Text-based peer–peer collaborative dialogue in a computer-mediated learning environment in the EFL context

Gang Zeng a,*, Shigenobu Takatsuka b

a The Joint Graduate School in Science of Education, Hyogo University of Teacher Education, Japan
b Department of English Language Teaching, Graduate School of Education, Okayama University, Okayama, Japan

Received 20 October 2008; received in revised form 19 January 2009; accepted 27 January 2009

Abstract

This study investigates EFL learners’ dialogues in synchronous task-based computer-mediated communication (CMC). The focus is on whether learners engage each other in text-based dialogues regarding the language use in pursuit of the task goal in the CMC context and how their mutual engagement impacts their language learning. Sixteen Chinese tertiary-level learners voluntarily participated in this study. They were randomly assigned to eight virtual pairs, and completed four collaborative tasks via Moodle, a course management system. The study was conducted within a sociocultural framework, especially Swain’s concept of collaborative dialogue. Language-related episode (LRE) was employed as a research tool to analyze the learners’ dialogue concerning their language use during the completion of the tasks. The data set includes recorded online chat logs, a post-task survey that elicited the learners’ perspectives on the online collaborative learning and two individualized posttests (immediate and delayed). The findings revealed that learners did assist each other in attending to language forms through collaborative dialogue, which consequently enhanced their language learning.

© 2009 Elsevier Ltd. All rights reserved.

Keywords: Collaborative dialogue; Computer-mediated communication; Language-related episode; English as a foreign language

1. Introduction

One of the greatest challenges facing English as a foreign language (EFL) education is how to generate peer–peer dialogues in the target language for meaningful purposes in and out of the class. Peer–peer collaborative dialogue, in which learners collaboratively “engage in problem solving and knowledge building” (Swain, 2000, p. 102), is of particular significance in the L2 learning process. In collaborative dialogue, learners use language to reflect on language use, and in so doing, the divide between language use and language learning is overcome with the two co-occurring in the same activity. In a comprehensive review of the research...
studies concerning peer–peer dialogues that occur during writing, speaking, listening and reading activities, Swain et al. (2002) concluded that peer–peer collaborative dialogue mediates L2 learning.

Recent years have witnessed a growing interest in integrating computer-mediated communication (CMC) tools into language learning along with the development of Internet technology. Pedagogically, CMC has proved to be an effective medium in facilitating the emergence of “a learner-centered discourse community” (Darhower, 2002), where learners can “benefit from interaction, because the written nature of the discussion allows greater opportunity to attend to and reflect on the form and content of the communication” (Kern and Warschauer, 2000, p. 15). Previous research has documented the positive effect of CMC on peer–peer interaction (e.g., Blake, 2000; Morris, 2005; Smith, 2003, 2005). Whereas much emphasis is put on how learners negotiate for meaning to repair communication breakdowns during their interaction, little attention is paid to learners’ collaborative efforts of problem solving and knowledge building in the CMC context.

Thus, the purpose of the present study is to explore peer–peer collaborative dialogue in a computer-mediated learning environment in the EFL context. The focus will be on how learners attend to their own and each other’s language use, and how this mutual attention to language use impacts their language learning. The study is conducted within the theoretical framework of a sociocultural approach, especially Swain’s (2000) concept of collaborative dialogue. Language-related episode (LRE), “an instance of collaborative dialogue” (Swain, 2001b, p. 286), is employed as a research tool to describe and analyze the dynamic nature of the learners’ online collaboration.

2. Literature review

2.1. Peer–peer interaction from a sociocultural perspective

The main premise of sociocultural theory is that learning is socially situated and a semiotic mediated process, happening first on the interpersonal (social) level and then on the intrapersonal (individual) level (Vygotsky, 1978). Important notions of sociocultural theory include mediation and Zone of Proximal Development (ZPD). The concept of mediation indicates that human cognition is mediated especially by language as the semiotic tool. ZPD refers to the distance between what a person can achieve on his own and what he or she can accomplish with assistance from a more competent other. Generally, learning within ZPD is perceived to occur in the expert–novice dialogic interaction, in which an expert (usually a parent or a teacher) provides contingent and graduated assistance to a novice (a child or a learner) (Aljaafreh and Lantolf, 1994). However, there has been an increasing interest in broadening the scope of ZPD to include peer–peer interaction in L2 acquisition. Lantolf (2000) claimed that ZPD is “more appropriately conceived as the collaborative constructions of opportunities for individuals to develop their abilities” (p. 17). A wide range of studies (e.g., Donato, 1994; Foster and Ohta, 2005; Ohta, 2000; Storch, 2002, 2003) have investigated how language learners assist each other within their respective ZPDs.

The traditional interactionist approach treats peer–peer interaction as an activity in which L2 learners negotiate meaning in case of communication breakdowns in order to achieve mutual understanding. Comprehensible input (Krashen, 1985) and comprehensible output (Swain, 1985), facilitated by negotiation of meaning, are considered to be the catalyst for language development (Long, 1996). Thus, the interactionist approach attempts to “enable learners to move beyond their current receptive and productive capacities when they need to understand unfamiliar language input or when they are required to produce a comprehensible message” (Kumuravadivelu, 2006, p. 69). Needless to say, the interactionist approach does provide a useful insight into the form–meaning relationship enabled by interaction. However, it reflects a limited perspective on the role of interaction for language learning, characterized as “conduit metaphor” or “information-processing metaphor”, perceiving knowledge as an exclusively individual cognitive construct and to be transmitted from one person to another (Swain, 2000, 2001b). The socially-constructed nature of interaction among peers has largely been ignored.

While the interactionist approach emphasizes the individual cognitive endeavor for the comprehensibility of message during interaction with others, the sociocultural approach stresses the collaborative effort for the co-construction of knowledge and meaning in the situated social context. For example, Donato (2004) perceives collaboration as “a powerful concept that moves us beyond reductive input–output models of
interaction and acknowledges the importance of goals, the mutuality of learning in activity, and collective human relationships” (pp. 299–230). Within this framework, language learning is seen to emerge through social mediation of collaborative activity. Thus, the sociocultural approach stresses more the dialogic and dynamic nature of peer–peer interaction. Swain’s collaborative dialogue provides us with a very useful insight for understanding peer–peer collaboration and its impact on language learning.

2.2. Collaborative dialogue and peer–peer collaboration

To broaden her original comprehensible output hypothesis, Swain (2000) used “collaborative dialogue”, viewing output within the sociocultural perspective of learning. Through collaborative dialogue, learners mutually scaffold each other to find how best to express their intended meaning by giving and receiving assistance as they interact with each other. In working towards the common task goal, learners become contributing members by pooling their knowledge and resources for joint decision making and problem solving. Thus, learners’ mutual attention to form in their collaborative dialogue does not necessarily result from non-comprehension, as is the case in the traditional interactionist literature; rather, it is a collaborative endeavor to achieve better joint performance. This joint effort of mutual knowledge construction will access each other’s ZPD, thereby leading to assisted performance (Ohta, 2000). Thus, collaborative dialogue is both a cognitive tool and a social tool that mediate language learning (Swain, 2000).

Collaborative dialogue has been generally operationalized by language-related episodes (LREs) (Lapkin et al., 2002). An LRE is defined as “any part of a dialogue where students talk about the language they are producing, question their language use, or other- or self-correct their language production” (Swain, 2001b, p. 287). Research has shown that LREs represent language learning in progress and therefore are the site of language learning (e.g., Ewald, 2005; Swain, 1998; Swain and Lapkin, 1998, 2002).

Collaborative dialogue can be prompted by collaborative tasks, which require learners to work in pairs, produce a final product, and communicate both language form and content (Swain, 2001a). These tasks “encourage learners to reflect on language form while still being oriented to meaning making” (Swain, 2000, p. 112). They should engage learners in meaningful activities in pursuit of a goal and facilitate effective collaboration. Through these collaborative tasks, learners will develop a shared responsibility over final production of the text and a sense of co-ownership, thereby encouraging their active contribution to the co-constructed resolutions.

2.3. Why text-based synchronous CMC

In text-based synchronous CMC, participants can have real-time conversational exchanges via text. It has been claimed to have several beneficial features, which make it a useful medium for creating an effective learning environment where learners collaboratively “learn language, learn about language and learn through language” (Warschauer, 1997, p. 471). First, it is time- and place-independent. Learners can communicate with each other anywhere and any time as long as there is an access to the Internet. Second, it enables quick feedback and real time interaction. Accordingly, learners can develop a strong sense of being part of a learning community, thereby increasing their engagement and motivation. Third, it is a new hybrid form of communication that brings speech and writing together “with the interactional and reflective aspects of language merged in a single medium” (Warschauer, 1997, p. 472). Learners can compose their utterances at their own pace and they can view each other’s language as they produce it. The visual display of their utterances provides opportunities for conscious attention to and reflection on their language use as well as prompts for further interaction (Kern et al., 2004). In addition, text-based synchronous CMC has other features, such as equal participation, reduced anxiety, creative expression and improved quality of output (see Kern, 1995; Warschauer, 1997). These may all contribute to learners’ collaborative knowledge construction.

2.4. Research questions

In response to the significant role of CMC in providing a promising avenue for creating a collaborative learning environment, there has been a growing body of research investigating computer-mediated
collaboration and its significance for language learning. Of particular significance are the studies by Schwienhorst (2003, 2004), O’Rourke (2005) and Appel and Mullen (2000), who have used MOOs (object-oriented multi-user domains) or e-mail for collaborative text-based exchanges, which tend to draw learners’ conscious attention to language form. They all have focused on promoting tandem language learning, in which “two native speakers of different languages communicate regularly with one another, each with the purpose of learning the other’s language” (O’Rourke, 2005, p. 434).

Despite the growing attention to research on CMC-based collaborative language learning, few studies have explored the issue within the framework of a sociocultural approach, which focuses more on collaboration than negotiation of meaning. The few studies adopting this approach either focus on NS–NNS interactions (e.g., Lee, 2004) or offline face-to-face collaborative dialogue at the computer (e.g., Gáñem Gutiérrez, 2003, 2006; Kitade, 2008; Tanaka, 2005). Even fewer studies have explored the issue in the EFL context. Thus, the present study, applying a sociocultural approach, will highlight how the CMC technologies may open up possibilities for the emergence of online peer–peer collaborative dialogue in terms of each other’s language use for a common goal in the EFL context. More specifically, we will address the following two questions:

1. Do learners engage each other in attending to language form in a text-based CMC learning environment motivated by collaborative tasks?
2. If so, how is their mutual attention to language form related to their language learning?

Language-related episode (LRE) is used as the unit of analysis in this study, as it has been used to attest learners’ mutual engagement in form-focused collaborative dialogue (e.g., Lapkin et al., 2002; Leeser, 2004; Watanabe and Swain, 2007). Language learning here refers to the internalization of linguistic knowledge and rules discussed or co-constructed in their collaborative dialogue.

3. The present study

3.1. Participants

The participants were 16 Chinese learners enrolled in the second academic year of a general English course in a teachers’ university in China, in which English classes are basically teacher-centered and test-oriented. They voluntarily participated in the research project, which was carried out while they were preparing for the forthcoming national college English test 4 (CET-4). CET-4 is designed for learners who have finished two years’ college English study and as a requirement for a bachelor’s degree. They were highly motivated to participate in this study because they thought the online learning activity might be helpful for the test. In terms of language proficiency, since 13 of the learners passed CET-4 (its passing score is generally considered to be equivalent to 550 of TOEFL-PBT) on their first try shortly after the project and the remaining three passed it on their second try four months later, they reached the intermediate level of language proficiency in this context. In terms of computer literacy, all the learners had experience of using text-based online chat in their native language, and were familiar and comfortable with computer-mediated communication. They had fairly easy access to the Internet in the university library and in net cafés on and off campus.

3.2. CMC tools

To carry out this project, a Moodle site was created where learners could read the task instructions, collaboratively work on the tasks and upload their joint productions. Moodle is a free online course management system (CMS), which is learning-centered, building the tools into an interface that centers the learning task. By using Moodle installed in a web server, educators can create a customized course website and exercise access control, providing an easy way to host a variety of online activities, in which learners share ideas and engage in the construction of knowledge (Cole, 2005). Therefore, Moodle is facilitative for collaborative language learning. Using the built-in chat function of Moodle, we created eight chat rooms for learners to carry out the assigned tasks, whose instructions were given on the front page of the course site.
3.3. Procedure

The 16 learners were randomly put into eight pairs. To familiarize the learners with online chat in the target language and the tasks, we gave them demonstrations on how to use some major built-in tools and time for practice in the first week. Some notes of warning were also offered on the course site so that they could avoid the pitfalls when carrying out the subsequent tasks. We formally started the treatment session when we were sure the learners had become accustomed to and felt comfortable navigating this learning environment.

Altogether, five tasks were designed based on the three features (i.e. working in pairs, producing a final product and communicating both content and form) of a collaborative task as previously mentioned. As the first task was a practice task, the learners’ interactions generated by this task were not included in the data set. The learners were required to work on the tasks once a week for five weeks in a row. Each pair determined the common time to be online and chatted for about an hour each time. They were allowed to carry out the tasks anywhere with access to the Internet. The learners were strongly advised, but not required, to chat in English in order to carry out the tasks. Their chat logs were automatically recorded in the course site and retrieved for analysis. At the end of each task, they were required to submit their joint product by uploading it onto the course site.

3.4. Data collection and analysis

Multiple data sources were used in this study, including learners’ online exchanges, learners’ responses to a survey and the results of the two individualized posttests developed based on the identified LREs. The excerpts selected from the learners’ online interactions were also employed to further inform the analysis in this paper. To increase reliability, we asked another EFL teacher to transcribe and code the data, which were further validated by another two EFL researchers. Data collection and analysis procedure consisted of the following three stages:

Stage 1: Post-task survey. Immediately after the learners completed all the tasks in Week 4, we created a two-part survey for learners to complete in order to elicit learners’ perspectives on the collaborative online learning. The first part consisted of 15 five-point scale questions (from strongly disagree to strongly agree) and the second part was more like a paper-based interview, which was intended to invite their free comments (general reflection) on their collaboration, the tasks and CMC environment, and invite their advice on improvement.

Stage 2: Identification of LREs. The learners’ online chat logs were downloaded and analyzed upon the completion of the tasks. First, the two raters independently coded the data for LREs that emerged in the learners’ online interactions. The inter-rater reliability is 92.9%. Then, the differences between the two raters were further discussed until 100% agreement was reached. The identified LREs were classified into two categories: lexis-based LREs and form-based LREs (see Swain, 2001b). Lexis-based LREs included instances in which learners searched for lexical items and/or chose among competing lexical items. For example, the two learners in Excerpt 1 discuss choosing between the two words poor and pity.

Excerpt 1: An example of lexis-based LREs

85. Ping: then, his poor wife said to others that he was always a man who took his own job seriously.
86. Bing: why do you use “poor”? 
87. Ping: poor in my sentence means helpless and painful
88. Bing: I think we should use “pity”
89. Ping: What?! You are wrong... 

Form-based LREs were instances in which learners focused on an aspect of English morphology, syntax or discourse. Excerpt 2 shows how two learners discuss a language form in their dialogues. In response to Tang’s incorrect suggestion of changing look into looked, Zhang explains “The verb ‘make’ should add the primary”, indicating the verb make should be followed by “object + bare infinitive”. To get her meaning across, she uses a Chinese word yuanxing (dictionary form) to supplement her explanation.
Excerpt 2: An example of form-based LREs

104. Tang: I think “look” should be changed “looked”
105. Zhang: emm. The verb “make” should add the primary (yuanxing)
106. Tang: Sorry

The identified LREs were also coded for two outcomes: successfully resolved LREs and unsuccessfully resolved (incorrectly resolved and unresolved) LREs (see Swain, 1998). Obviously, Excerpt 1, in which two learners do not reach an agreement over the lexical choice, is an example of the former type; Excerpt 2, in which one learner accepts the other’s explanation of the problem, is an example of the latter type.

Stage 3: Two individualized posttests. Both immediate (Week 5) and delayed (Week 9) individualized posttests were conducted based on LREs identified in the chat logs. Formats of the test questions include multiple choice, fill-in-the-blank, sentence improvement and translation. They were of discrete nature and have been proved in previous research to be effective in assessing “the learning of the exact aspect of language about which learners have metatalked” (Swain, 1998, p. 77). The first author created the tests first and discussed with another EFL teacher until they arrived at an agreement over the test items to be used. To increase the test reliability, we did not inform the learners of the tests in advance and we designed totally different test items in the two posttests. After each test, the two raters graded the tests together and discussed the discrepancies until they reached full agreement on the results. Excerpts 3 and 4 are two examples demonstrating how test questions are developed from the emerging LREs.

Excerpt 3: An example of a multiple-choice test item developed from an LRE

269. Yuan: The first sentence is “a nine year-old boy dashed into flames to pull his younger brother into safety.”
270. Yan: What does the word ‘dash’ mean?
271. Yuan: dash is to run in a rush
272. Yan: OK, Thanks

**Test question for Yan:** He *dashed* out and followed the man who had delivered the letter? What does “dashed” mean?
A. walked slowly B. ran in a rush C. walked fast D. ran slowly

Excerpt 4: An example of a sentence-improvement test item developed from an LRE

321. Yan: Lucky, the little boy didn’t hurt. The doctor praised the older boy’s
322. Yan: quick thinking, and said he is a young (hero)
323. Yuan: luckily
324. Yan: sorry

**Test question for Yan:** Correct the mistake in the following sentence:
Lucky, he found his wallet in the corner of the room.

We developed a test question for both the two parties in case of an unsuccessfully resolved LRE as we assumed they were their common problems.

Excerpt 5: An example of an unsuccessfully resolved LRE and the test item developed from it

77. Song: the police’s statement said the man hung himself in the tree in the zoo. Right?
78. Song: but I can’t distinguish the “hanged” and “hung”
79. Yi: oh, I see. You are right. I think “hung” is right.
80. Song: ok

**Test question for both Song and Yi:** Fill in the blank with the proper form of the word provided. He was so sad at the loss of his job that he ______(hang) himself from a tree yesterday.
We did not develop test items for the careless errors that occurred in the LREs as exemplified below:

**Excerpt 6: An example of careless mistakes**

302. Xin: We have already say five benefits about the coming Olympic Games.
303. Xin: already said.

4. Results

4.1. Mutual engagement in attending to language forms in the collaborative dialogue

The first research question is concerned with whether learners engage with each other in a collaborative effort in attending to language forms while proceeding with the tasks in this CMC context. To address this question, we examined the frequency and nature of LREs and learner’s perspectives on their online interactions. As Table 1 indicates, altogether the eight pairs spent 45 h and 15 min on the assigned tasks, took 2789 turns and produced 23,507 words. On average, each spent 5 h and 39 min, took 348 turns and produced 2938 words. Based on Swain’s definition of LREs, as was previously mentioned, we identified 216 LREs (56 lexis-based LREs and 160 form-based LREs), with an average of 27 per pair. Of the 216 LREs, 194 LREs led to successful solutions to the emerging language problems. The rate of LREs per minute ranged from 0.06 to 0.11, with the average of 0.08. The ratio of LREs to the amount of words in the talk ranged from 52.5 to 121.6 with the average of 91.9 per 10,000 words. The amount of words in talk far surpassed that of the study conducted by Williams (1999), who reported a range in the ratio of LREs from 1.46 to 2.50 during the learners’ face-to-face oral interactions. Interestingly, the results of our study are in line with that of Shekary and Tahririan (2006), which is, to our knowledge, the only other study to investigate text-based online chat via synchronous CMC using LREs as the unit of analysis. Their study, whose participants were 16 advanced Persian EFL learners, reported that the rate of LREs was 0.08 and the ratio 89.49. Taking into consideration the fact that the participants in our study were intermediate EFL learners, the results, which were most probably due to the collaborative nature of the learners’ interactions, are particularly significant.

To examine the mutuality of this process of attending to language use, we had a closer look at the emerging LREs. Excerpt 7 is an example showing how learners engage each other in the improvement of each other’s language use while working towards the common goal of completing the task.

**Excerpt 7: An example of learners’ mutuality in attending to language use in LREs**

56. Song: the wife said he always took his job seriously. do you agree
57. Yi: and then “his wife said that he always took his job seriously.” I think it is better. do you agree with me?
58. Song: it is better. if i use always, can i use the “took”?

Table 1
Summary of the results of the learners’ online interactions.

<table>
<thead>
<tr>
<th>Dyad</th>
<th>N of words</th>
<th>N of turns</th>
<th>Time spent (Hrs:Mins)</th>
<th>N of LREs</th>
<th>N of LREs/minute</th>
<th>N of LREs/10,000 words</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dyad 1</td>
<td>1970</td>
<td>289</td>
<td>4:13</td>
<td>22</td>
<td>0.08</td>
<td>111.7</td>
</tr>
<tr>
<td>Dyad 2</td>
<td>2235</td>
<td>301</td>
<td>6:03</td>
<td>25</td>
<td>0.06</td>
<td>111.9</td>
</tr>
<tr>
<td>Dyad 3</td>
<td>2810</td>
<td>333</td>
<td>5:00</td>
<td>25</td>
<td>0.08</td>
<td>88.9</td>
</tr>
<tr>
<td>Dyad 4</td>
<td>6472</td>
<td>667</td>
<td>8:04</td>
<td>34</td>
<td>0.07</td>
<td>52.5</td>
</tr>
<tr>
<td>Dyad 5</td>
<td>1669</td>
<td>207</td>
<td>5:05</td>
<td>20</td>
<td>0.06</td>
<td>119.8</td>
</tr>
<tr>
<td>Dyad 6</td>
<td>2549</td>
<td>267</td>
<td>6:29</td>
<td>31</td>
<td>0.08</td>
<td>121.6</td>
</tr>
<tr>
<td>Dyad 7</td>
<td>2027</td>
<td>225</td>
<td>3:48</td>
<td>15</td>
<td>0.06</td>
<td>74</td>
</tr>
<tr>
<td>Dyad 8</td>
<td>3775</td>
<td>500</td>
<td>6:21</td>
<td>44</td>
<td>0.11</td>
<td>116.5</td>
</tr>
<tr>
<td>Total</td>
<td>23,507</td>
<td>2789</td>
<td>45:15</td>
<td>216</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>2938</td>
<td>348</td>
<td>5:39</td>
<td>27</td>
<td>0.08</td>
<td>91.9</td>
</tr>
</tbody>
</table>

Note: N = number.
In the LRE above, Yi first suggests improvement in response to the sentence produced in Turn 56 by adding *that* behind *said* and then invites an opinion with the phrase “do you agree” (Turn 57). Song expresses her agreement followed by requesting for assistance “if i use always, can i use the ‘took’?” (Turn 58). Yi provides an explanation to the question and then checks comprehension with the phrase “do you understand” (Turn 59). Song confirms the comprehension, “oh, i see” (Turn 60). From this example, we can expect that their attention to language forms is not just due to communication breakdowns but as a collaborative effort for a more precise and appropriate way of expression. They request and obtain information from each other for successful task completion. This kind of dialogue is commonly distributed in their online exchanges. The use of *we* by Yi in Turn 59 shows that they are collaboratively constructing the knowledge and share the ownership over the joint product.

Through a detailed analysis, we found learners used a variety of discourse moves to initiate, negotiate and follow up each other’s contributions during the LREs. Examples of these discourse moves, which are broadly classified into two categories (initiation of LREs and responses to LREs), are presented in Table 2.

The results of the survey provided further evidence to support their mutual engagement in the collaborative dialogue regarding language use; the learners’ responses to the questions concerning collaboration are very positive on the Likert scale of 5 to 1. They thought they enjoyed the collaborative learning process (4.2), were willing to offer help (4.8) or accept the suggested solution (4.4) when faced with a language problem, and could make a joint effort to carry out each task (4.4). They were satisfied with the joint work they submitted (4.3). When asked about their free comments on this online learning experience in the paper-based interview, learners’ responses are generally affirmative. One learner wrote:

**Excerpt 8:** A learner’s comment

> Our collaboration was very pleasant. As I was trying to find the language errors made by my partner, I attended to the accuracy of my own expression. I felt a sense of satisfaction and fulfillment upon completion of each task.

(English translation mine)

Another learner commented:

**Excerpt 9:** A learner’s comment

> During our collaboration, my partner and I tried to point out each other’s mistakes. We cooperated with each other, mutually improved ourselves and successfully completed our tasks. What we have gained is as much as, if not more than, what we have invested in the task. Our joint effort was worthwhile.

(English translation mine)

### 4.2. Positive impact on language learning

Our second research question concerns how their text-based dialogues facilitated by the collaborative tasks impact their learning. To address this question, we analyzed scores on the two posttests developed based on the identified LREs.

As shown in Table 3, we tested on the language problems resulting from 151 LREs. We left out the other 65 LREs because they were either about careless errors or about the language use on the discourse level (e.g., deciding on the title of the text), which were beyond the scope of this study. We developed 164 test items for both immediate and delayed posttests based on the identified LREs. It should be noted here that the numbers of the test items in the two posttests (see Table 3) are different. This is because in the immediate posttest 14 test problems were correctly solved but not with LRE-related linguistic items. Thus, we counted these problems as invalid. As the table indicates, in the immediate posttest, from the 150 test items developed from the
Table 2
Summary of discourse moves identified in the LREs.

<table>
<thead>
<tr>
<th>Discourse move</th>
<th>Example</th>
<th>Discourse move</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initiation of LRE</strong></td>
<td></td>
<td><strong>Response to the initiation</strong></td>
<td></td>
</tr>
<tr>
<td>Inviting opinion</td>
<td>Yi: it should be “the sun has just risen” not rise, do you think so?</td>
<td>Expressing doubt</td>
<td>Wang: Are you sure</td>
</tr>
<tr>
<td></td>
<td>Song: I see thank you</td>
<td></td>
<td>Guo: I am not sure, but I will ask teacher for help</td>
</tr>
<tr>
<td>Requesting for assistance</td>
<td>Xin: er...I forget the past tense of “throw” suddenly do you know</td>
<td>Explaining through examples</td>
<td>An: …can you tell me what “advertisement” means</td>
</tr>
<tr>
<td></td>
<td>Ying: threw</td>
<td></td>
<td>Li: it is always showed on TV or newspaper letting people know the products</td>
</tr>
<tr>
<td></td>
<td>Xin: Oh! Yes! So clever you are!</td>
<td></td>
<td>Li: ad is short for advertisement</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>An: thank you.i know</td>
</tr>
<tr>
<td>Self correcting</td>
<td>Yi: I have an error. It should be “benefit”</td>
<td>Providing recast</td>
<td>Tan: and her hair is juande (Chinese)</td>
</tr>
<tr>
<td></td>
<td>Song: I think so</td>
<td></td>
<td>Zhang: yes her hair is curly</td>
</tr>
<tr>
<td>Seeking confirmation</td>
<td>Yi: add “and the responsibility made him very anxious.” Right?</td>
<td>Using paralanguage for emphasis</td>
<td>Zhang: oh, yes I FORGOT</td>
</tr>
<tr>
<td></td>
<td>Song: I think so</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suggesting improvement</td>
<td>Z: “wasn’t hurt” is better</td>
<td>Code switching</td>
<td>Zhang: in Chinese “某种程度”</td>
</tr>
<tr>
<td></td>
<td>T: yes, this is better</td>
<td></td>
<td>Tang: I understand this time</td>
</tr>
<tr>
<td>Other correcting</td>
<td>Shu: she said that he was worry about the koala getting sick</td>
<td>Using synonyms</td>
<td>Tang: assets?</td>
</tr>
<tr>
<td></td>
<td>Qian: not “worry” it should be “worried”</td>
<td></td>
<td>Zhang: means possessions</td>
</tr>
<tr>
<td></td>
<td>Shu: yeah, you are right</td>
<td></td>
<td>Zhang: money</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Zhang: and all he owned</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tang: oh, I know</td>
</tr>
<tr>
<td>Reminding</td>
<td>Yi: I am sorry, you have the same fault. It is “there”, not “in there”</td>
<td>Expressing disagreement</td>
<td>Guo: drag does not mean push we can only use drag like drag sb</td>
</tr>
<tr>
<td></td>
<td>Song: it is my fault, sorry</td>
<td></td>
<td>Wang: go to find it in a dictionary</td>
</tr>
<tr>
<td>Stating an opinion</td>
<td>Shu: i think the Verb should be Consistent</td>
<td>Warning</td>
<td>Guo: responsibility is n (noun) please remember next time</td>
</tr>
<tr>
<td>Providing an alternative</td>
<td>Qian: what about “lying on”?</td>
<td>Checking confirmation</td>
<td>Tang: dishevelled means if your room is not tidied, it would be...</td>
</tr>
<tr>
<td></td>
<td>Shu: it is fire! the woman cannot lie on it</td>
<td></td>
<td>Tang: Do you understand?</td>
</tr>
<tr>
<td></td>
<td>Qian: yes</td>
<td></td>
<td>Zhang: en.yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Zhang: you mean untidy</td>
</tr>
<tr>
<td>Requesting clarification</td>
<td>Bing: why do you use “poor”?</td>
<td>Proving</td>
<td>Wen: in my senior second education, I was taught</td>
</tr>
<tr>
<td></td>
<td>Ping: poor in my sentence means helpless and painful</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
LREs, learners got 110 correct, with the accuracy rate of 73.3%. The results of the delayed posttests were also confirmatory. 118 out of 164 test items were correctly answered with the accuracy rate of 71.9%. It is worth mentioning here that the test items based on the LREs leading to successful language resolutions had higher accuracy rates, which were 80.6% for immediate posttest and 77.7% for delayed posttest.

It is evident from the data that learners’ mutual engagement in collaborative dialogue and their meta-linguistic awareness resulting from the joint effort fostered their language development. This could also be proved by the learners’ comments. One student wrote as follows:

Excerpt 10: A learner’s comment

...I enjoyed the practice very much and have learned a lot from it. I can’t express how fulfilled I feel now! After completing the five tasks, I have gained some confidence. Now when I chat with my classmates, I find myself unconsciously speaking English. I feel a little proud of being able to do that because I feel that I can speak well...after this practice, I find that I still have much potential for improvement.

(English translation mine)

When asked about the best part of this learning process, eight learners (50%) mentioned completing the tasks in collaboration with their partners. Other learners’ answers include feeling fresh about this learning experience, finding a good way to improve oral English, experimenting with the newly acquired knowledge, noticing the “hole” in the inter-language and feeling empowered to make more effort.

In spite of the beneficial effects, the task-based learning process was not without its troubles and difficulties. Among the troubles mentioned by the learners are the unstable network condition, their limited proficiency to express the intended meaning and the inability to spell some words. To improve the situation, learners mentioned the provision of feedback from the teacher, easier access to the website and closer connection of the tasks with the outside world.

5. Discussion and implications

The results indicate that the computer-mediated language learning environment via Moodle facilitated learners’ text-based collaborative dialogue and enhanced their language learning. The text-based medium amplified learners’ mutual attention to linguistic form and fostered their collaborative construction of knowledge. There was a very high frequency of LREs during learners’ interactions. This demonstrates that in order to attain the task goals, the learners participating in this study made a collaborative effort to resolve the language problems encountered when proceeding with the collaborative tasks in the CMC context. This was also evidenced from the learners’ points of view. The responsibility and the ownership over the joint production required of the tasks encouraged them to maintain a supportive discourse and actively engage with each other’s contributions. In this collaborative learning process, they stated or invited opinions, asked for or received help, expressed agreement or disagreement, self-corrected or corrected each other, and modified initial utterances or explored alternatives. They mutually used the target language to reflect on the target language use (Swain, 2000), thereby developing a meta-linguistic awareness. The reciprocal nature of this type of interaction accessed to each other’s ZPDs and led to assisted performance. The positive results of the two tailor-made posttests have proved that this assisted performance consequently fostered their language learning.

<table>
<thead>
<tr>
<th>Type of LREs</th>
<th>Correct responses in immediate posttest</th>
<th>Correct responses in delayed posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All LREs</td>
<td>Successful LREs</td>
</tr>
<tr>
<td></td>
<td>N (T)</td>
<td>%</td>
</tr>
<tr>
<td>Lexis-based LREs</td>
<td>29 (36)</td>
<td>80.5</td>
</tr>
<tr>
<td>Form-based LREs</td>
<td>81 (114)</td>
<td>71.1</td>
</tr>
<tr>
<td>Total</td>
<td>110 (150)</td>
<td>73.3</td>
</tr>
</tbody>
</table>

Note: N = number of successfully resolved test items; T = total number of test items; % = percentage of total test items.
Thus, the study lends support to Swain et al.’s (2002) claim that collaborative dialogue is used “as a cognitive tool to process and manage meaning making; as a social tool to communicate with others” (p. 172).

Some communicative misunderstandings existed in their online exchanges; however, the learners’ interactions tended to focus more on the joint endeavor of problem solving and knowledge building. Most LREs emerged in the absence of communication breakdowns. In this sense, learners were not simply “information processors” (see Mayer, 1996) sending and receiving messages; rather they were “mutual scaffolders” (see Vygotsky, 1978) offering and receiving assistance for better joint productions in this socially situated context.

There are several pedagogical implications of the study. This research might provide useful insights for EFL teachers and those responsible for curriculum development. CMC is becoming an easily accessible learning environment, which is especially significant for learners in the EFL context, where learners have few opportunities to use the target language outside the class. Through the integration of CMC into course syllabi, EFL teachers can create a supportive learning environment, in which learners interact with each other for meaningful purposes beyond the confines of the classroom walls. It should be noted that there are some missed learning opportunities during learners’ interactions, especially in the unsuccessfully resolved LREs. This was mainly because some of the problems were beyond the learners’ capacity. As for those strongly motivated learners, they might turn to external resources or other people for help. However, for many other learners, the missed opportunities would never be regained without the teacher’s helpful intervention. Thus, the guiding role assumed by the teacher seems particularly crucial in the CMC context. As the learners’ online exchanges are permanently recorded in the course site and can be easily accessed, teachers should either encourage learners to reflect on their own online interactions or examine them on their own. In so doing, the unresolved problems can be zeroed in on and consequently resolved. Furthermore, the missed opportunities might result from learners’ unskilled use of interaction strategies. Teachers can teach learners some cooperative strategies to maximize their learning opportunities. In a study examining the effect of a cooperative small-group oral training program, Naughton (2006) discovered that certain strategies could be taught to facilitate learners’ creation and exploitation of learning opportunities. Cooperative strategy training may be applied to the CMC context to give rise to various learning opportunities in the collaborative dialogue for learners’ individual cognitive development. Finally, as for the choice of CMC tools, it is important to remember that it is not the CMC per se but the effective way of using CMC to achieve certain pedagogical goals that helps most (Kern, 2006).

6. Conclusion

Within the sociocultural theoretical framework, the study set out to examine EFL learners’ collaborative dialogue motivated by collaborative tasks and its effect on language learning in the computer-mediated learning environment. The results revealed that learners did mutually attend to each other’s language use, and that their mutual attention to language form enhanced their language development. It should be acknowledged that the research was conducted under some limitations. Most importantly, the unstable network and the busy schedule might have affected learners’ effective participation. Another limitation was its relatively small scale which has repercussions for its scope for generalization. To further examine the effect of the learners’ collaborative dialogue on their language learning, post-task individual writing might have been necessary. Future research should investigate the comparison across different pairs. The impact of proficiency differences on language learning in the CMC context will also be an interesting issue to explore.

Acknowledgements

The first author wants to thank Japanese Ministry of Education, Culture, Sports, Science and Technology for their financial support for the research. Both authors are grateful to Professor Toshihiko Yamaoka, Professor Kinune Hirano and Professor Tatsushiro Yoshida for their continued support and helpful and insightful comments. Our deep thanks also go to Editor Norman F. Davies and the reviewer for their valuable comments and suggestions for improvement.
References


Kitade, K., 2008. The role of offline metalanguage talk in asynchronous computer-mediated communication. Language Learning and Technology 12, 64–84.


Tanaka, N., 2005. Collaborative interaction as the process of task completion in task-based CALL classrooms. JALT CALL Journal 1, 21–40.


