	72	5	8	0.4	12
		<i>M</i>	75.5	6.5	8.0	0.3	14.0	
		<i>SD</i>	17.63	2.20	2.28	0.14	4.07	
		Community Z (n=6)	123	35	4	1	0.0	4
			124	67	5	5	0.4	8
			125	71	5	8	0.3	12
			126	69	6	6	0.2	10
			127	79	5	6	0.3	11
			128	53	8	5	0.0	7
	<i>M</i>	68.0	5.0	5.5	0.2	9.0		
	<i>SD</i>	15.83	1.38	2.31	0.17	2.94		
Class B (n=16)	Community X (n=8)	201	55	5	5	0.0	10	
		202	80	5	9	0.1	16	
		203	64	9	10	0.1	15	
		204	76	4	7	0.3	14	
		205	71	7	8	0.0	15	
		206	61	5	6	0.2	10	
		207	37	6	3	0.0	6	
		208	86	6	8	0.3	13	
		<i>M</i>	67.5	5.5	7.5	0.1	13.5	
		<i>SD</i>	15.63	1.55	2.27	0.11	3.42	
		Community Y (n=8)	209	70	9	7	0.0	13
			210	72	5	5	0.0	12
			211	57	4	7	0.1	11
			212	84	7	9	0.2	15
			213	83	6	8	0.1	15
			214	53	5	6	0.2	10
	215		62	9	9	0.0	11	
	216		83	5	6	0.0	13	
	<i>M</i>	71.0	5.5	7.0	0.1	12.5		
	<i>SD</i>	12.29	1.91	1.46	0.09	1.85		
Class C (n=13)	Community X (n=6)	301	39	6	5	0.0	5	
		302	48	5	5	0.0	8	
		303	39	3	6	0.2	10	
		304	42	5	5	0.0	6	
		305	65	7	8	0.3	15	
		306	59	7	7	0.0	11	
		<i>M</i>	45.0	5.5	5.5	0.0	9.0	
		<i>SD</i>	11.00	1.52	1.26	0.11	3.66	
		Community Y (n=7)	307	55	5	7	0.3	11
			308	40	5	5	0.0	8
			309	63	5	7	0.3	12
			310	55	6	6	0.0	10
			311	63	7	7	0.0	11
	312		45	6	6	0.0	8	
	313		62	7	7	0.0	11	
	<i>M</i>	55.0	6.0	7.0	0.0	11.0		
	<i>SD</i>	9.14	0.90	0.79	0.14	1.57		
	<i>M</i>	62.0	5.0	6.0	0.1	11.0		
	<i>SD</i>	21.80	1.97	2.39	0.14	4.06		
	The bot		73	5	7	0.3	10	

Table 8. Excerpts From Frequent 4-grams

Community X in Class A ($n=12$)		Community Y in Class A ($n=10$)	
4-grams	Frequency	4-grams	Frequency
Elvis Presley Memorial Estate	16	Elvis Presley Memorial Estate	12
when it is open**	12	when it is open**	10
forward to hearing from	10	I am writing to**	7
Graceland Elvis Presley Memorial	10	I would like to	7
to hearing from you	10	it is open 2**	7
it is open admission**	8	to hearing from you	6
is open admission and	7	1 when it is**	5
Presley Memorial Estate in	7	3 access to the**	5
Estate in Memphis Tennessee	6	about Graceland Elvis Presley	5
I am writing to**	6	dear director of Graceland	5
looking forward to hearing	6	forward to hearing from	5
Memorial Estate in Memphis	6	Graceland Elvis Presley Memorial	5
open admission and access	6	hearing from you soon	5
hearing from you soon	5	the Elvis Presley Memorial	5
I look forward to	5	about the Elvis Presley	4
thank you for your*	5	access to the estate**	4
you for your consideration*	5		

Note. **: 4-grams used by the bot's writing. *: 4-grams likely influenced by peer writing.

Tables 8 shows frequent 4-grams of Community X and Y in Class A. The 4-grams with a double asterisk appeared in the bot's writing, although part of them appeared in the textbook as well. The ones with a single asterisk seemed to have been influenced by peer writing. In fact, the bot's expressions such as "I am writing to ..." were used by some students who answered that they referred to peer writing, but that they did not refer to the bot's writing. In other words, it indicates that the bot's writing influences learners' writing directly or indirectly via peer writing. In this study, the bot presented model writing as an advanced member, and it can safely be assumed that the students found it to be a model intuitively. Model writing the bot presented could raise the students' consciousness of how text is organized and of suitable expressions in the context. The bot can present not only model writing but also any kind of text, and so there is a strong possibility that it serves as a scaffolder in the learning community. In short, I believe that the bot could indirectly promote the students' autonomous learning.

6. Conclusion

It can be concluded, from what has been discussed above, that as for the first re-

search question, “Which factor affects students’ writing most?”, the most influential factor is peer writing in all the classes. Peer writing was the most often used reference by the students, and they thought that it was the most helpful function. We also found that the students thought the bot’s writing or the link to the online dictionary helpful. Many students focused on the perfection level of English writing in the online writing activities, hence we can see that these factors were useful in order to elaborate their writing.

With regard to the second research question, “How does the virtual member work in an online learning community?”, the bot’s writing, which was a model, was used directly and indirectly. This is probably because many of the students did not have confidence or enough knowledge of writing e-mails and wanted to follow seemingly more advanced expressions as much as possible. Therefore, it suggests that the students might have raised their awareness of how to write an e-mail by referring to the model writing presented by the bot.

Through this study, we found that the online writing system *Coconut* could present a collaborative learning community in varying degrees. Moreover, we have seen that the bot played a role as a scaffolder in the online community. These observations lead us to believe that the bot’s presentation of model writing raised the students’ awareness of how to write an e-mail. Without a real facilitator, the virtual member could help develop the students’ writing skills and their own autonomy, and provided opportunities for collaborative learning. Moreover, if the bot presents another kind of text, the usage of the bot will be different. The bot could present hints of the writing process like a facilitator. In this study, the bot’s role was to show model writing, which was helpful for the students, but there is room for more work on other aspects of the bot’s role.

The *Coconut* provides some functions such as the link to an online dictionary and example sentences from corpora so that students can learn within the *Coconut*, and how to use the *Coconut* depends on learners. Actually, we need to remember that a number of the students focused on working on the activities on their own in the study. In other words, the *Coconut* is an online learning system by the student-centered approach. As a challenge for the future, we would like students to realize their progress for developing their writing skills through the *Coconut*. For that purpose, we will test diversification of the bot’s role and add the function of portfolio of students’ writing, which can show the progress for their writing skills and comparison of the progress with their peers. We believe that the online writing system *Coconut* helps students become autonomous learners and develop their writing skills.

Notes

1. Bruner's concept of scaffolding is close to Zone of Proximal Development (Vygotsky, 1978). Veterans play a role of building scaffolding for new members to come closer to veterans.
2. Learners learn in different places or at different times in asynchronous learning.
3. This figure is the number of the students who answered the questionnaire.
4. Class C worked on a variety of types of e-mail writing activities.
5. In order to look at the whole peer writing or the bot's writing, the students need to click the name of each writing.

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Appendix 1

Please fill out the following questions.

1. Please answer the following questions about your background.
 - 1) Sex ① Male ② Female
 - 2) Your nickname on the online forum
 - 3) Your score on the TOEIC Listening and Reading test (IP)
 - ① ~549 ② 550~649 ③ 650~729 ④ 730~859 ⑤ 860~
 - 4) Your score on other tests for measuring English ability, if any
 - 5) How well did you know how to write e-mails before this activity?
 - ① I am confident in writing e-mails.
 - ② I know how to write e-mails, but I make some mistakes.
 - ③ I know how to write e-mails, but I am not confident in writing well.
 - ④ I have some knowledge of writing e-mails, so I am not confident in writing well.
 - ⑤ I have little knowledge of writing e-mails.
 - 6) Where did you write and post your writing?
 - ① In class ② Outside classroom hours on campus ③ At home
 - ④ Other (Please specify)
2. Please answer the questions about the writing activities with the use of the online system.
 - 1) How much did you refer to peer writing?
 - ① I referred to much of peer writing and incorporated it into my writing.
 - ② I referred to peer writing and incorporated part of it into my writing.
 - ③ I referred to all the peer writing, but I did not incorporate it into my writ-

ing.

- ④ I hardly referred to peer writing.
 - ⑤ Other (Please specify)
- 2) If you chose ① or ② above, which of these did you refer to? (Multiple answers are permitted.)
- ① English expressions ② The idea ③ The sentence structure
 - ④ Other (Please specify)
- 3) How much did you refer to the bot's writing?
- ① I referred to much of the bot's writing and incorporated it into my writing.
 - ② I referred to the bot's writing and incorporated part of it into my writing.
 - ③ I referred to the bot's writing, but I did not incorporate it into my writing.
 - ④ I hardly referred to the bot's writing.
 - ⑤ Other (Please specify)
- 4) If you chose ① or ② above, which of these did you refer to? (Multiple answers are permitted.)
- ① English expressions ② The idea ③ The sentence structure
 - ④ Other (Please specify)
- 5) What did you often refer to? (Multiple answers are permitted.)
- ① The textbook ② Peer writing ③ The bot's writing
 - ④ The example sentences from an online dictionary
 - ⑤ The example sentences from BNC
 - ⑥ The example sentences from COCA ⑦ Your dictionary
 - ⑧ Other (Please specify)
- 6) Were you aware of a contribution to peer writing activities?
- ① Very often ② Sometimes ③ Not very often ④ Rarely
- 7) What did you focus on in the online writing activities? (Multiple answers are permitted.)
- ① The perfection level of English writing
 - ② The contribution to the members
 - ③ Collaborative learning
 - ④ Working on the activities with friendly competition
 - ⑤ Working on the activities on my own
 - ⑥ Other (Please specify)
- 8) Do you mind if somebody sees your writing?
- ① Not at all ② Yes, a little ③ Yes, very much
- 9) Please describe what you gained by checking peer writing and giving comments.

- 10) Please describe what you gained from peer response[comments].
3. Please answer the questions about the online writing system.
 - 1) Did you work on the writing activities with the use of online writing system without difficulty?
 - ① With ease ② Acceptably ③ With difficulty
 - 2) Please give the reason for your reply above.
 - 3) What kind of functions of the online writing system do you think were helpful? (Multiple answers are permitted.)
 - ① Referring to peer writing and comments
 - ② Seeing the numbers of words and versions of writing
 - ③ Referring to the bot's writing
 - ④ Using the link to the online dictionary
 - ⑤ Seeing the example sentences from BNC
 - ⑥ Seeing the example sentences from COCA
 - ⑦ Seeing the emoticons for peer response
 - ⑧ Other (Please specify.)
 - 4) What kind of functions of the online writing system do you think were hard to use or were useless? (Multiple answers are permitted.)
 - ① Referring to peer writing and comments
 - ② Seeing the numbers of words and versions of writing
 - ③ Referring to the bot's writing
 - ④ Using the link to the online dictionary
 - ⑤ Seeing the example sentences from BNC
 - ⑥ Seeing the example sentences from COCA
 - ⑦ Seeing the emoticons for peer response
 - ⑧ Other (Please specify.)
4. Please answer what you noticed or how you felt through the writing activities or about the online writing system.